38
8-2-93 JS(2)

ORNL/CON-368

**OAK RIDGE
NATIONAL
LABORATORY**

MARTIN MARIETTA

**Energy Efficiency and Renewable
Energy Program**

Bibliography

1993 Edition

K. H. Vaughan

**MANAGED BY
MARTIN MARIETTA ENERGY SYSTEMS, INC.
FOR THE UNITED STATES
DEPARTMENT OF ENERGY**

ORNL/CON-368

**ENERGY EFFICIENCY AND RENEWABLE
ENERGY PROGRAM**

BIBLIOGRAPHY

1993 Edition

Kathi H. Vaughan

Date Published—June 1993

Prepared by the
Oak Ridge National Laboratory
Oak Ridge, Tennessee 37831
managed by
MARTIN MARIETTA ENERGY SYSTEMS, INC.
for the
U.S. DEPARTMENT OF ENERGY
under contract DE-AC05-84OR21400

MASTER

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

Contents

	<u>Page</u>
Preface	v
Analysis and Evaluation	1
Building Equipment Research	11
Building Thermal Envelope Systems and Materials	21
District Heating	33
Residential and Commercial Conservation Program	35
Weatherization Assistance Program	37
Existing Buildings Research Program	39
Ceramic Technology Project	45
Alternative Fuels and Propulsion Technology	67
Microemulsion Fuels	75
Industrial Chemical Heat Pumps	77
Materials For Advanced Industrial Heat Exchangers	79
Advanced Industrial Materials	81
Tribology	89
Energy-Related Inventions Program	93
Electric Energy Systems	95
Superconducting Technology Program for Electric Energy Systems	105
Thermal Energy Storage	111
Biofuels Feedstock Development	115
Biotechnology	133
Continuous Chromatography In Multicomponent Separations	135
Sensors For Electrolytic Cells	137
Hydropower Environmental Mitigation	139
Environmental Control Technology	141
Continuous Fiber Ceramic Composite Technology	143

PREFACE

The *Bibliography* contains listings of publicly available reports, journal articles, and published conference papers sponsored by the DOE Office of Energy Efficiency and Renewable Energy and published between 1987 and mid-1993. Information on documents published prior to 1987 can be obtained from Kathi Vaughan at the address given below.

Most of the documents in the *Bibliography* are available from Oak Ridge National Laboratory. Single copies may be requested by contacting Kathi Vaughan. Items may also be purchased from the National Technical Information Service (address given below), or obtained directly from the publisher, libraries, or other information service.

Kathi H. Vaughan
Conservation and Renewable Energy Program
Oak Ridge National Laboratory
P. O. Box 2008
Oak Ridge TN 37831-6188
Facsimile 615/576-7572
Voice 615/574-5204

National Technical Information Service
U.S. Department of Commerce
5285 Port Royal Road
Springfield VA 22151

ANALYSIS AND EVALUATION

- 1 ***A Good Integrated Resource Plan: Guidelines for Electric Utilities and Regulators***
ORNL/CON-354 (December 1992)
E. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 2 ***Electric-Utility DSM Programs: 1990 Data and Forecasts to 2000***
ORNL-CON-347 (June 1992)
E. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 3 ***Effects of Utility DSM Programs on Risk***
ORNL/CON-346 (May 1992)
E. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 4 ***Transportation Energy Data Book: Edition 12***
ORNL-6710 (Edition 12 of ORNL-5198) (March 1992)
S. C. Davis. Oak Ridge National Laboratory, Oak Ridge, Tenn.
M. D. Morris. University of Tennessee, Knoxville, Tenn.
- 5 ***The Demand-Side Management Program Development Process—A Utility Perspective***
ORNL/CON-345 (March 1992)
A. K. Wolfe. Oak Ridge National Laboratory, Oak Ridge, Tenn.
N. E. Yourstone. Consultant to Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 6 ***From DSM Technologies to DSM Programs: Issues in Demand-Side Planning for Electric Utilities***
Energy 17(2), pp. 151–60 (February 1992)
L. J. Hill, E. Hirst, M. Schweitzer. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 7 ***Public Involvement in Integrated Resource Planning: A Study of Demand-Side Management Collaboratives***
ORNL/CON-344 (February 1992)
J. Raab. Consultant to Oak Ridge National Laboratory, Oak Ridge, Tenn.
M. Schweitzer. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 8 ***The Role of Evaluation When Electric Utilities Get Financial Incentives for Their DSM Programs***
Evaluation Review 16(1), pp. 93–107 (February 1992)
E. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 9 ***Making Energy Efficiency Happen***
pp. 205–21, *Technologies for a Greenhouse-Constrained Society*, ed. M. A. Kuliasha, A. Zucker, and K. J. Ballew (Chelsea, Mich.: Lewis Publishers, Inc., 1992)
E. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 10 ***Data and Analysis Needed to Prepare an Electric-Utility Integrated Resource Plan***
Proceedings of Clean Air Workshop, Columbus, Ohio, May 7–8, 1992 (National Regulatory Research Institute, 1992)
E. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 11 ***Definitions and Tradeoffs: Cost-Effectiveness of Utility DSM Programs***
Proceedings ACEEE 1992 Summer Study on Energy Efficiency in Buildings, pp. 8.89–8.97 (Washington, D.C.: American Council for an Energy-Efficient Economy, 1992)
E. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 12 Coming to Terms with DSM**
Proceedings ACEEE 1992 Summer Study on Energy Efficiency in Buildings, pp. 7.203–7.205 (Washington, D.C.: American Council for an Energy-Efficient Economy, 1992)
E. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
C. Sabo. Barakat and Chamberlin, Inc., Washington, D.C.
- 13 The Context and Organization of Demand-Side Management Collaboratives: An Overview**
Proceedings ACEEE 1992 Summer Study on Energy Efficiency in Buildings, pp. 8.141–8.149 (Washington, D.C.: American Council for an Energy-Efficient Economy, 1992)
M. Schweitzer. Oak Ridge National Laboratory, Oak Ridge, Tenn.
J. Raab. Raab Associates, Boston, Mass.
- 14 The Reliability of Residential Energy Conservation Resources**
Proceedings ACEEE 1992 Summer Study on Energy Efficiency in Buildings, pp. 7.267–7.275 (Washington, D.C.: American Council for an Energy-Efficient Economy, 1992)
M. A. Brown, D. L. White. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 15 Handbook of Evaluation of Utility DSM Programs**
ORNL/CON-336 (December 1991)
B. H. Bronfman. Bronfman & Associates, Portland, Ore.
G. L. Fitzpatrick. Applied Energy Group, Inc., Woodbury, N.Y.
E. G. Hicks. New England Power Service Company, Westborough, Mass.
E. Hirst, J. H. Reed. Oak Ridge National Laboratory, Oak Ridge, Tenn.
M. G. Hoffman, H. Michaels, A. Schon. XENERGY, Burlington, Mass.
K. Keating. Bonneville Power Administration, Portland, Ore.
S. Nadel. American Council for an Energy-Efficient Economy, Washington, D. C.
J. S. Peters. Barakat & Chamberlin, Inc., Portland, Ore.
W. Saxonis. New York State Energy Office, Albany, N.Y.
D. M. Violette. RCG/Hagler, Bailly, Inc., Boulder, Colo.
- 16 Comparison of Methods to Integrate DSM and Supply Resources in Electric-Utility Planning**
ORNL/CON-341 (December 1991)
L. J. Hill. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 17 The Effects of Utility DSM Programs on Electricity Costs and Prices**
ORNL/CON-340 (November 1991)
E. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 18 Electric-Utility DSM Programs: Terminology and Reporting Formats**
ORNL/CON-337 (October 1991)
E. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
C. Sabo. Barakat & Chamberlin, Inc., Washington, D. C.
- 19 Light-Duty Vehicle Summary: First Six Months of Model Year 1991**
ORNL-6672/S1 (August 1991)
P. S. Hu. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 20 Improving Energy Efficiency in the USA: The Federal Role**
Energy Policy, pp. 567–77 (July/August 1991)
E. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 21 Highway Vehicle MPG and Market Shares Report: Model Year 1992**
ORNL-6672 (April 1991)
L. S. Williams. University of Tennessee, Knoxville, Tenn.
P. S. Hu. Oak Ridge National Laboratory, Oak Ridge, Tenn.

-
- 22 *Diamond: A Model of Incremental Decision Making for Resource Acquisition by Electric Utilities***
ORNL/CON-315 (February 1991)
M. B. Gettings, E. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
E. Yourstone. Consultant to Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 23 *Demand-Side Management and Integrated Resource Planning: Findings From a Survey of 24 Electric Utilities***
ORNL/CON-314 (February 1991)
M. Schweitzer, E. Hirst, L. J. Hill. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 24 *Transportation Energy Data Book: Edition 11***
ORNL-6649 (Edition 11 of ORNL-5198) (January 1991)
S. C. Davis, P. S. Hu. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 25 *Integrating Demand-Side Management Programs Into the Resource Plans of U.S. Electric Utilities***
ORNL/CON-311 (January 1991)
L. J. Hill, E. Hirst, M. Schweitzer. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 26 *Possible Effects of Electric-Utility DSM Programs, 1990 to 2010***
ORNL/CON-312 (January 1991)
E. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 27 *Commercializing Government-Sponsored Computer Software Advances in the Implementation and Impact of Computer Systems*, ed. M. Fleisher and J. Morrell, pp. 263-75 (Greenwich, Conn.: JAI Press, 1991)**
R. K. Goel, M. A. Brown. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 28 *Evaluating Demand-Side Management Programs***
Electric Perspectives 14(6), pp. 24-30 (November/December 1990)
E. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 29 *Balancing the Scales: Data on Electricity Supply and Demand Resources***
ORNL/CON-306 (September 1990)
E. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 30 *Energy Efficiency in Nonprofit Agencies: Creating Effective Program Models***
ORNL/TM-11602 (August 1990)
M. A. Brown, D. L. White. Oak Ridge National Laboratory, Oak Ridge, Tenn.
B. Prindle. Alliance to Save Energy, Washington, D. C.
M. I. Scherr. United Way of America, Alexandria, Va.
- 31 *Electricity, Getting More With Less***
Technology Review 93(5), pp. 32-40 (July 1990)
E. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 32 *Closing The Efficiency Gap: Barriers to Improving Energy Efficiency Resources, Conservation and Recycling* 3, pp. 276-81 (June 1990)**
M. A. Brown, E. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 33 *Demand-Side Data Needs for Least-Cost Utility Planning***
Energy 15(5), pp. 403-12 (May 1990)
E. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
C. Goldman. Lawrence Berkeley Laboratory, Berkeley, Calif.

- 34 Balancing the Scales: Toward Parity in Electric Supply and Demand Data**
The Electricity Journal 3(4), pp. 28-33 (May 1990)
E. A. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 35 Key Issues in Electric Utility Integrated Resource Planning: Findings from a Nationwide Study**
ORNL/CON-300 (April 1990)
M. Schweitzer, E. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
E. Yourstone. Consultant to Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 36 Progress and Potential in Evaluating Energy-Efficiency Programs**
Evaluation Review 14(2), pp. 192-205 (April 1990)
E. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 37 The Market Penetration of Energy-Efficiency Programs**
ORNL/CON-299 (April 1990)
L. Berry. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 38 Light-Duty Vehicle MPG and Market Shares Report: Model Year 1989**
ORNL-6626 (April 1990)
L. S. Williams. University of Tennessee, Knoxville, Tenn.
P. S. Hu. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 39 Why The Federal Government Should Help Improve U.S. Energy Efficiency**
Ambio, A Journal of the Human Environment XIX(2), pp. 96-98 (April 1990)
E. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 40 Demonstrations as a Policy Instrument with Energy Technology Examples**
Knowledge: Creation, Diffusion, and Utilization 11(3): pp. 219-36 (March 1990)
S. M. Macey. Southwest Texas State University, San Marcos, Texas
M. A. Brown. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 41 Guidelines for a "Good" Integrated Resource Plan**
Public Utilities Fortnightly 125(7), pp. 18-24 (March 1990)
E. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 42 Assessing Integrated Resource Plans Prepared by Electric Utilities**
ORNL/CON-298 (February 1990)
E. Hirst, M. Schweitzer. Oak Ridge National Laboratory, Oak Ridge, Tenn.
E. Yourstone. Consultant to Oak Ridge National Laboratory, Oak Ridge, Tenn.
J. Eto. Lawrence Berkeley Laboratory, Berkeley, Calif.
- 43 Energy Efficiency: How Far Can We Go?**
ORNL/TM-11441 (January 1990)
R. S. Carlsmith. Oak Ridge National Laboratory, Oak Ridge, Tenn.
W. U. Chandler. Battelle-Pacific Northwest Laboratories, Washington, D.C.
J. E. McMahon. Lawrence Berkeley Laboratory, Berkeley, Calif.
D. J. Santini. Argonne National Laboratory, Argonne, Ill.

-
- 44 The Technology Transfer Process: Background for the U.S. National Energy Strategy**
PNL-SA-17482* (Richland, Wash.: Pacific Northwest Laboratory, January 1990)
D. E. Deonigi, N. L. Moore, S. A. Smith, R. L. Watts. Pacific Northwest Laboratory, Richland, Wash.
M. A. Brown. Oak Ridge National Laboratory, Oak Ridge, Tenn.
R. J. Noun. Solar Energy Research Institute, Golden, Colo.
- 45 Flexibility Benefits of Demand-Side Programs in Utility Planning**
The Energy Journal 11(1), pp. 151-65 (1990)
E. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 46 Technology-Transfer Strategies of DOE's Conservation Programs**
Journal of Technology Transfer 15(1), pp. 33-40 (1990)
M. A. Brown. Oak Ridge National Laboratory, Oak Ridge, Tenn.
C. H. Major. U.S. Department of Energy, Office of Conservation and Renewable Energy, Washington, D. C.
- 47 Electric-Utility Resource Planning and Decision Making: The Importance of Uncertainty**
Risk Analysis 10(1), pp. 137-46 (1990)
E. Hirst, M. Schweitzer. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 48 Data Requirements for Utility Integrated Resource Planning**
Energy Systems & Policy 12(4), pp. 219-31 (December 1989)
E. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 49 Conservation Programs Can Cut Load-Growth Uncertainty for Electric Utilities**
Technological Forecasting and Social Change 36(4), pp. 415-24 (December 1989)
E. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 50 The Administrative Costs of Energy Conservation Programs**
ORNL/CON-294 (November 1989)
L. Berry. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 51 Comparison of EIA Data Collections: Electricity Supply and Demand**
ORNL/M-998 (October 1989)
E. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 52 Federal Roles to Realize National Energy-Efficiency Opportunities in the 1990s**
ORNL/CON-290 (October 1989)
E. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 53 Comparing Building Energy Analysis Software**
Home Energy 6(5), pp. 13-18 (September/October 1989)
P. Weiss. Consultant to Oak Ridge National Laboratory, Oak Ridge, Tenn.
M. A. Brown. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 54 Transportation Energy Data Book: Edition 10**
ORNL-6565 (edition 10 of ORNL-5198) (September 1989)
S. C. Davis. University of Tennessee, Knoxville, Tenn.
D. B. Shonka. Shonka Research Associates, Inc., Marietta, Ga.
G. J. Anderson-Batiste, P. S. Hu. Oak Ridge National Laboratory, Oak Ridge, Tenn.

*Available from Pacific Northwest Laboratory, Post Office Box 999, Richland, Washington 99352.

- 55 Energy Use and Consumer Dissimilarity in Multifamily Residential Conservation**
Proceedings of the National Energy Program Evaluation Conference, Chicago, August 23-25, 1989, pp. 219-24 (Argonne, Ill.: Argonne National Laboratory, August 1989)
D. L. White. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 56 Recent Accomplishments of the U.S. Department of Energy's Least-Cost Utility Planning Program**
ORNL/CON-288 (August 1989)
L. Berry, E. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 57 Light-Duty Vehicle Summary: Model Year 1976 to the First Half of Model Year 1989**
ORNL/M-916 (August 1989)
L. S. Williams. University of Tennessee, Knoxville, Tenn.
P. S. Hu. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 58 Electric-Utility Energy-Efficiency and Load-Management Programs: Resources for the 1990s**
ORNL/CON-285 (June 1989)
E. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 59 Least-Cost Planning in the Utility Sector: Progress and Challenges. Volume 2: Technical Appendix**
LBL-27131* (June 1989)
C. Goldman, F. Krause, eds. Lawrence Berkeley Laboratory, Berkeley, Calif.
E. Hirst, ed. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 60 Least-Cost Planning in the Utility Sector: Progress and Challenges**
ORNL/CON-284 (May 1989)
C. Goldman, F. Krause, eds. Lawrence Berkeley Laboratory, Berkeley, Calif.
E. Hirst, ed. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 61 Light-Duty Vehicle MPG and Market Shares Report: Model Year 1988**
ORNL-6549 (April 1989)
P. S. Hu. Oak Ridge National Laboratory, Oak Ridge, Tenn.
L. S. Williams, D. J. Beal. University of Tennessee, Knoxville, Tenn.
- 62 Benefits and Costs of Small, Short-Lead-Time Power Plants and Demand-Side Programs in an Era of Load-Growth Uncertainty**
ORNL/CON-278 (March 1989)
E. A. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 63 Recent Publications of DOE's Office of Buildings and Community Systems**
ORNL/CON-276 (February 1989)
M. A. Brown. Oak Ridge National Laboratory, Oak Ridge, Tenn.
J. Hayes. Applied Management Sciences, Oak Ridge, Tenn.
- 64 Integrated Resource Planning at Electric Utilities: The Planning Process Evaluation and Program Planning 12**, pp. 213-23 (1989)
E. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.

*Available from the University of California, Lawrence Berkeley Laboratory, One Cyclotron Road, Berkeley, California 94720.

-
- 65 Technology Transfer Strategies of the U.S. Department of Energy's Conservation Program**
ORNL/CON-277 (December 1988)
M. A. Brown. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 66 Uncertainty in Long-Term Resource Planning for Electric Utilities**
ORNL/CON-272 (December 1988)
E. Hirst, M. Schweitzer. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 67 Gas Furnace Purchases: A Study of Consumer Decision Making and Conservation Investments**
ORNL/TM-10727 (October 1988)
R. A. Cantor, D. A. Trumble. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 68 Technical Accomplishments of DOE's Office of Transportation Systems**
ORNL/CON-267 (September 1988)
S. A. Snell. Hagler, Bailly & Co., Inc., Washington, D.C.
M. A. Brown, S. C. Davis. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 69 Effects of Energy-Efficiency Programs on Load-Growth Uncertainty for Electric Utilities**
ORNL/CON-260 (August 1988)
E. A. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 70 Light-Duty Vehicle MPG and Market Shares Report: First Six Months of Model Year 1988**
ORNL-6496 (August 1988)
P. S. Hu. Oak Ridge National Laboratory, Oak Ridge, Tenn.
L. S. Williams. University of Tennessee, Knoxville, Tenn.
- 71 Modeling Operating Weight and Axle Weight Distributions for Highway Vehicles**
ORNL-6437 (July 1988)
D. L. Greene. Oak Ridge National Laboratory, Oak Ridge, Tenn.
J.-C. Liang. Rensselaer Polytechnic Institute, Troy, N.Y.
- 72 Technology Transfer for DOE's Office of Transportation Systems: Assessment and Strategies**
ORNL/CON-244 (April 1988)
S. A. Snell. University of Tennessee, Knoxville, Tenn.
M. A. Brown. Oak Ridge National Laboratory, Oak Ridge, Tenn.
A. M. Zerega. U. S. Department of Energy, Washington, D. C.
- 73 Weatherizing Homes in Portland: An Evaluation of a Community-Based Partnership Residential Conservation Pilot Program**
ORNL/Sub/85-06613/1 (February 1988)
S. J. Morgan. Technical Development Corp., Boston, Mass.
- 74 Marginal-Cost-of-Service Analysis: A Powerful Marketing Tool for Electric Utilities**
ORNL/CON-251 (February 1988)
E. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 75 Developing an Integrated Planning Process: An Electric Utility Case Study**
ORNL/CON-247 (January 1988)
E. A. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
C. Knutsen. Puget Sound Power and Light Co., Bellevue, Wash.
- 76 Creating Viable Utility Conservation/Load Management Programs**
Energy 13(2), pp. 33-44 (January 1988)
E. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 77 Regulatory Responsibility for Utility Integrated Resource Planning**
ORNL/CON-249 (January 1988)
E. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 78 Key Issues for State Regulators on Electric-Utility Integrated Resource Planning**
Proceedings of the 27th Regulatory Conference, Iowa State University, Ames, May 1988, pp. 366-76 (1988)
E. A. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 79 Financing Energy Conservation: Innovative Approaches with Geographic Problems**
The Canadian Geographer 32(2), pp. 169-72 (1988)
M. A. Brown. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 80 Stimulating Energy Conservation by Sharing the Savings: A Community-Based Approach**
Environment and Planning A 20, pp. 517-34 (1988)
M. A. Brown, D. L. White. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 81 Occupant Evaluation of Commercial Office Lighting: Volume II, Preliminary Data Analysis**
ORNL/TM-10264/V2 (November 1987)
R. W. Marans. University of Michigan, Ann Arbor, Mich.
M. A. Brown. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 82 Hood River Conservation Project Load Analysis**
ORNL/CON-240 (November 1987)
T. K. Stovall. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 83 Impact of the Hood River Conservation Project on Electricity Use for Residential Water Heating**
ORNL/CON-238 (October 1987)
M. A. Brown, D. L. White, S. L. Purucker. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 84 An Analysis of the Impact of Residential Retrofits on Indoor Temperature Choice**
ORNL/CON-236 (October 1987)
T. M. Dinan. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 85 Use of Wood for Space Heating: Analysis of Hood River Conservation Project Submetered Homes**
ORNL/CON-234 (September 1987)
B. E. Tonn, D. L. White. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 86 Weatherization Assistance for Low-Income Households: An Evaluation of Local Program Performance**
ORNL-6337 (August 1987)
M. Schweitzer, S. Rayner, A. K. Wolfe. Oak Ridge National Laboratory, Oak Ridge, Tenn.
T. W. Mason. T. W. Mason Associates, P.C., Knoxville, Tenn.
B. R. Ragins. Marquette University, Milwaukee, Wis.
R. A. Cartor. University of Tennessee, Knoxville, Tenn.
- 87 Evaluation Design: Factors In the Organization of Evaluation as an Extension of the Theory of Evaluation Design**
Proceedings of the 1987 Conference on Energy Conservation Program Evaluation: Practical Methods, Useful Results 2, pp. 283-94 (August 1987)
H. G. Peach. Pacific Power and Light Co., Portland, Ore.
E. A. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 88 Occupant Evaluation of Commercial Office Lighting: Volume 3, Data Archive and Database Management System**
ORNL/TM-10264/V3, ed. M. A. Brown (August 1987)
G. Gillette. American Institute of Architects Foundation, Washington, D.C.
- 89 Expert Systems and Microwave Communication Systems Alarms Processing: A Feasibility Study**
ORNL/TM-10429 (July 1987)
B. E. Tonn, R. T. Goeltz, S. Purucker. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 90 Electric Utility Energy Conservation and Load Management Programs: Current Activities at Ten Utilities**
Electric Potential 3(3), pp. 20-32 (May-June 1987)
E. Hirst. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 91 Answering Behavioral Questions about Energy Efficiency in Buildings**
Energy 12(5), pp. 339-53 (May 1987)
P. C. Stern. National Research Council, Washington, D.C.
E. Aronson. University of California, Santa Cruz, Calif.
J. M. Darley, W. Kempton. Princeton University, Princeton, N.J.
D. H. Hill. University of Michigan, Ann Arbor, Mich.
E. Hirst, T. J. Wilbanks. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 92 Investigations of Variations in Monthly Market Shares of Light-Duty Vehicles**
ORNL/TM-10248 (May 1987)
P. S. Hu, R. Lee. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 93 Electricity Use and Savings in the Hood River Conservation Project**
ORNL/CON-231 (April 1987)
E. Hirst, R. Goeltz, D. Trumble. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 94 Transportation Energy Data Book: Edition 9**
ORNL-6325 (March 1987)
M. C. Holcomb, S. D. Floyd. Oak Ridge National Laboratory, Oak Ridge, Tenn.
S. L. Cagle. University of Tennessee, Knoxville, Tenn.
- 95 Impact Analysis of a Residential Energy Conservation Shared Savings Program: The General Public Utilities Experience**
ORNL/CON-217 (February 1987)
M. A. Brown, D. L. White. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 96** *Motor Vehicle MPG and Market Shares Report: Model Year 1986*
ORNL-6351 (February 1987)
P. S. Hu. Oak Ridge National Laboratory, Oak Ridge, Tenn.
L. S. Buckels. University of Tennessee, Knoxville, Tenn.
- 97** *A Comparative Analysis of Utility- and Non-Utility-Based Energy Service Companies: A Case Study Approach*
ORNL/Sub/84-19701/1 (January 1987)
Consumer Energy Council of America Research Foundation. Washington, D.C.
- 98** *Inventory of Energy Research in Schools of Architecture 1972-1985*
ORNL/Sub/84-89680/1 (January 1987)
D. Prowler, E. Johnson-Mohler, M. Asetline. University of Pennsylvania, Philadelphia, Pa.
- 99** *The Diffusion of Ideas and Innovations*
International Encyclopedia of Communications, ed. E. Barnouw (New York: Oxford University Press, 1987)
M. A. Brown. Oak Ridge National Laboratory, Oak Ridge, Tenn.

BUILDING EQUIPMENT RESEARCH

- 100 Report Style Guide for Subcontractors of the Efficiency and Renewables Research Section, Energy Division, Oak Ridge National Laboratory**
ORNL/TM-12082 (September 1992)
T. A. Stone, M. N. Bennett. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 101 An Assessment of Desiccant Cooling and Dehumidification Technology**
ORNL/CON-309 (July 1992)
V. C. Mei, F. C. Chen. Oak Ridge National Laboratory, Oak Ridge, Tenn.
Z. Lavan. Illinois Institute of Technology, Chicago, Ill.
R. K. Collier, Jr. Collier Engineering Services, Merritt Island, Fla.
G. Meckler. Gershon Meckler Associates, P.C., Herndon, Va.
- 102 Global Warming Implication of Replacing CFCs: Combining Energy and Fluorocarbon Emission Effects**
ASHRAE Journal 34(4), pp. 14-19 (April 1992)
S. K. Fischer, P. D. Fairchild, P. J. Hughes. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 103 Development and Proof-Testing of Advanced Absorption Refrigeration Cycle Concepts. Report on Phases I and IA**
ORNL/Sub/86-17498/1 (March 1992)
R. J. Modahl, F. C. Hayes. The Trane Company, La Crosse, Wisc.
- 104 Alternatives to CFCs and Global Warming: A Systems Approach to Evaluating Net Contributions**
Materials Research Society Bulletin XVII(3), pp. 39-42 (March 1992)
S. K. Fischer. Oak Ridge National Laboratory, Oak Ridge, Tenn.
M. McFarland. E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.
- 105 Modeled Performance of Non-Chlorinated Substitutes for CFC-11 and CFC-12 Centrifugal Chillers**
ORNL/M-2391 (1992)
J. R. Sand, S. K. Fischer. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 106 Market Potential Estimates and R&D Planning for Advanced Absorption Systems for Large Commercial Buildings**
ASHRAE Transactions 98(2), pp. 156-64 (Atlanta, Ga.: American Society of Heating, Refrigerating, and Air-conditioning Engineers, 1992)
J. M. MacDonald, P. J. Hughes, H. A. McLain. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 107 Flow Boiling Enhancement of R22 and a Nonazeotropic Mixture of R143a and R124 Using Perforated Folds**
ASHRAE Transactions 98(2), pp. 402-10 (Atlanta, Ga.: American Society of Heating, Refrigerating, and Air-conditioning Engineers, 1992)
J. C. Conklin, E. A. Vineyard. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 108 An Analytical Screening of Alternatives for R-502 in Low-Temperature Refrigerating Applications**
ASHRAE Transactions 98(2), pp. 188-203 (Atlanta, Ga.: American Society of Heating, Refrigerating, and Air-conditioning Engineers, 1992)
S. K. Fischer. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 109 Benchmark Performance Analysis of an ECM-Modulated Air-to-Air Heat Pump with a Reciprocating Compressor**
ASHRAE Transactions 98(1), pp. 430–50 (Atlanta, Ga.: American Society of Heating, Refrigerating, and Air-conditioning Engineers, 1992)
C. K. Rice. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 110 Modeled Performance of Non-Chlorinated Substitutes for CFC-11 and CFC-12 in Centrifugal Chillers**
Proceedings of the 1991 International CFC and Halon Alternatives Conference, Baltimore, Md., December 3–12, 1991 (Baltimore, Md.: December 1991)
J. R. Sand, S. K. Fischer. Oak Ridge National Laboratory, Oak Ridge, Tenn.
P. A. Joyner. Electric Power Research Institute, Palo Alto, Calif.
- 111 Total Equivalent Global Warming Impact: Combining Energy and Fluorocarbon Emission Effects**
Proceedings of the 1991 International CFC and Halon Alternatives Conference, Baltimore, Md., December 3–12, 1991, pp. 790–800 (Baltimore, Md.: December 1991)
P. D. Fairchild, S. K. Fischer, P. J. Hughes. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 112 Absorption Chillers: Part of the Solution**
Proceedings of the 1991 International CFC and Halon Alternatives Conference, Baltimore, Md., December 3–12, 1991, pp. 364–74 (Baltimore, Md.: December 1991)
P. J. Hughes. Oak Ridge National Laboratory, Oak Ridge, Tenn.
A. J. Occhionero. American Gas Cooling Center, Arlington, Va.
E. A. Reid. Columbia Gas Distribution Company, Columbus, Ohio
- 113 Analysis of Non-CFC Automotive Air Conditioning**
Proceedings of the 1991 International CFC and Halon Alternatives Conference, Baltimore, Md., December 3–12, 1991 (Baltimore, Md.: December 1991)
V. C. Mei, F. C. Chen. Oak Ridge National Laboratory, Oak Ridge, Tenn.
R. Sullivan. Office of Conservation and Renewable Energy, U.S. Department of Energy, Washington, D. C.
- 114 Overview of CFC Replacement Issues for Household Refrigeration**
Proceedings of the 1991 International CFC and Halon Alternatives Conference, Baltimore, Md., December 3–12, 1991, pp. 310–16 (Baltimore, Md.: December 1991)
E. A. Vineyard. Oak Ridge National Laboratory, Oak Ridge, Tenn.
L. Roke. Fisher & Paykel, Greenmount, Auckland, New Zealand
F. Hallett. Frigidaire, Washington, D. C.
- 115 Computer Model for Simulation of Absorption Systems in Flexible and Modular Form**
ORNL/Sub/90-89673 (August 1991)
G. Grossman, K. Gomme, D. Gadoth. Technion Israel Institute of Technology, Haifa, Israel
- 116 Estimated Size and Performance of a Natural Gas Fired Duplex Stirling for Domestic Refrigeration Applications**
Proceedings of the XVIII International Congress of Refrigeration, Montreal, Canada, August 10–15, 1991 (Paris: International Institute of Refrigeration, 1991)
D. M. Berchowitz. Sunpower, Inc., Athens, Ohio
J. A. Shonder. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 117 Heat Exchanger Thermal Performance for Two Nonazeotropic Refrigerant Mixtures**
Proceedings of the XVIII International Congress of Refrigeration, Montreal, Canada, August 10–15, 1991 (Paris: International Institute of Refrigeration, 1991)
J. C. Conklin, E. A. Vineyard. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 118 Advantages of Enthalpy-Temperature Diagrams for Nonazeotropic Refrigerant Mixtures**
Proceedings of the XVIII International Congress of Refrigeration, Montreal, Canada, August 10–15, 1991 (Paris: International Institute of Refrigeration, 1991)
J. C. Conklin, J. R. Sand. Oak Ridge National Laboratory, Oak Ridge, Tenn.
E. Granryd. Royal Institute of Technology, Stockholm, Sweden
- 119 Cycle Performance Comparison Between A Nonazeotropic Refrigerant Mixture and R-22**
Proceedings of the XVIII International Congress of Refrigeration, Montreal, Canada, August 10–15, 1991 (Paris: International Institute of Refrigeration, 1991)
E. A. Vineyard, J. C. Conklin. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 120 Tubeside Condensation of Nonazeotropic Refrigerant Mixtures for Two Enhanced Surfaces**
Proceedings of the ASME/JSME Thermal Engineering Joint Conference 3, pp. 251–56 (New York: American Society of Mechanical Engineers, March 1991)
J. C. Conklin, E. A. Vineyard. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 121 Heat Transfer of Burled Pipe for Heat Pump Application**
ASME Journal of Solar Energy Engineering 113, pp. 51–55 (February 1991)
V. C. Mei. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 122 Braun Heat Pump Engine/Compressor and Its Hermetic Rod Seal**
Proceedings of the 26th Intersociety Energy Conversion Engineering Workshop, Boston, Massachusetts, August 1991 91-2, p. 510 (LaGrange Park, Ill.: American Nuclear Society, Inc., August 1991)
A. T. Braun, M. S. Alam. Tectonics Research, Inc., Minneapolis, Minn.
R. J. Fiskum. Office of Conservation and Renewable Energy, U.S. Department of Energy, Washington, D. C.
- 123 Options of Desiccant Cooling and Dehumidification Technology**
Proceedings of the 26th Intersociety Energy Conversion Engineering Workshop, Boston, Massachusetts, August 1991 91-2, p. 566 (LaGrange Park, Ill.: American Nuclear Society, Inc., August 1991)
E. Kweller. Office of Conservation and Renewable Energy, U.S. Department of Energy, Washington, D. C.
V. C. Mei, F. C. Chen. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 124 Residential Absorption Heat Pump Using a Generator-Absorber Heat Exchange Cycle**
Proceedings of the 26th Intersociety Energy Conversion Engineering Workshop, Boston, Massachusetts, August 1991 91-2, p. 498 (LaGrange Park, Ill.: American Nuclear Society, Inc., August 1991)
B. A. Phillips. Phillips Engineering Company, St. Joseph, Mich.
R. C. DeVault. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 125 Natural Gas Fueled Combustor for a 3 kW Output Stirling Engine**
Proceedings of the 26th Intersociety Energy Conversion Engineering Workshop, Boston, Massachusetts, August 1991 91-2, p. 566 (LaGrange Park, Ill.: American Nuclear Society, Inc., August 1991)
W. D. Waldron, G. T. Riecke. Mechanical Technology, Inc., Latham, N.Y.
- 126 Experimental Study of the Effects of Alcohol Additives in Lithium Bromide Water Pool Absorbers**
ASHRAE Transactions 97(2), pp. 403–405 (Atlanta: American Society of Heating, Refrigerating, and Air-conditioning Engineers, 1991)
Y. Elkassabgi. Texas A&I University, Kingsville, Texas
H. Perez-Blanco. Pennsylvania State University, University Park, Penn.
- 127 The Alternative Refrigerant Dilemma for Refrigerator-Freezers: Truth or Consequences**
ASHRAE Transactions 97(2), pp. 955–60 (Atlanta: American Society of Heating, Refrigerating, and Air-conditioning Engineers, 1991)
E. A. Vineyard. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 128 Thermal Performance Analysis for Heat Exchangers Using Nonazeotropic Refrigerant Mixtures**
Proceedings Winter Meeting ASME, Dallas, Texas, November 25–30, 1990, Symposium on Heat Transfer in Advanced Energy Systems AES 18/HTD 151, pp. 25–32 (New York: American Society of Mechanical Engineers, November 1990)
E. Granryd. Royal Institute of Technology, Stockholm, Sweden
J. C. Conklin. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 129 Development of a High-Efficiency, Gas-Fired, Absorption Heat Pump for Residential and Small-Commercial Applications. Phase I Final Report. Analysis of Advanced Cycles and Selection of the Preferred Cycle**
ORNL/Sub/86-24610/1 (September 1990)
B. A. Phillips. Phillips Engineering Co., St. Joseph, Mich.
- 130 Performance Testing of a Commercially Produced Cryogenic Refrigerator**
ORNL/TM-10809 (September 1990)
E. G. Keshock. University of Tennessee, Knoxville, Tenn.
R. W. Murphy. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 131 Initial Parametric Results Using CYCLEZ—An LMTD-Specified, Lorenz-Meutzner Cycle Refrigerator-Freezer Model**
ASHRAE/Purdue CFC Conference Proceedings, pp. 448–58 (West Lafayette, Ind.: Purdue University, July 1990)
C. K. Rice, J. R. Sand. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 132 Thermodynamic Calculations for Mixtures of Environmentally Safe Refrigerants Using the Lee-Kesler-Plöcker Equation of State**
ASHRAE/Purdue CFC Conference Proceedings, pp. 373–82 (West Lafayette, Ind.: Purdue University, July 1990)
S. K. Fischer, J. R. Sand. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 133 Energy Use Impact of CFC Alternatives**
Proceedings of the Fifth Cogeneration and Independent Power Congress, 1990 HVAC & Controls Symposium & Expo Section (Boston, Mass.: Association of Energy Engineers, June 1990)
S. K. Fischer. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 134 Development of Design Guidelines for Direct Expansion Ground Coil Heat Exchangers for Ground Coupled Heat Pump Systems**
EPRI CU-6828 (Palo Alto, Calif.: Electric Power Research Institute, May 1990)
V. C. Mei, V. D. Baxter. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 135 An Experimental Evaluation of Two Nonazeotropic Refrigerant Mixtures in a Water-to-Water, Breadboard Heat Pump**
ORNL/M-1117 (April 1990)
M. Kauffield, W. Mulroy, M. McLinden, D. Didion. National Institute of Standards and Technology, Gaithersburg, Md.
- 136 Triple Effect Absorption Chiller Cycle: A Step Beyond Double-Effect Cycles**
Proceedings of the IEA Annex XVI Workshop on High Performance Heat Pumps, Susono City, Japan, Report No. HPB-WR-6, pp. II-27-40 (March 1990)
R. C. DeVault. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 137 A Menu-Driven Program for Determining Properties of Aqueous Lithium Bromide Solutions**
ORNL/TM-11331 (January 1990)
M. R. Patterson, H. Perez-Blanco. Oak Ridge National Laboratory, Oak Ridge, Tenn.
R. N. Crosswhite. Oak Ridge Associated Universities, Oak Ridge, Tenn.
- 138 A Magnetically Coupled Stirling Engine Driven Heat Pump: Design Optimization and Operating Cost Analysis**
Proceedings of the 25th Intersociety Energy Conversion Engineering Conference, 2, pp. 204-10 (New York: American Institute of Chemical Engineers, 1990)
R. J. Vincent, W. Waldron. Mechanical Technology, Inc., Latham, N.Y.
- 139 Study of Asymmetric Supersonic Jet Flow for Ejectors**
Thermo-Physical Aspects of Energy Conversion, AES 16, pp. 55-66 (New York: American Society of Mechanical Engineers, 1990)
C. M. Ho. University of Southern California, Los Angeles, Calif.
G. S. Knoke. BDM Inc., Seattle, Wash.
E. W. Geller, H. T. Liu. Flow Research, Inc., Kent, Wash.
W. H. Jou. Flow Research, Inc., Seattle, Wash.
R. W. Murphy, F. C. Chen. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 140 Hardware Development and Initial Subassembly Test of a Gas-Fired Stirling-Rankine Residential Heat Pump**
Proceedings of the 25th Intersociety Energy Conversion Engineering Conference, 5, pp. 258-63 (New York: American Institute of Chemical Engineers, 1990)
G. Chen, J. McEntee. Sunpower, Inc., Athens, Ohio
- 141 Advanced Absorption Technology Development in the United States Heat Pumps Solving Energy and Environmental Challenges. Proceedings IEA Heat Pump Conference, Tokyo, Japan, March 12-15, 1990, pp. 69-80 (Pergamon Press, 1990)**
R. C. DeVault. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 142 Performances of Four Magnetic Heat Pump Cycles**
Thermo-Physical Aspects of Energy Conversion, AES 16, pp. 103-15 (New York: American Society of Mechanical Engineers, 1990)
F. C. Chen, R. W. Murphy, V. C. Mei. Oak Ridge National Laboratory, Oak Ridge, Tenn.
G. L. Chen. Sunpower, Inc., Athens, Ohio

- 143 Energy Technology R&D and the Greenhouse Effect**
Heat Pumps Solving Energy and Environmental Challenges. Proceedings of the IEA Heat Pump Conference, Tokyo, Japan, March 12-15, 1990, pp. 231-41 (Pergamon Press, 1990)
P. D. Fairchild, W. Fulkerson. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 144 Absorption Fluids Data Survey. 1989 Update**
ORNL/Sub/84-47989/4 (October 1989)
R. A. Macriss, T. S. Zawacki. Institute of Gas Technology, Chicago, Ill.
- 145 Free-Piston Stirling Engine Magnetically Coupled Heat Pump: Critical Component Evaluation. Phase I Final Report**
ORNL/Sub/86-SA578/1 (August 1989)
G. Chen. Sunpower, Inc., Athens, Ohio
- 146 Laboratory Study of the Dynamic Losses of a Single Speed, Split System Air-to-Air Heat Pump Having Tube and Plate Fin Heat Exchangers**
ORNL/CON-253 (August 1989)
W. A. Miller. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 147 Selection of Ozone-Free, Nonazeotropic Refrigerant Mixtures for Capacity Modulation in Residential Heat Pumps**
ASHRAE Transactions 95(1), pp. 34-46 (Atlanta: American Society of Heating, Refrigerating, and Air-Conditioning Engineers, June 1989)
E. A. Vineyard, J. R. Sand. Oak Ridge National Laboratory, Oak Ridge, Tenn.
T. G. Statt. Department of Energy, Washington, D.C.
- 148 Refrigerator-Freezer Energy Testing with Alternative Refrigerants**
CFCs: Time of Transition, pp. 205-10 (Atlanta: American Society of Heating, Refrigerating, and Air-Conditioning Engineers, June 1989)
E. A. Vineyard, J. R. Sand, W. A. Miller. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 149 Energy-Use Impact of Chlorofluorocarbon Alternatives**
ORNL/CON-273 (February 1989)
S. K. Fischer, F. A. Creswick. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 150 Dynamic Characteristics Concerned in the Design of a Free-Piston Stirling Engine/Magnetic Coupling/Compressor**
Proceedings of the 24th Intersociety Energy Conversion Engineering Conference, Washington, D.C., August 1989 5, pp. 2219-23 (1989)
G. Chen. Sunpower, Inc., Athens, Ohio
- 151 System Design and Performance Prediction of a Free-Piston Stirling Engine/Magnetic Coupling/Compressor Assembly in a Gas Residential Heat Pump**
Advances in Heat Pumps 1989, AES 7/HTD 125, pp. 81-86 (New York: American Society of Mechanical Engineers, 1989)
G. Chen, W. T. Beale. Sunpower, Inc., Athens, Ohio
- 152 Magnetically Linked Free-Piston Stirling-Refrigerant Compressor Heat Pump**
Analysis and Applications of Heat Pumps, AES 8/SED 6, pp. 57-60 (New York: American Society of Mechanical Engineers, 1989)
G. Chen, W. T. Beale. Sunpower, Inc., Athens, Ohio

-
- 153 Heat Transfer of Buried Pipe for Heat Pump Application**
Advances in Heat Pumps-1989 AES 7/HTD 125, pp. 23-29 (New York: American Society of Mechanical Engineers, 1989)
V. C. Mei. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 154 Motor Current Signature Analysis A Potential Diagnostic for Air Conditioners**
ASHRAE Transactions 95(1), pp. 312-17 (Atlanta: American Society of Heating, Refrigerating, and Air-Conditioning Engineers, 1989)
W. A. Miller, H. D. Haynes, F. P. Griffin, W. P. Levins, M. A. Karnitz. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 155 Comparison of Thermoelectric and Vapor Cycle Technologies for Groundwater Heat Pump Application**
ASME Journal of Solar Energy Engineering 111, pp. 353-57 (1989)
V. C. Mei, F. C. Chen. Oak Ridge National Laboratory, Oak Ridge, Tenn.
B. Mathiprakasam. Midwest Research Institute, Kansas City, Mo.
- 156 Advanced Evacuated Thermal Insulations: The State of the Art**
Thermal Insulation 12, pp. 183-208 (1989)
H. A. Fine. University of Kentucky, Lexington, Ky.
- 157 Research and Development on Heat Pumps for Space Conditioning Applications. Proceedings of the 2nd DOE/ORNL Heat Pump Conference, Washington, D.C., April 17-20, 1988**
CONF-8804100 (August 1988)
E. T. Rogers, ed. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 158 Potential Impacts of CFC Restrictions on Refrigeration and Space-Conditioning Equipment**
International Journal of Refrigeration 11, pp. 217-21 (July 1988)
F. A. Creswick, S. K. Fischer, J. R. Sand. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 159 The Oak Ridge Heat Pump Design Model: Mark III Version Program Documentation**
ORNL/TM-10192 (March 1988)
S. K. Fischer, C. K. Rice, W. L. Jackson. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 160 Absorption Fluids Data Survey: Final Report on Worldwide Data**
ORNL/Sub/84-47989/3 (February 1988)
R. A. Macriss, J. M. Gutraj, T. S. Zawacki. Institute of Gas Technology, Chicago, Ill.
- 161 Free-Piston Stirling Engine Diaphragm-Coupled Heat-Actuated Heat Pump Component Technology Program. Volume 2, Phase IIA and IIB Final Report, Lennox Test Program**
ORNL/Sub/86-47985/2&V2 (January 1988)
R. A. Ackermann. Mechanical Technology, Inc., Latham, N.Y.
- 162 Free-Piston Stirling Engine Diaphragm-Coupled Heat-Actuated Heat Pump Component Technology Program. Volume 1, Phase IIA and IIB Final Report, Technical Discussion**
ORNL/Sub/86-47985/2&V1 (January 1988)
R. A. Ackermann. Mechanical Technology, Inc., Latham, N.Y.

- 163 Field Performance Validation of an Advanced Design Earth-Coupled Heat Pump System**
ORNL/Sub/85-22035/1 (January 1988)
P. J. Hughes, R. J. Hackner. W. S. Fleming & Associates, Inc., East Syracuse, N.Y.
- 164 Experimental Study of Short-Tube Refrigerant Flow Analysis and Applications of Heat Pumps. Proceedings of the ASME Winter Annual Meeting, Chicago, November 27–December 2, 1988, AES 8, pp. 37–42 (New York: American Society of Mechanical Engineers, 1988)**
V. C. Mei. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 165 Implications of CFC Ban on National Energy Use**
ASHRAE Journal 30, pp. 30–34 (1988)
S. K. Fischer, F. A. Creswick. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 166 Testing of a Stirling Cycle Cooler**
Analysis and Applications of Heat Pumps. Proceedings of the ASME Winter Annual Meeting, Chicago, November 27–December 2, 1988, AES 8, pp. 49–55 (New York: American Society of Mechanical Engineers, 1988)
F. C. Chen, R. W. Murphy. Oak Ridge National Laboratory, Oak Ridge, Tenn.
E. G. Keshock. University of Tennessee, Knoxville, Tenn.
- 167 Numerical Flts of the Properties of Lithium-Bromide Water Solutions**
ASHRAE Transactions 94(2), pp. 2059–77 (Atlanta: American Society of Heating, Refrigerating, and Air-Conditioning Engineers, 1988)
H. Perez-Blanco, M. R. Patterson. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 168 Laboratory Examination and Seasonal Analysis of the Dynamic Losses for a Continuously Variable Speed Heat Pump**
ASHRAE Transactions 94(2), pp. 1246–68 (Atlanta: American Society of Heating, Refrigerating, and Air-Conditioning Engineers, 1988)
W. A. Miller. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 169 Two-Phase Refrigerant Flow Measurement with Liquid and Vapor Separation Technique**
ASHRAE Transactions 94(2), pp. 238–43 (Atlanta: American Society of Heating, Refrigerating, and Air-Conditioning Engineers, 1988)
V. C. Mei. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 170 A Model of an Ammonia-Water Falling Film Absorber**
ASHRAE Transactions 94(1), pp. 467–83 (Atlanta: American Society of Heating, Refrigerating, and Air-Conditioning Engineers, 1988)
H. Perez-Blanco. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 171 Evaluation of Capacity Modulation Using Nonazeotropic Refrigerant Mixtures**
ASHRAE Transactions 94(1), pp. 292–303 (Atlanta: American Society of Heating, Refrigerating, and Air-Conditioning Engineers, 1988)
E. A. Vineyard. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 172 Modulating Heat Pump Component and Adjustable Speed Drive Efficiencies Measured in the Laboratory**
ASHRAE Transactions 94(1), pp. 874–91 (Atlanta: American Society of Heating, Refrigerating, and Air-Conditioning Engineers, 1988)
W. A. Miller. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 173 Efficiency Characteristics of Speed Modulated Drives at Predicted Torque Conditions for Air-to-Air Heat Pumps**
ASHRAE Transactions 94(1), pp. 892-921 (Atlanta: American Society of Heating, Refrigerating, and Air-Conditioning Engineers, 1988)
C. K. Rice. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 174 Heat Pump Ground Coil Analysis with Thermal Interference**
ASME Journal of Solar Energy Engineering 110, pp. 67-73 (1988)
V. C. Mei. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 175 Measurements of Heat-Transfer Coefficients of Nonazeotropic Refrigerant Mixtures Condensing Inside Horizontal Tubes**
ORNL/Sub/81-7762/6&01 (November 1987)
D. DeGrush, W. F. Stoecker. University of Illinois Urbana-Champaign, Urbana, Ill.
- 176 Free-Piston Stirling Engine Diaphragm-Coupled Heat-Actuated Heat Pump Component Technology Program. Phase 1B Final Report**
ORNL/Sub-83/47985/1 (September 1987)
R. A. Ackermann. Mechanical Technology, Inc., Latham, N.Y.
- 177 Free-Piston Stirling Engine Diaphragm-Coupled Heat-Actuated Heat Pump Component Technology Program. Phase 1C Final Report**
ORNL/Sub-86/47985/1 (July 1987)
R. A. Ackermann. Mechanical Technology, Inc., Latham, N.Y.
- 178 U.S. Heat Pump Research and Development Projects 1976-1986**
ORNL/CON-224 (April 1987)
K. H. Zimmerman. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 179 Absorption Fluids Data Survey: Final Report on Foreign Data**
ORNL/Sub/84-47989/2 (April 1987)
R. A. Macriss, J. M. Gutraj, T. S. Zawacki. Institute of Gas Technology, Chicago, Ill.
- 180 Final Report: 1984-85 Annual Performance Testing and Analysis of Two Horizontal Coil Ground-Coupled Heat Pump Systems**
ORNL/Sub/81-7685/4&92 (April 1987)
W. S. Johnson, B. A. McGraw, R. N. Baugh, W. Griffith. University of Tennessee, Knoxville, Tenn.
- 181 Impact of Refrigerant Property Uncertainties on Prediction of Vapor Compression Cycle Performance**
NBSIR 86-3373 (February 1987)
P. A. Domanski, D. A. Didion. National Bureau of Standards, Gaithersburg, Md.
- 182 A Comparison of Cylinder Heat Transfer Expressions Based on Prediction of Gas Spring Hysteresis Loss**
Fluid Flow and Heat Transfer in Reciprocating Machinery. Proceedings of the ASME Winter Annual Meeting, Boston, Mass., December 13-18, 1987, ed. T. Morel et al., pp. 89-96 (New York: American Society of Mechanical Engineers, 1987)
A. A. Kornhauser, J. L. Smith, Jr. Massachusetts Institute of Technology, Cambridge, Mass.

- 183 Estimated Fuel Savings for Heat Pump Systems That Combine Ejectors and Engine-Driven Compressors**
Fluid Flow and Heat Transfer in Reciprocating Machinery. Proceedings of the ASME Winter Annual Meeting, Boston, Mass., December 13-18, 1987, ed. T. Morel et al., paper no. 87-WA/AES-4 (New York: American Society of Mechanical Engineers, 1987)
R. W. Murphy. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 184 Comparison of a Thermoelectric Cooling System and a Groundwater Heat Pump**
Fluid Flow and Heat Transfer in Reciprocating Machinery. Proceedings of the ASME Winter Annual Meeting, Boston, Mass., December 13-18, 1987, ed. T. Morel et al., paper no. 87-WA/AES-3 (New York: American Society of Mechanical Engineers, 1987)
V. C. Mei, F. C. Chen. Oak Ridge National Laboratory, Oak Ridge, Tenn.
B. Mathiprakasam. Midwest Research Institute, Kansas City, Mo.
- 185 Further Developments in the Design of a Free-Piston Stirling Engine Heat Pump for Residential Applications**
ASHRAE Transactions 93(2), pp. 160-71 (Atlanta: American Society of Heating, Refrigerating, and Air-Conditioning Engineers, 1987)
R. A. Ackermann. Mechanical Technology, Inc., Albany, N.Y.
J. M. Clinch. Gas Research Institute, Chicago, Ill.
G. T. Privon. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 186 Effect of Backfilling Material on Ground Coil Performance**
ASHRAE Transactions 93(2), pp. 1845-57 (Atlanta: American Society of Heating, Refrigerating, and Air-Conditioning Engineers, 1987)
V. C. Mei. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 187 Steady-State Refrigerant Flow and Airflow Control Experiments for a Continuously Variable Speed Air-to-Air Heat Pump**
ASHRAE Transactions 93(2), pp. 1191-1204 (Atlanta: American Society of Heating, Refrigerating, and Air-Conditioning Engineers, 1987)
W. A. Miller. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 188 Effects of Fin Pattern on the Air-Side Heat Transfer Coefficient in Plate Finned-Tube Heat Exchangers**
ASHRAE Transactions 93(2), pp. 1961-84 (Atlanta: American Society of Heating, Refrigerating, and Air-Conditioning Engineers, 1987)
D. T. Beecher, T. J. Fagan. Westinghouse Electric Corp., Pittsburgh, Pa.
- 189 Research Requirements in the Evaporative Cooling Field**
ASHRAE Transactions 93(1), pp. 185-96 (Atlanta: American Society of Heating, Refrigerating, and Air-Conditioning Engineers, 1987)
R. H. Turner. University of Nevada, Reno, Nev.
F. C. Chen. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 190 The Effect of Void Fraction Correlation and Heat Flux Assumption on Refrigerant Charge Inventory Predictions**
ASHRAE Transactions 93(1), pp. 341-67 (Atlanta: American Society of Heating, Refrigerating, and Air-Conditioning Engineers, 1987)
C. K. Rice. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 191 Heat Pumps. Prospects in Heat Pump Technology & Marketing**
Chelsea, Michigan: Lewis Publishers, Inc., 1987
K. H. Zimmerman, R. H. Powell, Jr., eds. Oak Ridge National Laboratory, Oak Ridge, Tenn.

BUILDING THERMAL ENVELOPE SYSTEMS AND MATERIALS

- 192** *The Simulated Impact of Climate on the Drying Times of a Wetted Low-Slope Roof System*
J. Thermal Insul. and Bldg. Envs. 16, pp. 234–45 (January 1993)
A. O. Desjarlais, D. M. Kyle, J. E. Christian. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 193** *Gauge for Nondestructive Measurement of the Internal Pressure in Powder-filled Evacuated Panel Superinsulation*
Rev. Sci. Instrum. 63(12), pp. 5774–79 (December 1992)
T. G. Kollie, L. S. Thacker. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 194** *Literature Review: Heat Transfer Through Two-Phase Insulation Systems Consisting of Powders in a Continuous Gas Phase*
ORNL/M-2426 (December 1992)
D. W. Yarbrough. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 195** *Molsture Effects In Low-Slope Roofs: Drying Rates After Water Addition with Various Vapor Retarders*
ORNL/CON-308 (October 1992)
C. R. Pedersen. Danish Building Research Institute, Denmark
T. W. Petrie. Marquette University, Milwaukee, Wis.
G. E. Courville, A. O. Desjarlais, P. W. Childs, K. E. Wilkes. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 196** *A Study of Changes In Foundation Insulation Levels In the United States*
ORNL/CON-351 (October 1992)
J. E. Christian. Oak Ridge National Laboratory, Oak Ridge, Tenn.
M. K. Voss. St. Mary's College, Winona, Minn.
- 197** *Numerical Analysis of Heat Transfer by Conduction and Natural Convection In Loose-Fill Fiberglass Insulation—Effects of Convection on Thermal Performance*
ORNL/CON-338 (April 1992)
A. A. Delmas, K. E. Wilkes. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 198** *Prelliminary Evaluation of Radiation Control Coatings for Energy Conservation In Buildings*
ORNL/Sub/89-SE791/1 (February 1992)
R. W. Anderson. Robert W. Anderson and Associates, Inc., Boulder City, Nev.
- 199** *The Effect of Compression on the Material R-Value of Fiberglass Batt Insulation*
J. Thermal Insul. 15 (January 1992)
R. S. Graves, D. W. Yarbrough. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 200** *A Shape Factor Method for Computing Heating Loads from Building Slab-on-Grade Foundations*
pp. 166–75, *Thermal Performance of the Exterior Envelopes of Buildings V, Proceedings of the ASHRAE/DOE/BTECC Conference, December 7–10, 1992, Clearwater Beach, Florida* (Atlanta: American Society of Heating, Refrigerating, and Air-conditioning Engineers, 1992)
W. W. Rust. Oak Ridge Associated Universities, Oak Ridge, Tenn.
J. E. Christian. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 201 Thermal Performance of Fiberglass and Cellulose Attic Insulations**
pp. 357–67, *Thermal Performance of the Exterior Envelopes of Buildings V, Proceedings of the ASHRAE/DOE/BTECC Conference, December 7–10, 1992, Clearwater Beach, Florida* (Atlanta: American Society of Heating, Refrigerating, and Air-conditioning Engineers, 1992)
K. E. Wilkes, P. W. Childs. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 202 In-Situ Thermal Performance of APP Modified Bitumen Roof Membranes Coated with Reflective Coatings**
pp. 420–28, *Thermal Performance of the Exterior Envelopes of Buildings V, Proceedings of the ASHRAE/DOE/BTECC Conference, December 7–10, 1992, Clearwater Beach, Florida* (Atlanta: American Society of Heating, Refrigerating, and Air-conditioning Engineers, 1992)
J. D. Carlson, T. L. Smith. National Roofing Contractors Association, Rosemont, Ill.
J. E. Christian. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 203 Energy Efficient Residential Building Foundations Enhance Indoor Air Quality**
ASHRAE Journal 33(11), pp. 36–41 (November 1991)
J. E. Christian. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 204 Moisture Control Handbook: New, Low-rise, Residential Construction**
ORNL/Sub/89-SD350/1 (October 1991)
J. Lstiburek. Building Science Corp., Chestnut Hill, Mass.
J. Carmody. Underground Space Center, University of Minnesota, Minneapolis, Minn.
- 205 Corrosiveness of Wet Residential Building Thermal Insulation Mechanisms and Evaluation of Electrochemical Methods for Assessing Corrosion Behavior**
ORNL/Sub/90-SF204/1 (October 1991)
E. E. Stansbury. Consultant to Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 206 A Round Robin Evaluation of the Corrosiveness of Wet Residential Insulation by Electrochemical Measurements**
ORNL/Sub/90-SF204/2 (October 1991)
E. E. Stansbury. Consultant to Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 207 Laboratory Tests Results on the Thermal Resistance of Polyisocyanurate Foamboard Insulation Blown With CFC-11 Substitutes—A Cooperative Industry/Government Project**
ORNL/TM-11645 (September 1991)
D. L. McElroy, R. S. Graves, D. W. Yarbrough, F. J. Weaver. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 208 A Review of Vacuum Insulation Research and Development in the Building Materials Group of the Oak Ridge National Laboratory**
ORNL/TM-11703 (September 1991)
T. G. Kollie, D. L. McElroy, R. S. Graves, F. J. Weaver. Oak Ridge National Laboratory, Oak Ridge, Tenn.
H. A. Fine. University of Kentucky, Lexington, Ky.
K. W. Childs. Martin Marietta Energy Systems, Inc., Oak Ridge, Tenn.

- 209 Interlaboratory Comparison of Four Heat Flow Meter Apparatuses on Planed Polyisocyanurate Boards Foamed with CFC-11**
ORNL/TM-11720 (June 1991)
R. S. Graves, D. L. McElroy. Oak Ridge National Laboratory, Oak Ridge, Tenn.
R. C. Miller. Jim Walter Research Corp., St. Petersburg, Fla.
D. W. Yarbrough. Tennessee Technological University, Cookeville, Tenn.
R. R. Zarr. National Institute of Standards and Technology, Gaithersburg, Md.
- 210 Technics: Under Steep Roofing**
Progressive Architecture, pp. 54-56 (May 1991)
J. E. Christian. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 211 Builder's Foundation Handbook**
ORNL/CON-295 (May 1991)
J. Carmody. Underground Space Center, University of Minnesota, Minneapolis, Minn.
J. Christian. Oak Ridge National Laboratory, Oak Ridge, Tenn.
K. Labs. Undercurrent Design Research, New Haven, Conn.
- 212 Thermal Properties of Polyisocyanurate Foam Board Insulation Blown With CFC-11 Substitutes**
Proc. Third International Symposium on Roofing Technology, Montreal, Canada, April 17-19, 1991, pp. 133-42 (Rosemont, Ill.: National Roofing Contractors Association, April 1991)
D. L. McElroy, G. E. Courville, J. E. Christian, R. L. Linkous, R. S. Graves. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 213 Steady-State and Transient Tests Using the Unguarded Thin-Heater Apparatus (Thermophysical Properties of Building Materials)**
ORNL/TM-11629 (March 1991)
D. L. McElroy, R. S. Graves, D. W. Yarbrough. Oak Ridge National Laboratory, Oak Ridge, Tenn.
H. A. Fine. University of Kentucky, Lexington, Ky.
- 214 Thermal Performance of HCFC-22 Blown Extruded Polystyrene Insulation Materials: Testing and Applications, 2nd Volume, ASTM STP 1116**, ed. R. S. Graves and D. C. Wysocki, pp. 214-28 (Philadelphia: American Society for Testing and Materials, 1991)
D. W. Yarbrough, R. S. Graves, J. E. Christian. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 215 Thermal Measurement of In-situ and Thin-Specimen Aging of Experimental Polyisocyanurate Roof Insulation Foamed With Alternative Blowing Agents**
Insulation Materials: Testing and Applications, 2nd Volume, ASTM STP 1116, ed. R. S. Graves and D. C. Wysocki, pp. 142-66 (Philadelphia: American Society for Testing and Materials, 1991)
J. E. Christian, G. E. Courville, R. S. Graves, R. L. Linkous, D. L. McElroy, F. J. Weaver, D. W. Yarbrough. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 216 ASHRAE Standard 90.2 Envelope Load Factors and Trade-off Procedures**
ASHRAE Transactions 97(2), pp. 928-40 (1991)
M. F. McBride. Owens-Corning Fiberglas, Granville, Ohio
B. A. Wilcox. Berkeley Solar Group, Oakland, Calif.
J. E. Christian. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 217 Thermal Mass Credits Relating to Building Envelope Energy Standards**
ASHRAE Transactions 97(2), pp. 941-51 (1991)
J. E. Christian. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 218 ORNL's Search for Roof Insulation CFC Alternatives**
The Construction Specifier 43(11) (November 1990)
J. E. Christian. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 219 Assessment of the Energy Conservation Potential of Active (Variable Thermal Resistance and Switchable Absorptance) Building Thermal Insulation Systems**
ORNL/TM-11425 (June 1990)
H. A. Fine. University of Kentucky, Lexington, Ky.
D. L. McElroy. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 220 Fabrication, Evaluation, and Application of Evacuated Panel Insulation (EPI) to Portable Coolers**
ORNL/Sub/88-SD731/1 (March 1990)
R. W. Barito, M. O. Barito. R. W. Barito & Associates, Louisville, Ky.
T. G. Kollie, D. L. McElroy, F. J. Weaver, S. H. Werst, W. Chu. Oak Ridge National Laboratory, Oak Ridge, Tenn.
K. W. Childs. Martin Marietta Energy Systems, Inc., Oak Ridge, Tenn.
H. A. Fine. Consultant to Oak Ridge National Laboratory, Oak Ridge, Tenn.
H. L. Landrum, Jr. Igloo Products Corp., Houston, Texas
- 221 Chlorofluorocarbon (CFC) Technologies Review of Foamed-Board Insulation for Buildings**
ORNL/TM-11291 (March 1990)
D. L. McElroy. Oak Ridge National Laboratory, Oak Ridge, Tenn.
M. P. Scofield. U.S. Department of Energy, Office of Conservation and Renewable Energy, Washington, D.C.
- 222 Research and Development Data to Define the Thermal Performance of Reflective Materials Used to Conserve Energy in Building Applications**
ORNL/Sub/88-SA835/1 (March 1990)
A. O. Desjarlais, R. P. Tye. Thermatest Division of Holometrix, Inc., Cambridge, Mass.
- 223 Proceedings of the Roof Wind Uplift Testing Workshop, Oak Ridge, Tennessee, November 8-9, 1989**
CONF-891173 (February 1990)
G. E. Courville, comp.; P. S. Gillis, ed. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 224 Thermal Resistance of Fine Powders at Atmospheric Pressure and Under Vacuum**
Insulation Materials, Testing, and Applications, ed. D. L. McElroy and J. F. Kimpflen, ASTM STP 1030, pp. 52-65 (Philadelphia, Pa.: American Society for Testing and Materials, 1990)
D. L. McElroy, F. J. Weaver, D. W. Yarbrough, R. S. Graves. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 225 Modeling of Thermal Resistance Test Configurations That Use Thin Heaters**
Insulation Materials, Testing, and Applications, ed. D. L. McElroy and J. F. Kimptlen, ASTM STP 1030, pp. 525-36 (Philadelphia, Pa.: American Society for Testing and Materials, 1990)
D. W. Yarbrough, D. L. McElroy, R. S. Graves. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 226 The Most Needed Building Foundations Research Products**
Proceedings of Symposium on Insulation Materials, Testing, and Applications, Bal Harbor, Fla., December 7-9, 1987, STP 1030, pp. 655-62 (Philadelphia: American Society for Testing and Materials, 1990)
J. E. Christian. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 227 An In Situ Evaluation of the Settling of Loose-Fill Rock Wool Insulation in the Attics of Two Manufactured Home Units**
Proceedings of Symposium on Insulation Materials, Testing, and Applications, Bal Harbor, Fla., December 7-9, 1987, STP 1030, pp. 237-43 (Philadelphia: American Society for Testing and Materials, 1990)
R. S. Graves, D. W. Yarbrough. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 228 Evaluation of a Commercial, Portable, Ambient-Temperature Emissometer**
Rev. Sci. Instrum. 61, pp. 1509-17 (1990)
T. G. Kollie, F. J. Weaver, D. L. McElroy. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 229 Buildings Energy Research: A Bibliography Update**
ORNL/CON-292 (December 1989)
R. S. Weaver, L. F. Goins, P. M. Love. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 230 Catalog of Thermal Bridges in Commercial and Multi-Family Residential Construction**
ORNL/Sub/88-SA407/1 (December 1989)
A. N. Tuluca, D. M. Evans, K. Kuman, M. Krarti. Steven Winter Associates, Inc., New York, N.Y.
K. W. Childs. Martin Marietta Energy Systems, Inc., Oak Ridge, Tenn.
G. E. Courville. Oak Ridge National Laboratory, Oak Ridge, Tenn.
T. Vonier. Thomas Vonier Associates, Inc., Washington, D.C.
R. Tye. Holometrix, Inc., Cambridge, Mass.
- 231 Measurement of Thermal Drift in Foam Insulation**
ORNL/TM-11290 (October 1989)
G. E. Courville, P. W. Childs. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 232 Overview of the Applicability of Electrochemical Methods to Evaluation of the Corrosiveness of Residential Building Thermal Insulations with Proposed Cooperative Test Program**
ORNL/Sub/87-B8240/1 (September 1989)
E. E. Stansbury. Consultant to Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 233 U.S. Building Materials Industry: R&D Barriers Assessment**
ORNL/Sub/88-SB964/1 (September 1989)
F. H. Klareich, J. C. Frank. RCG/Hagler, Bailly, Inc., Washington, D.C.

- 234 *Guide for Estimating Differences in Building Heating and Cooling Energy Due to Changes in Solar Reflectance of a Low-Sloped Roof***
ORNL-6527 (August 1989)
E. I. Griggs. Tennessee Technological University, Cookeville, Tenn.
T. R. Sharp, J. M. MacDonald. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 235 *Heat and Mass Transfer Through Porous Media***
ORNL/Sub/85-27486/2 (August 1989)
S. Motakef, L. R. Glicksman. Massachusetts Institute of Technology, Cambridge, Mass.
- 236 *Model for Roof Thermal Performance***
ORNL/CON-274 (July 1989)
K. E. Wilkes. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 237 *International Symposium Proceedings on Mathematical Modeling of Roof Systems, Oak Ridge, Tennessee, September 15-16, 1988***
CONF-8809314 (May 1989)
G. E. Courville, ed. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 238 *The Roof Research Center - A National User Facility for Thermal Performance and Durability of Roofing Systems. Users Manual.***
ORNL/M-329/2 (April 1989)
G. E. Courville. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 239 *Design Description of the Large Scale Climate Simulator***
ORNL/TM-10675 (March 1989)
W. R. Huntley. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 240 *Changes in the Heating and Cooling Energy Use in Buildings Due to Lowering the Surface Solar Absorptance of Roofs***
ORNL/TM-10339 (February 1989)
E. I. Griggs. Tennessee Technological University, Cookeville, Tenn.
G. E. Courville. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 241 *An Experimental Study of Stabilized Cellulosic Insulation Installed in Four Attic Sections of Manufactured Homes***
ORNL/TM-10775 (January 1989)
R. S. Graves, D. W. Yarbrough. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 242 *ZIP—The ZIP-Code Insulation Program (Version 1.0). Economic Insulation Levels for New and Existing Houses by Three-Digit ZIP Code. Users Guide and Reference Manual***
ORNL/TM-11009* (January 1989)
S. R. Petersen. National Institute of Standards and Technology, Gaithersburg, Md.
- 243 *A Capacitance Probe for Measurement of Moisture Content in Open Pore Thermal Insulations***
ORNL/Sub/85-27486/1 (January 1989)
S. Motakef, L. R. Glicksman. Massachusetts Institute of Technology, Cambridge, Mass.

*Also available as report no. NISTIR 88-3801 from the National Institute of Standards and Technology, Gaithersburg, Maryland 20899.

- 244 The Thermal Resistance of Flat Powder-Filled Evacuated Panels**
Proceedings of the International Conference on Thermal Insulation, San Francisco, California, February 27–March 1, 1989, 5, pp. 20–34 (Sunnyvale, Calif.: Product Safety Corporation, 1989)
R. S. Graves, D. W. Yarbrough, D. L. McElroy. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 245 Testing of Loose-Fill Cellulosic Insulation Taken From Residential Attics In Four Cities**
Proceedings of the Second California Thermal Insulation Conference, Sacramento, California September 18–20, 1989, ed. S. A. Siddiqui, pp. 86–97 (North Highlands, Calif.: Bureau of Home Furnishings and Thermal Insulation, 1989)
R. S. Graves, D. W. Yarbrough. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 246 Proceedings: Thermal Performance of the Exterior Envelopes of Buildings IV, December 4–7, 1989, Orlando, Florida**
Atlanta: American Society of Heating, Refrigerating, and Air-Conditioning Engineers, 1989
P. M. Love, G. E. Courville, eds. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 247 Proceedings: 1986 International Daylighting Conference, November 4–7, 1986, Long Beach, California**
Atlanta: American Society of Heating, Refrigerating, and Air-Conditioning Engineers, 1989
E. Bales, ed. New Jersey Institute of Technology, Newark, N.J.
- 248 Radon Mitigation in New Construction**
Encyclopedia of Architecture: Design, Engineering, and Construction 4, pp. 147–55 (New York: John Wiley & Sons, Inc., 1989)
J. E. Christian. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 249 Techniques for In Situ Determination of Thermal Resistance of Light Weight Board Insulations**
J. Heat Trans. 111, pp. 274–80 (1989)
G. E. Courville. Oak Ridge National Laboratory, Oak Ridge, Tenn.
J. V. Beck. Michigan State University, East Lansing, Mich.
- 250 The International Energy Agency on Low Slope Roofing Systems**
Int. J. Roofing Technol. 1, pp. 29–31 (1989)
G. E. Courville. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 251 Comparison of the Dynamic Thermal Performance of Insulated Roof Systems**
Proceedings of the Ninth Conference on Roofing Technology, Gaithersburg, Maryland, May 4–5, 1989, pp. 50–55 (Chicago, Ill.: National Roofing Contractors Association, 1989)
G. E. Courville, P. W. Childs. Oak Ridge National Laboratory, Oak Ridge, Tenn.
P. H. Shipp. USG Corp., Libertyville, Ill.
T. W. Petrie. Marquette University, Milwaukee, Wis.
- 252 Final Report of Research and Development of a Diagnostic Procedure to Measure Changes in Thermal Integrity of Building Envelopes. Phase II BTR Meter Development**
ORNL/Sub/83-47959/2 (December 1986)
J. E. Janssen, R. W. Rasmussen. Honeywell Corporate Systems Development Division, Golden Valley, Minn.

- 253 Structural Thermal Break Systems for Buildings Heat Transfer Characteristics of Lightweight Structural Concrete Walls**
ORNL/Sub/84-21006/3 (December 1988)
M. G. Van Geem. Construction Technology Laboratories, Inc., Skokie, Ill.
- 254 Results of Workshop to Develop Alternatives for Insulations Containing CFCs Research Project Menu**
ORNL/CON-269 (December 1988)
J. E. Christian, D. L. McElroy. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 255 ASTM/DOE Hot Box Round Robin**
ORNL/Sub/84-97333/2 (November 1988)
E. Bales. New Jersey Institute of Technology, Newark, N.J.
- 256 Feasibility Study for Collecting Site Soil Characterization Thermal Property Data for Residential Construction**
ORNL/Sub/86-04923/1 (October 1988)
L. R. Salomone. STS Consultants, Ltd., Fairfax, Va.
- 257 Heat Loss Through Building Envelopes Due to Convective Loops**
K/CSD/TM-80 (October 1988)
J. E. Park, J. R. Kirkpatrick. Martin Marietta Energy Systems, Inc., Oak Ridge, Tenn.
- 258 A Study of Radiative Heat Transfer Through Foam Insulation**
ORNL/Sub/86-09099/3 (October 1988)
L. R. Glicksman, M. R. Torpey. Massachusetts Institute of Technology, Cambridge, Mass.
- 259 Structural Thermal Break Systems for Buildings. Development and Properties of Concrete Systems**
ORNL/Sub/84-21006/2 (October 1988)
A. Litvin, M. G. Van Geem. Construction Technology Laboratories, Skokie, Ill.
- 260 Corrosiveness Testing of Thermal Insulating Materials—A Simulated Field Exposure Study Using a Test Wall**
ORNL/Sub/78-7556/4 (September 1988)
K. Sheppard, R. Weil. Stevens Institute of Technology, Hoboken, N.J.
A. Desjarlais. Dynatech Scientific Co., Cambridge, Mass.
- 261 Assessment of the Thermal and Physical Properties of Masonry Block Products**
ORNL/Sub/86-22020/1 (September 1988)
R. Valore, Jr., A. Tuluca, A. Caputo. Steven Winter Associates, Inc., New York, N.Y.
- 262 Thermal Properties of Wood and Wood Panel Products for Use in Buildings**
ORNL/Sub/87-21697/1* (September 1988)
A. TenWolde, J. D. McNatt, L. Krahn. U.S. Department of Agriculture, Forest Service, Forest Products Laboratory, Madison, Wis.
- 263 Steady State Radiative Heat Transfer Through Insulations**
ORNL/Sub/84-89634/1 (August 1988)
P. G. Klemens, N. Kim. University of Connecticut, Storrs, Conn.

*Also available as report no. DOE/USDA-21697/1 from the National Technical Information Service, U.S. Department of Commerce, 5825 Port Royal Road, Springfield, Virginia 22161.

- 264 Thermal Resistance of Wall Cavities Containing Reflective Insulation**
ORNL/Sub-7715/6 (August 1988)
B. J. Han. Tennessee Technological University, Cookeville, Tenn.
D. W. Yarbrough. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 265 Calculation of Heat Flow and Temperature Fields for Building Envelopes Containing Thermal Bridges**
ORNL/M-566 (June 1988)
K. W. Childs. Martin Marietta Energy Systems, Inc., Oak Ridge, Tenn.
- 266 Analysis of Seven Thermal Bridges Identified in a Commercial Building**
K/CSD/TM-78 (June 1988)
K. W. Childs. Martin Marietta Energy Systems, Inc., Oak Ridge, Tenn.
- 267 Building Foundation Design Handbook**
ORNL/Sub/86-72143/1 (May 1988)
K. Labs. Undercurrent Design Research, New Haven, Conn.
J. Carmody, R. Sterling, L. Shen. University of Minnesota, Minneapolis, Minn.
Y. J. Huang. Lawrence Berkeley Laboratory, Berkeley, Calif.
D. Parker. Florida Solar Energy Center, Cape Canaveral, Fla.
- 268 The Impact of Surface Reflectance on the Thermal Performance of Roofs: An Experimental Study**
ORNL/TM-11699 (April 1988)
E. I. Griggs. Tennessee Technological University, Cookeville, Tenn.
P. H. Shipp. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 269 Calculational Model Development for Fibrous Thermal Insulation—Transient Test Procedures**
ORNL/Sub/85-27494/1 (February 1988)
J. R. Thomas, Jr. Virginia Polytechnic Institute and State University, Blacksburg, Va.
- 270 Effect of Surface Mass on Roof Thermal Performance**
Proceedings of the 5th Annual Symposium on Improving Building Energy Efficiency in Hot and Humid Climates, Houston, September 13–14, 1988, pp. 326–34 (1988)
K. E. Wilkes, J. P. Sanders. Oak Ridge National Laboratory, Oak Ridge, Tenn.
P. H. Shipp. USG Corp., Libertyville, Ill.
- 271 Determination of Radiative Properties of Fiberglass and Foam Insulations**
ORNL/Sub/86-55930/1 (December 1987)
S. Yajnik, J. A. Roux. University of Mississippi, University, Miss.
- 272 Building Envelope Thermal Anomaly Analysis**
ORNL/Sub/85-00294/1 (December 1987)
B. S. Melton, P. Mulrone. VVKR, Inc., Alexandria, Va.
T. Scott. University of Virginia, Charlottesville, Va.
K. W. Childs. Martin Marietta Energy Systems, Inc., Oak Ridge, Tenn.
- 273 Impact of CFC Restrictions on U.S. Building Foundation Thermal Performance**
ORNL/CON-245 (December 1987)
J. E. Christian. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 274 Assessment of Foam-In-Place Urethane Foam Insulations Used in Buildings**
ORNL/Sub/86-56525/1 (October 1987)
R. P. Tye. Dynatech Scientific, Inc., Cambridge, Mass.
- 275 A Combustion System Seasonal Efficiency Meter—A Preliminary Assessment of a Laboratory Model**
ORNL/Sub/85-53142/1 (September 1987)
N. Pearman. Honeywell, Inc., Technology Strategy Center, Golden Valley, Minn.
- 276 Simulation of the SWTMS Test Cells Using the DOE-2.1A Model**
ORNL/CON-221 (September 1987)
H. A. McLain, J. E. Christian, S. Y. Ohr, J. L. Bledsoe. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 277 Heat Transfer Characteristics of Insulated Concrete Sandwich Panel Walls**
ORNL/Sub/79-42539/8 (September 1987)
M. G. Van Geem, S. T. Shirley. Construction Technology Laboratories, Skokie, Ill.
- 278 Low-Slope Roofing Research Needs. An ORNL Draft Assessment**
ORNL/M-340 (August 1987)
H. W. Busching. Clemson University, Clemson, S.C.
G. E. Courville. Oak Ridge National Laboratory, Oak Ridge, Tenn.
M. Dvorchak. Mobay Chemical Corp., Pittsburgh, Pa.
J. McCorkle. Consultant to Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 279 Thickness and Density Measurements for Attic Loose-Fill Thermal Insulations in Eight Cities**
ORNL/TM-10414 (August 1987)
D. W. Yarbrough, R. S. Graves, D. L. McElroy. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 280 Ultraviolet Radiation Testing of Roofing Systems**
ORNL/Sub/85-27453/1 (July 1987)
K. R. Amirkhania, H. W. Busching. Clemson University, Clemson, S.C.
- 281 Structural Thermal Break Systems for Buildings Feasibility Study**
ORNL/Sub/84-21006/1 (March 1987)
S. C. Larson, M. G. Van Geem. Construction Technology Laboratories, Skokie, Ill.
- 282 Thermal Mass: A Comparison of Measurements and Blast Predictions for Six Test Cells in Two Climates**
ORNL/Sub/83-70373/2* (January 1987)
W. L. Carroll, A. Mertol, R. Sullivan. Lawrence Berkeley Laboratory, Berkeley, Calif.
- 283 Thermal Mass: Blast Residential Parametric Simulations**
ORNL/Sub/83-70373/1† (January 1987)
W. L. Carroll, R. Sullivan, A. Mertol. Lawrence Berkeley Laboratory, Berkeley, Calif.

*Also available as report no. LBL-18020 from the University of California, Lawrence Berkeley Laboratory, One Cyclotron Road, Berkeley, California 94720.

† Also available as report no. LBL-19681 from the University of California, Lawrence Berkeley Laboratory, One Cyclotron Road, Berkeley, California 94720.

- 284** *Inventory of Energy Research in Schools of Architecture 1972-1985*
ORNL/Sub/84-89680/1 (January 1987)
D. Prowler, E. Johnson-Mohler, M. Asekine. University of Pennsylvania, Philadelphia, Pa.

DISTRICT HEATING

285 *The National Action Plan for District Heating, Cooling and Cogeneration. An Industry-Government Partnership*

National Planning Committee for District Heating, Cooling and Cogeneration, March 1992*

286 *Characterization and Potential of Nonmetallic Piping Systems for District Heating*

ORNL/TM-10234 (July 1987)

M. H. Barnes. Scantec, Inc., St. Paul, Minn.

M. A. Kamitz, D. J. Naus, J. W. Bryson, Jr. Oak Ridge National Laboratory, Oak Ridge, Tenn.

*Available from M. A. Broders, Oak Ridge National Laboratory, P. O. Box 2008, Oak Ridge TN 37831-6070.

RESIDENTIAL AND COMMERCIAL CONSERVATION PROGRAM

- 287** *Direct Installation of Lighting Measures in Small Nonresidential Buildings*
Proceedings ACEEE 1990 Summer Study on Energy Efficiency in Buildings, Volume 8:
Utility Programs, pp. 8.37–8.42 (Washington, D.C.: American Council for an Energy-
Efficient Economy, 1990)
M. B. Gettings, J. M. MacDonald. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 288** *Life After RCS: Is There a Future for Audit and Other Residential Conservation Programs?*
Home Energy 7(3), pp. 24–28 (1990)
R. Vories. Infinite Energy, Denver, Colo.
D. L. White. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 289** *Expansion of Electric Utility DSM Services to Small Businesses*
ORNL/CON-293 (September 1989)
M. B. Gettings, J. M. MacDonald. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 290** *Marketing and Design of Residential Energy Conservation Programs for the Elderly*
ORNL/CON-246 (February 1988)
L. Berry, M. Schweitzer, E. Freeman. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 291** *Participation of the Elderly in Residential Conservation Programs*
Energy Policy 16(2), pp. 152–63 (1988)
L. G. Berry, M. A. Brown. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 292** *A Review of Utility Conservation Programs for the Commercial Building Sector*
ORNL/CON-220 (December 1987)
J. O. Kolb, M. S. Hubbard. Oak Ridge National Laboratory, Oak Ridge, Tenn.

WEATHERIZATION ASSISTANCE PROGRAM

- 293 *A Status Report on the National Weatherization Evaluation***
pp. 7.27-7.29, *Proceedings ACEEE 1992 Summer Study on Energy Efficiency in Buildings* (Washington, D. C.: American Council for an Energy-Efficient Economy, 1992)
M. A. Brown. Oak Ridge National Laboratory, Oak Ridge, Tenn.
D. A. Beschen. U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Washington, D. C.
- 294 *Scope of the Weatherization Assistance Program: The Weatherized Population and The Resource Base***
ORNL/CON-325 (May 1992)
M. Power, J. F. Eisenberg, E. Michels. Economic Opportunity Research Institute, Washington, D. C.
M. J. Witherspoon. National Association for State Community Service Programs, Washington, D. C.
M. A. Brown. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 295 *Characterization of the Weatherization Assistance Program Network***
ORNL/CON-324 (February 1992)
P. E. Mihlmester, W. C. Koehler, Jr., M. A. Beyer. Aspen Systems Corporation, Oak Ridge, Tenn.
M. A. Brown. Oak Ridge National Laboratory, Oak Ridge, Tenn.
D. A. Beschen, Jr. Weatherization Assistance Program, U.S. Department of Energy, Washington, D.C.
- 296 *Experimental Plan for the Fuel-Oil Study***
ORNL/TM-11668/V2 (January 1992)
M. P. Ternes, W. P. Levins, M. A. Brown. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 297 *Interaction of Heating and Cooling Energy Conservation Envelope Measures with Mechanical System Retrofits***
pp. 687-88, *Thermal Performance of the Exterior Envelopes of Buildings V, Proceedings of the ASHRAE/DOE/BTECC Conference, December 7-10, 1992, Clearwater Beach, Florida* (Atlanta, Ga.: American Society of Heating, Ventilating, and Air-Conditioning Engineers, 1992)
M. B. Gettings. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 298 *Evaluation Plan for the Weatherization Assistance Program***
ORNL/TM-11668/V1 (August 1991)
D. A. Beschen. Weatherization Assistance Program, U.S. Department of Energy, Washington, D.C.
M. A. Brown. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 299 *Experimental Plan for the Single-Family Study***
ORNL/TM-11668/V3 (September 1991)
L. G. Berry, M. A. Brown, T. Wright, D. L. White. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 300 *Assessment of Weatherization Assistance Program Needs for Improved Residential Measure Selection Techniques***
ORNL/CON-316 (February 1991)
M. B. Gettings, J. O. Kolb. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 301 *Measuring the Effects of Conservation Program Special Services: Client Education, Fuel Assistance, and Other Indirect Outcomes***
Affordable Comfort V, 5 (Harrisburg: Pennsylvania Energy Office, 1991)
D. L. White. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 302 *The North Carolina Field Test: Experimental Plan***
ORNL/TM-11339 (August 1990)
T. R. Sharp, M. P. Ternes. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 303 *Implementation of Blower Door and New Client Selection Concepts Into the Iowa Weatherization Assistance Program: Experimental Plan***
ORNL/CON-282 (August 1989)
M. P. Ternes, H. L. Hwang. Oak Ridge National Laboratory, Oak Ridge, Tenn.

EXISTING BUILDINGS RESEARCH PROGRAM

- 304 *Research Update, Existing Buildings Research, 1989-1991***
 ORNL/CON-333 (February 1993)
 J. M. MacDonald, M. P. Ternes, W. R. Mixon, T. R. Sharp, J. O. Kolb, K. E. Wilkes. Oak Ridge National Laboratory, Oak Ridge, Tenn. R. C. Diamond. Lawrence Berkeley Laboratory, Berkeley, Calif.
 R. Judkoff. National Renewable Energy Laboratory, Golden, Colo.
 R. P. Mazzucchi. Pacific Northwest Laboratories, Richland, Wash.
- 305 *The Oklahoma Field Test: Air-Conditioning Electricity Savings from Standard Energy Conservation Measures, Radiant Barriers, and High-Efficiency Window Air Conditioners***
 ORNL/CON-317 (August 1992)
 M. P. Ternes, W. P. Levins. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 306 *Modeling Study of the Cooling Season Performance of Exterior Wall Insulation***
 pp. 655-67, *Thermal Performance of the Exterior Envelopes of Buildings V, Proceedings of the ASHRAE/DOE/BTECC Conference, December 7-10, 1992, Clearwater Beach, Florida* (Atlanta, Ga.: American Society of Heating, Refrigerating, and Air-conditioning Engineers, 1992)
 H. A. McLain. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 307 *Energy Savings and Interactions from Retrofit Measures in Small Commercial Buildings in Boston***
 pp. 31-38, *Thermal Performance of the Exterior Envelopes of Buildings V, Proceedings of the ASHRAE/DOE/BTECC Conference, December 7-10, 1992, Clearwater Beach, Florida* (Atlanta, Ga.: American Society of Heating, Refrigerating, and Air-conditioning Engineers, 1992)
 T. R. Sharp, J. M. MacDonald. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 308 *Monitoring and Evaluation of Foundation Insulation Retrofits in Single-Family Detached Houses in St. Paul and Minneapolis, Minnesota. Final Report***
 ORNL/Sub/86-SA711/V (October 1991)
 M. J. Hewett. Center for Energy and the Urban Environment, Minneapolis, Minn.
 G. D. Nelson. Gary Nelson and Associates, Minneapolis, Minn.
 M. T. Noble. Natural Resources Corp., Minneapolis, Minn.
 D. A. Robinson. Robinson Technical Services, St. Paul, Minn.
 L. S. Shen, L. F. Goldberg. University of Minnesota, Minneapolis, Minn.
- 309 *Monitoring and Evaluation of Replacing Low-Efficiency Air Conditioners with High-Efficiency Air Conditioners in Single-Family Detached Houses in Austin, Texas***
 ORNL/Sub/86-SA566/V (August 1991)
 R. Burns, R. E. Hough. The Fleming Group, East Syracuse, N.Y.
- 310 *Thermal Model of Attic Systems with Radiant Barriers***
 ORNL/CON-262 (July 1991)
 K. E. Wilkes. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 311 *Radiant Barrier Attic Fact Sheet***
 DOE/CE-0335P, ORNL/M-1937 (June 1991)
 K. E. Wilkes. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 312 Analysis of Annual Thermal and Moisture Performance of Radiant Barrier Systems**
ORNL/CON-319 (April 1991)
K. E. Wilkes. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 313 The National Fuel End-Use Efficiency Field Test: Energy Savings and Performance of an Improved Energy Conservation Measure Selection Technique**
ORNL/CON-303 (March 1991)
M. P. Ternes, P. S. Hu, L. S. Williams. Oak Ridge National Laboratory, Oak Ridge, Tenn.
P. Goewey. National Fuel Gas Distribution Corp., Buffalo, N.Y.
- 314 Measured Space-Cooling Electricity Savings from Standard Energy Conservation Measures, Radiant Barriers, and High-Efficiency Window Air Conditioners**
Proceedings of the ACEEE 1990 Summer Study on Energy Efficiency in Buildings 9, pp. 299–308 (Washington, D.C.: American Council for an Energy-Efficient Economy, August 1990)
M. P. Ternes, W. P. Levins. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 315 Analysis of Annual Energy Savings Due to Radiant Barriers**
Proceedings of the ACEEE 1990 Summer Study on Energy Efficiency in Buildings 1, pp. 235–45 (Washington, D.C.: American Council for an Energy-Efficient Economy, August 1990)
K. E. Wilkes. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 316 Measurement of Energy Performance In a Small Bank Building**
ORNL/CON-297 (April 1990)
T. R. Sharp, J. M. MacDonald. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 317 Cooling Season Energy Measurements of Dust and Ventilation Effects on Radiant Barriers**
ORNL/CON-271 (March 1990)
W. P. Levins, M. A. Karnitz. Oak Ridge National Laboratory, Oak Ridge, Tenn.
J. A. Hall. Tennessee Valley Authority, Knoxville, Tenn.
- 318 Power Generation from Waste Incineration**
Energy Engineering 87(3), pp. 49–62 (1990)
J. O. Kolb, K. E. Wilkes. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 319 Energy Savings and Performance of an Improved Energy Efficiency Measure Selection Technique**
ASHRAE Transactions 96(Pt. 2) (Atlanta, Ga.: American Society of Heating, Refrigerating, and Air-Conditioning Engineers, 1990)
M. P. Ternes. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 320 A Protocol for Monitoring Energy Efficiency Improvements In Commercial and Related Buildings**
ORNL/CON-291 (September 1989)
J. M. MacDonald, T. R. Sharp, M. B. Gettings. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 321 *Protocols Are Being Developed to Guide Building Energy Monitoring Projects***
ASHRAE Journal 31(6), p. 38 (June 1989)
W. R. Mixon. Oak Ridge National Laboratory, Oak Ridge, Tenn.
H. Misuriello. W. S. Fleming Associates, Washington, D.C.
- 322 *Technology Adoption Strategy for the Existing Buildings Efficiency Research Program***
ORNL/CON-286 (June 1989)
P. E. Mihlmester, J. Gonos, L. Freeman. Applied Management Sciences, Inc., Oak Ridge, Tenn.
M. A. Brown. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 323 *Investigation of Metered Data Analysis Methods for Commercial and Related Buildings***
ORNL/CON-279 (May 1989)
J. M. MacDonald. Oak Ridge National Laboratory, Oak Ridge, Tenn.
D. M. Wasserman. Consultant to Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 324 *Moisture Measurements in Single-Family Houses with Attics Containing Radiant Barriers***
ORNL/CON-255 (February 1989)
W. P. Levins, M. A. Karnitz. Oak Ridge National Laboratory, Oak Ridge, Tenn.
J. A. Hall. Tennessee Valley Authority, Chattanooga, Tenn.
- 325 *The Oklahoma Cooling Retrofit Field Test: Experimental Plan***
ORNL/TM-10761 (January 1989)
M. P. Ternes, P. S. Hu. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 326 *Load Impacts of Energy Management Hardware***
Proceedings of the End-Use Load Information and Application Conference for Customer and Utility Communication, Syracuse, New York, May 16-17, 1989 (Syracuse, N.Y.: The Fleming Group, 1989)
J. M. MacDonald, T. R. Sharp. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 327 *The National Fuel Gas End-Use Efficiency Field Test: Experimental Plan***
ORNL/TM-10760 (September 1988)
M. P. Ternes, P. S. Hu. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 328 *Heating Energy Measurements of Single-Family Houses with Attics Containing Radiant Barriers in Combination with R-11 and R-30 Ceiling Insulation***
ORNL/CON-239 (August 1988)
W. P. Levins, M. A. Karnitz. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 329 *Research Update: Existing Building Efficiency Research, 1987-1988***
ORNL/CON-268 (August 1988)
J. M. MacDonald, M. A. Karnitz, W. R. Mixon. Oak Ridge National Laboratory, Oak Ridge, Tenn.
R. C. Diamond, R. L. Ritschard, M. H. Sherman. Lawrence Berkeley Laboratory, Berkeley, Calif.

- 330 Field Test Evaluation of Conservation Retrofits of Low-Income Single-Family Buildings in Wisconsin: Summary Report**
ORNL/CON-228/P1 (July 1988)
M. P. Temes, F. D. Boercker, L. N. McCold, M. B. Gettings. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 331 Radiant Barrier Research Plan**
ORNL/CON-256 (June 1988)
K. E. Wilkes, D. W. Yarbrough. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 332 Field Test Evaluation of Conservation Retrofits of Low-Income, Single-Family Buildings in Wisconsin: Blower-Door-Directed Infiltration Reduction Procedure, Field Test Implementation and Results**
ORNL/CON-228/P5 (June 1988)
M. B. Gettings, L. N. McCold. Oak Ridge National Laboratory, Oak Ridge, Tenn.
J. A. Schlegel. Wisconsin Energy Conservation Corp., Madison, Wis.
- 333 Field Test Evaluation of Conservation Retrofits of Low-Income, Single-Family Buildings in Wisconsin: Audit Field Test Implementation and Results**
ORNL/CON-228/P2 (June 1988)
L. N. McCold. Oak Ridge National Laboratory, Oak Ridge, Tenn.
J. A. Schlegel, L. O'Leary. Wisconsin Energy Conservation Corp., Madison, Wis.
D. C. Hewitt. Portland Energy Office, Portland, Ore.
- 334 Resources for O/M Training and Services in the Commercial Building Sector**
ORNL/CON-204 (April 1988)
J. O. Kolb. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 335 An Analytical Investigation of Energy End Use in Commercial Office Buildings**
ORNL/CON-250 (March 1988)
H. A. McLain, J. M. MacDonald, D. J. Downing. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 336 Effect of Lifestyle on Energy Use Estimations and Predicted Savings**
ORNL/CON-241 (March 1988)
T. K. Stovall, L. C. Fuller. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 337 Modeling of Residential Attics with Radiant Barriers**
Proceedings of the Fifth Annual Symposium on Improving Building Energy Efficiency in Hot and Humid Climates, Houston, Texas, September 13-14, 1988, pp. 161-68 (1988)
K. E. Wilkes. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 338 An Overview of 3-D Graphical Analysis Using DOE-2 Hourly Simulation Data**
ASHRAE Trans 94, pp. 212-27 (Atlanta: American Society of Heating, Refrigerating, and Air-Conditioning Engineers, 1988)
J. S. Haberl. University of Colorado, Boulder, Colo.
J. M. MacDonald. Oak Ridge National Laboratory, Oak Ridge, Tenn.
A. Eden. U.S. Department of Energy, Rocky Flats, Colo.

- 339 Management Approaches to Energy Cost Savings In Existing Commercial Buildings**
ORNL/Sub-86/56579/1 (October 1987)
D. G. Bergoust, D. G. Carter, G. A. Jackins, Jr., J. M. Poche, W. A. Rettberg, D. E. Ross, V. Williams, J. M. Bross, E. R. Bajer. American Consulting Engineers Council, Washington, D.C.
A. J. Willman, P. K. McClure. ACEC Research and Management Foundation, Washington, D.C.
J. M. MacDonald. Oak Ridge National Laboratory, Oak Ridge, Tenn.
E. C. Freeman, J. Holmes, P. H. Rose. U.S. Department of Energy, Washington, D.C.
- 340 Estimating Balance Point Temperature for Residential Buildings**
ORNL/CON-209 (August 1987)
T. R. Sharp, J. M. MacDonald. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 341 Single-Family Building Retrofit Performance Monitoring Protocol: Data Specification Guideline**
ORNL/CON-196 (June 1987)
M. P. Ternes. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 342 Cooling Energy Measurements of Single-Family Houses with Attics Containing Radiant Barriers in Combination with R-11 and R-30 Ceiling Insulation**
ORNL/CON-226 (May 1987)
W. P. Levins, M. A. Karnitz. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 343 Field Test Evaluation of Conservation Retrofits of Low-Income, Single-Family Buildings: Combined Building Shell and Heating System Retrofit Audit**
ORNL/CON-228/P3 (May 1987)
L. N. McCold. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 344 Evaluation of Gas Heating System Retrofit Pilot Programs in Kentucky and Minnesota**
ORNL/CON-229 (March 1987)
L. Berry, J. Bledsoe, T. Vineyard, D. L. White. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 345 Heating-Energy Measurements of Unoccupied Single-Family Houses with Attics Containing Radiant Barriers**
ORNL/CON-213 (January 1987)
W. P. Levins, M. A. Karnitz. Oak Ridge National Laboratory, Oak Ridge, Tenn.

CERAMIC TECHNOLOGY PROJECT

- 346 *Apparent Enhanced Fatigue Resistance under Cyclic Tensile Loading for a HIPed Silicon Nitride***
J. Am. Ceram. Soc. 76(3), pp. 788-92 (1993)
 M. G. Jenkins, M. K. Ferber. Oak Ridge National Laboratory, Oak Ridge, Tenn.
 C.-K. J. Lin. Oak Ridge Institute for Science and Education, Oak Ridge, Tenn.
- 347 *Evaluation of Slalon Internal Combustion Engine Components and Fabrication of Several Ceramic Components for Automotive Applications***
 ORNL/M-22553 (October 1992)
 C. H. McMurtry, M. O. Ten Eyck. The Carborundum Company, Niagara Falls, N.Y.
- 348 *Development of Improved Processing Methods for High Reliability Structural Ceramics for Advanced Heat Engines***
 ORNL/Sub/89-SD548/1 (July 1992)
 A. E. Pasto, S. Natansohn. GTE Laboratories, Inc., Waltham, Mass.
- 349 *Ceramic Technology Project Database: March 1990 Summary Report***
 ORNL/M-1860 (July 1992)
 B. L. P. Keyes. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 350 *Ceramic Technology Project Database: September 1991 Summary Report***
 ORNL/M-1862 (June 1992)
 B. L. P. Keyes. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 351 *Ceramic Technology Project Database: September 1990 Summary Report***
 ORNL/M-1861 (June 1992)
 B. L. P. Keyes. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 352 *Development of Wear-Resistant Ceramic Coating for Diesel Engine Components, Volume 1: Coating Development and Tribological Testing, Final Report***
 ORNL/Sub/87-SA581/1 (June 1992)
 M. G. S. Naylor. Cummins Engine Company, Inc., Columbus, Ind.
- 353 *Development of Ceramic Matrix Composites for Application in the Ceramic Technology for Advanced Heat Engines Project Phase IIA. Development of In-Situ Toughened Silicon Nitride***
 ORNL/Sub/85-22008/3 (June 1992)
 J. Pollinger, D. Newson, H. Yeh, E. Solidum, J. Yamanis, M. Behi, C.-W. Li, P. Whalen.
 Garrett Ceramic Components Division, Torrance, Calif.
- 354 *Reliability Improvements of High Strength Silicon Nitride Through Process Optimization and Control***
Proceedings of the Annual Automotive Technology Development Contractors' Coordination Meeting 1991 P-256, pp. 137-44 (Warrendale, Pa.: Society of Automotive Engineers, June 1992)
 V. K. Pujari, D. M. Tracey, N. D. Corbin, M. R. Foley, A. K. Garg, N. I. Paille, P. J. Pelletier, L. C. Sales, C. A. Willkens, R. L. Yeckley. Norton Co., Northboro, Mass.

- 355 Life Prediction Methodology of Ceramic Engine Components**
Proceedings of the Annual Automotive Technology Development Contractors' Coordination Meeting 1991 P-256, pp. 253-59 (Warrendale, Pa.: Society of Automotive Engineers, June 1992)
P. K. Khandelwal, D. L. Vaccari. Allison Gas Turbine Division, General Motors Corp., Indianapolis, Ind.
- 356 Progress in Life Prediction Methodology for Ceramic Components of Advanced Heat Engines**
Proceedings of the Annual Automotive Technology Development Contractors' Coordination Meeting 1991 P-256, pp. 261-72 (Warrendale, Pa.: Society of Automotive Engineers, June 1992)
H. T. Fang, J. S. Cuccio, J. C. Wade, K. G. Seybold. Allied-Signal Aerospace Co., Phoenix, Ariz.
M. G. Jenkins. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 357 Tensile Creep Testing of Structural Ceramics**
Proceedings of the Annual Automotive Technology Development Contractors' Coordination Meeting 1991 P-256, pp. 273-80 (Warrendale, Pa.: Society of Automotive Engineers, June 1992)
S. M. Wiederhorn, R. Krause, D. C. Cranmer. National Institute of Standards and Technology, Gaithersburg, Md.
- 358 Evaluation of the Elevated-Temperature Mechanical Reliability of a HIPed Silicon Nitride**
Proceedings of the Annual Automotive Technology Development Contractors' Coordination Meeting 1991 P-256, pp. 281-91 (Warrendale, Pa.: Society of Automotive Engineers, June 1992)
M. K. Ferber, M. G. Jenkins. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 359 Creep Testing of SNW-1000 Sintered Silicon Nitride**
Proceedings of the Annual Automotive Technology Development Contractors' Coordination Meeting 1991 P-256, pp. 293-305 (Warrendale, Pa.: Society of Automotive Engineers, June 1992)
J. Sankar, A. D. Kelkar, R. Vaidyanathan, J. Gao. North Carolina A&T State University, Greensboro, N.C.
- 360 Statistical Procedures for Estimating Component Strengths and Associated Confidence Bounds**
Proceedings of the Annual Automotive Technology Development Contractors' Coordination Meeting 1991 P-256, pp. 385-95 (Warrendale, Pa.: Society of Automotive Engineers, June 1992)
C. A. Johnson, W. T. Tucker. General Electric Corporate Research and Development, Schenectady, N.Y.
- 361 Mechanical Testing of Candidate Si_3N_4 Ceramics**
Proceedings of the Annual Automotive Technology Development Contractors' Coordination Meeting 1991 P-256, pp. 397-401 (Warrendale, Pa.: Society of Automotive Engineers, June 1992)
N. L. Hecht, S. M. Goodrich, L. Chuck, D. E. McCullum. University of Dayton Research Institute, Dayton, Ohio
- 362 Wear-Resistant Ceramic Coatings**
Proceedings of the Annual Automotive Technology Development Contractors' Coordination Meeting 1991 P-256, pp. 403-15 (Warrendale, Pa.: Society of Automotive Engineers, June 1992)
M. G. S. Naylor. Cummins Engine Co., Inc., Columbus, Ind.

- 363 Development of Wear Resistant Ceramic Coatings for Diesel Engines**
Proceedings of the Annual Automotive Technology Development Contractors' Coordination Meeting 1991 P-256, pp. 417-24 (Warrendale, Pa.: Society of Automotive Engineers, June 1992)
M. H. Haselkorn, F. A. Kelley. Caterpillar, Inc., Peoria, Ill.
- 364 The Cost-Effective Ceramic Machining Program Plan**
Proceedings of the Annual Automotive Technology Development Contractors' Coordination Meeting 1991 P-256, pp. 425-31 (Warrendale, Pa.: Society of Automotive Engineers, June 1992)
P. J. Blau. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 365 Nondestructive Evaluation Development for Process Control of Ceramics**
Proceedings of the Annual Automotive Technology Development Contractors' Coordination Meeting 1991 P-256, pp. 433-37 (Warrendale, Pa.: Society of Automotive Engineers, June 1992)
W. A. Ellingson, D. L. Holloway, E. A. Sivers. Argonne National Laboratory, Argonne, Ill.
J. Ling. Chinese Academy of Sciences.
J. P. Pollinger, H. C. Yeh. Allied Signal Aerospace Co., Torrance, Calif.
- 366 Development of Ultra-Low-Expansion Ceramics: CMZP and CMZP Matrix Composites**
Proceedings of the Annual Automotive Technology Development Contractors' Coordination Meeting 1991 P-256, pp. 145-57 (Warrendale, Pa.: Society of Automotive Engineers, June 1992)
D. A. Hirschfeld, Y. P. Yang, T. K. Li, J. J. Brown. Virginia Polytechnic Institute and State University, Blacksburg, Va.
- 367 In-Situ Reinforced Silicon Nitride**
Proceedings of the Annual Automotive Technology Development Contractors' Coordination Meeting 1991 P-256, pp. 159-65 (Warrendale, Pa.: Society of Automotive Engineers, June 1992)
H. Yeh, D. Newson, J. Pollinger, E. Solidum. Allied-Signal Aerospace Co., Torrance, Calif.
J. Yamanis, M. Behi, C.-W. Li, P. Whalen. Allied-Signal Corp., Morristown, N. J.
- 368 Improved Processing of Ceramic Composites and Cost Effective Sintering of Si_3N_4**
Proceedings of the Annual Automotive Technology Development Contractors' Coordination Meeting 1991 P-256, pp. 167-70 (Warrendale, Pa.: Society of Automotive Engineers, June 1992)
D. E. Wittmer, T. E. Paulson, D. Doshi. Southern Illinois University, Carbondale, Ill.
C. W. Miller, Jr. Centorr Furnaces/Vacuum Industries, Nashua, N. H.
- 369 Scalability Demonstration Program for Silicon Nitride by the Sullivan™ Process for Advanced Ceramics**
Proceedings of the Annual Automotive Technology Development Contractors' Coordination Meeting 1991 P-256, pp. 171-75 (Warrendale, Pa.: Society of Automotive Engineers, June 1992)
T. M. Sullivan. Sullivan Mining Corp., San Diego, Calif.
- 370 Development of a High Temperature Hexoloy SX Silicon Carbide**
Proceedings of the Annual Automotive Technology Development Contractors' Coordination Meeting 1991 P-256, pp. 177-81 (Warrendale, Pa.: Society of Automotive Engineers, June 1992)
K. Chia, G. V. Srinivasan, S. K. Lau, R. S. Storm. The Carborundum Company, Niagara Falls, N. Y.

- 371 Development of Si_3N_4 in the System Si_3N_4 - Y_2O_3 - SiO_2 - MO_2 C**
Proceedings of the Annual Automotive Technology Development Contractors' Coordination Meeting 1991 P-256, pp. 247-51 (Warrendale, Pa.: Society of Automotive Engineers, June 1992)
B. Mikijelj, J. Mangels. Ceradyne, Inc., Costa Mesa, Calif.
- 372 Tribology of Improved Transformation-Toughened Ceramics-Heat Engine Test. Final Report**
ORNL/Sub/90-SG372/1 (April 1992)
E. Lilley, G. A. Rossi, P. J. Pelletier, Norton Company, Northboro, Mass.
- 373 Material Development in the Si_3N_4 System Using Glass Encapsulated Hip'ing. Final Report, Phase II**
ORNL/Sub/86-95906/2 (April 1992)
N. D. Corbin, G. J. Sundberg, K. N. Siebein, C. A. Wilkens, V. K. Pujari, G. A. Rossi, J. S. Hansen, C. L. Chang, J. L. Hammarstrom. Norton Company, Northboro, Mass.
- 374 Analytical and Experimental Evaluation of Joining Ceramic Oxides to Ceramic Oxides and Ceramic Oxides to Metal for Advanced Heat Engine Applications. Final Report**
ORNL/Sub/87-SB046/1 (April 1992)
J. Ahman, B. Majumdar, A. R. Rosenfield, S. L. Swartz, J. Cawley, E. Park, D. Hauser, A. T. Hopper. Battelle Columbus Laboratories, Columbus, Ohio
- 375 Effect of Translucence of Engineering Ceramics on Heat Transfer in Diesel Engines. Final Report.**
ORNL/Sub/88-22042/2 (April 1992)
S. Wahiduzzaman, T. Morel. Integral Technologies Inc., Westmont, Ill.
- 376 Interference of Wedge-Shaped Protrusions on the Faces of a Griffith Crack in Biaxial Stress. Final Report**
ORNL/Sub/87-07685/2 (April 1992)
J. A. M. Boulet. University of Tennessee, Knoxville, Tenn.
- 377 Development of Low-Expansion Ceramics for Diesel Engine Applications. Final Report**
ORNL/Sub/86-22049/1 (April 1992)
J. J. Brown, Jr. Virginia Polytechnic Institute and State University, Blacksburg, Va.
- 378 Development of Ceramic Matrix Composites for Application in Ceramic Technology for Advanced Heat Engine Program. Final Report**
ORNL/Sub/85-22011/2 (April 1992)
S. T. Buljan, J. G. Bakdoni, M. L. Huckabee, J. Neil, J. Hefter. GTE Laboratories, Inc., Waltham, Mass.
- 379 Development of Ceramic Matrix Composites for Application in Ceramic Technology for Advanced Heat Engine Program. Final Report, Phase II**
ORNL/Sub/85-22008/2 (April 1992)
H. Yeh, E. Solidum, K. Karasek, G. Stranford, D. Yuhas, J. Schienle, S. Bradley. Garrett Ceramic Components Division, Allied Signal Aerospace Co., Torrance, Calif.
- 380 Analytical and Experimental Evaluation of Joining Silicon Carbide to Silicon Carbide and Silicon Nitride to Silicon Nitride for Heat Engine Applications. Final Report**
ORNL/Sub/87-SB045/1 (April 1992)
M. R. Foley, G. A. Rossi, G. J. Sundberg, J. A. Wade, F. J. Wu. Norton Company, Northboro, Mass.

- 381 Development of Adherent Ceramic Coatings to Reduce Contact Stress Damage of Ceramics. Final Report**
ORNL/Sub/86-95915/1 (April 1992)
C. D'Angelo, H. J. Kim, D. W. Oblas, H. E. Rebenne, V. K. Sarin. GTE Laboratories, Inc., Waltham, Mass.
- 382 Processing of Sinterable Transformation Toughened Ceramics for Application in Ceramic Technology for Advanced Heat Engines Project. Final Report, Phase II**
ORNL/Sub/85-22031/2 (April 1992)
E. Lilley, G. A. Rossi. Norton Company, Northboro, Mass.
- 383 Interference of Wedge-Shaped Protrusions on the Faces of a Griffith Crack in Biaxial Stress. Final Report**
ORNL/Sub/87-07685/1 (April 1992)
J. A. M. Boulet. University of Tennessee, Knoxville, Tenn.
- 384 Evaluation of Silicon Nitride Internal Combustion Engine Components. Final Report**
ORNL/Sub/89-SE500/1 (April 1992)
W. Voldrich. Garrett Ceramic Components Division, Torrance, Calif.
- 385 Studies of Dynamic Contact of Ceramics and Alloys for Advanced Heat Engines. Final Report**
ORNL/Sub/84-00216/1 (April 1992)
P. A. Gaydos, K. F. Dufrane. Battelle Columbus Division, Columbus, Ohio
- 386 Engine Testing of Ceramic Cam-Roller Followers**
ORNL/Sub/90-SF985/1 (April 1992)
Y. Kalish. Detroit Diesel Corporation, Detroit, Mich.
- 387 Development of Wear Resistant Ceramic Coatings for Diesel Engine Components. Final Report**
ORNL/Sub/87-SA582/1 (April 1992)
M. H. Haselkorn. Caterpillar, Inc., Peoria, Ill.
- 388 Reinforcements for High Temperature Ceramics. Final Report**
ORNL/Sub-90/SB688/1 (April 1992)
C. I. Kyriacou, J. L. Sepulveda, M. A. Watson. Keramont, Tucson, Ariz.
- 389 Ceramic Technology Project Semiannual Progress Report for April 1991 Through September 1991**
ORNL/TM-11984 (March 1992)
D. R. Johnson. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 390 The Cost of Silicon Nitride Powder: What Must It Be To Compete?**
ORNL-6694 (February 1992)
S. Das, T. R. Curlee. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 391 A Review of Techniques for Joining Advanced Ceramics**
Am. Ceram. Soc. Bull. 71(6), pp. 947-54 (1992)
M. L. Santella. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 392 Pressure Casting Process Control by Ultrasonic Technique**
Ceramic Engineering & Science Proceedings 13(7), pp. 536–45 (Westerville, Ohio: American Ceramic Society, 1992)
V. K. Pujari, L. C. Sales. Norton Co., Northboro, Mass.
J. S. Wang, J. Fraser. Precision Acoustics Devices, Inc., Fremont, Calif.
- 393 Continuous Sintering of Si_3N_4 in a Controlled Atmosphere Belt Furnace**
Ceramic Engineering & Science Proceedings 13(7), pp. 546–61 (Westerville, Ohio: American Ceramic Society, 1992)
D. E. Wittmer, T. E. Paulson. Southern Illinois University, Carbondale, Ill.
C. W. Miller, Jr. Centorr Furnaces/Vacuum Industries, Nashua, N. H.
- 394 Twisting and Friction Errors in Flexure Testing**
Ceramic Engineering & Science Proceedings 13(7), pp. 319–30 (Westerville, Ohio: American Ceramic Society, 1992)
G. D. Quinn. National Institute of Standards and Technology, Gaithersburg, Md.
- 395 Ceramic-Metal Joints Brazed with Palladium Alloys**
J. Am. Welding Soc. 71(1), pp. 25s–35s (1992)
J. H. Seiverian, S. Kang. GTE Laboratories, Inc., Waltham, Mass.
- 396 The Role of Ion Species on the Adhesion Enhancement of Ion Beam Mixed Fe/Al_2O_3 Systems**
Proceedings of the Fall Meeting of the Materials Research Society, Boston, December 2–6, 1991 238, pp. 793–98 (Pittsburgh, Pa.: Materials Research Society, 1992)
J. E. Pawel, C. J. McHargue, L. J. Romana, L. L. Horton, J. J. Wert. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 397 Ion Beam Enhanced Adhesion of Iron Films to Sapphire Substrates**
Surf. Coatings Technol. 51, pp. 129–32 (1992)
J. E. Pawel, C. J. McHargue, L. J. Romana, J. J. Wert. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 398 Study and Analysis of the Stress State in a Ceramic, Button-Head, Tensile Specimen**
ORNL/TM-11767 (September 1991)
M. G. Jenkins, M. K. Ferber, R. L. Martin, V. T. Jenkins, V. J. Tennerly. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 399 Report on the Planning Workshop on Cost-Effective Ceramic Machining**
ORNL/M-1745 (November 1991)
P. J. Blau. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 400 Ceramic Technology for Advanced Heat Engines Project Semiannual Progress Report for October 1990 Through March 1991**
ORNL/TM-11859 (July 1991)
D. R. Johnson. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 401 Gelcasting—A New Ceramic Forming Process**
Am. Ceram. Soc. Bull. 70(1), pp. 1641–49 (1991)
O. O. Omatete, M. A. Janney, R. A. Strehlow. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 402 High Temperature Degradation of Structural Composites**
Ceram. Int. 17, pp. 243–52 (1991)
S. M. Wiederhorn, B. J. Hockey. National Institute of Standards and Technology, Gaithersburg, Md.

- 403 Microstructural Characterization of Creep-Deformed SIC Whisker-Reinforced Si_3N_4 Composite**
Ultramicroscopy 37, p. 263 (1991)
K. L. More. Oak Ridge National Laboratory, Oak Ridge, Tenn.
D. A. Koester, R. F. Davis. North Carolina State University, Raleigh, N. C.
- 404 Deformation and Microstructural Changes in SIC Whisker-Reinforced Si_3N_4 Composites**
J. Mater. Res. 6(12), p. 2735 (1991)
D. A. Koester, R. F. Davis. North Carolina State University, Raleigh, N. C.
K. L. More. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 405 Defect Characterization in a CVD α Si_3N_4**
Proceedings of the 49th Annual Meeting of the Electron Microscopy Society of America, ed. G. W. Bailey, pp. 936-37 (San Francisco: San Francisco Press, 1991)
K. L. More. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 406 Ceramic Technology for Advanced Heat Engines Project Semiannual Progress Report for April 1990 Through September 1990**
ORNL/TM-11719 (December 1990)
D. R. Johnson. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 407 Ceramic Technology for Advanced Heat Engines Project Database: September 1989 Summary Report**
ORNL/M-1286 (October 1990)
B. L. P. Keyes. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 408 Mechanical Behavior of a SIC-Fiber/ Si_3N_4 Composite**
MTL TN 90-2* (September 1990)
J. J. Swab, G. D. Quinn, D. J. Snoha. U.S. Army Materials Technology Laboratory, Watertown, Mass.
- 409 The Evaluation of Environmental Effects in Toughened Ceramics for Advanced Heat Engines Investigation of Selected SIC and Si_3N_4 Ceramics**
ORNL/Sub/84-00221/2 (August 1990)
N. L. Hecht, G. A. Graves, D. E. McCullum, A. P. Berens, S. Goodrich, J. D. Wolf, J. R. Hoenigman, P. Yaney, D. Grant, S. Hilton. University of Dayton Research Center, Dayton, Ohio
- 410 Synthesis of High Purity Sinterable Si_3N_4 Powders**
ORNL/Sub/85-SB012/1 (August 1990)
G. M. Crosbie, R. L. Predmesky, J. M. Nicholson. Ford Motor Co., Dearborn, Mich.
- 411 Ceramic Technology for Advanced Heat Engines Project. Semiannual Progress Report for April 1989 Through September 1989**
ORNL/TM-11489 (August 1990)
D. R. Johnson. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 412 Influence of Diesel Engine Exposure on the Rupture Strength of Silicon Nitride and Partially Stabilized Zirconia**
ORNL-6612 (June 1990)
C. R. Brinkman, G. M. Begun, R. L. Graves, W. K. Kahl, K. C. Liu, B. H. West. Oak Ridge National Laboratory, Oak Ridge, Tenn.

* Available from the U.S. Army Materials Technology Laboratory, Watertown, Mass. 02172-0001.

- 413 Effect of Environment upon Mechanical Behavior of Structural Ceramics for Application in the DOE Ceramic Technology for Advanced Heat Engines Project. Final Report, January 1985 December 1986**
ORNL/Sub/84-00221/1 (June 1990)
N. L. Hecht, G. A. Graves, D. E. McCullum, A. P. Berens, S. Goodrich, J. D. Wolf, J. R. Hoenigman, P. Yaney, D. Grant, S. Hilton, S. D. Jang. University of Dayton Research Institute, Dayton, Ohio
- 414 Analytical and Experimental Evaluation of Joining Silicon Nitride to Metal and Silicon Carbide to Metal for Advanced Heat Engine Applications. Final Report Phase I**
ORNL/Sub/87-SB047C/1 (April 1990)
S. Kang, J. H. Selverian, H. Kim, D. O'Neil. GTE Laboratories, Inc., Waltham, Mass.
K. Kim. Brown University, Providence, R.I.
- 415 Ceramic Technology for Advanced Heat Engines Project Data Base: March 1989 Summary Report**
ORNL/M-1098 (April 1990)
B. L. P. Keyes. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 416 Development of Wear-Resistant Ceramic Coatings for Diesel Engine Components**
Proceedings of the Twenty-Seventh Automotive Technology Development Contractors' Coordination Meeting P-230, pp. 131-41 (Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1990)
M. G. S. Naylor, M. P. Fear. Cummins Engine Company, Inc., Columbus, Ind.
- 417 Wear-Resistant Ceramic Coatings for Diesel Engine Components**
Proceedings of the Twenty-Seventh Automotive Technology Development Contractors' Coordination Meeting P-230, pp. 143-48 (Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1990)
M. H. Hasekom, F. A. Kelley, C. D. Weiss. Caterpillar, Inc., Peoria, Ill.
- 418 Studies of Dynamic Contact of Ceramics and Alloys for Advanced Heat Engines**
Proceedings of the Twenty-Seventh Automotive Technology Development Contractors' Coordination Meeting P-230, pp. 149-53 (Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1990)
P. A. Gaydos, K. F. Dufrene. Battelle Columbus Laboratories, Columbus, Ohio
- 419 Identification and Development of Optimum Silicon Carbide Whiskers for Silicon Nitride Matrix Composites**
Proceedings of the Twenty-Seventh Automotive Technology Development Contractors' Coordination Meeting P-230, pp. 167-72 (Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1990)
T. N. Tiegs, L. F. Allard, P. F. Becher, M. K. Ferber. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 420 Synthesis of High-Purity Sinterable Silicon Nitride Powder**
Proceedings of the Twenty-Seventh Automotive Technology Development Contractors' Coordination Meeting P-230, pp. 191-96 (Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1990)
G. M. Crosbie, R. L. Predmesky, J. M. Nicholson. Ford Motor Co., Dearborn, Mich.

- 421 Advanced Processing of High-Performance Silicon Nitride Ceramics**
Proceedings of the Twenty-Seventh Automotive Technology Development Contractors' Coordination Meeting P-230, pp. 197-206 (Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1990)
A. E. Pasto, S. Natansohn. GTE Laboratories, Inc., Waltham, Mass.
- 422 Material Development in the Silicon Nitride-Silicon Carbide Whisker System**
Proceedings of the Twenty-Seventh Automotive Technology Development Contractors' Coordination Meeting P-230, pp. 207-13 (Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1990)
N. D. Corbin, K. N. Siebein, J. S. Hansen, G. J. Sundberg, V. K. Pujari, G. A. Rossi. Norton Co., Northborough, Mass.
- 423 Mechanical Properties Characterization of High Performance Ceramics**
Proceedings of the Twenty-Seventh Automotive Technology Development Contractors' Coordination Meeting P-230, pp. 217-33 (Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1990)
N. L. Hecht, D. E. McCullum, S. Goodrich, L. Chuck. University of Dayton Research Institute, Dayton, Ohio
- 424 High Temperature Tensile and Fatigue Strengths of Silicon Nitride**
Proceedings of the Twenty-Seventh Automotive Technology Development Contractors' Coordination Meeting P-230, pp. 235-44 (Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1990)
K. C. Liu, C. R. Brinkman. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 425 Numerical and Empirical Verification of the Stress State in a Ceramic, Button-head, Tensile Specimen**
Proceedings of the Twenty-Seventh Automotive Technology Development Contractors' Coordination Meeting P-230, pp. 245-50 (Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1990)
M. G. Jenkins, M. K. Ferber, R. L. Martin, V. J. Tennery. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 426 Tensile Creep of SiC Whisker Reinforced Silicon Nitride**
Proceedings of the Twenty-Seventh Automotive Technology Development Contractors' Coordination Meeting P-230, pp. 251-64 (Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1990)
B. J. Hockey, S. M. Wiederhorn, W. Liu. National Institute of Standards and Technology, Gaithersburg, Md.
J. G. Baldoni, S.-T. Buljan. GTE Laboratories, Inc., Waltham, Mass.
- 427 Fracture Strength Analysis of Silicon Nitride and Silicon Carbide Ceramics from an International Cooperative Research Program**
Proceedings of the Twenty-Seventh Automotive Technology Development Contractors' Coordination Meeting P-230, pp. 265-73 (Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1990)
V. J. Tennery, M. K. Ferber. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 428 Life Prediction Methodology for Ceramic Components of Advanced Heat Engines**
Proceedings of the Twenty-Seventh Automotive Technology Development Contractors' Coordination Meeting P-230, pp. 275-82 (Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1990)
A. M. Comfort, J. S. Cuccio. Garrett Auxiliary Power Div., Allied-Signal Aerospace Co., Phoenix, Ariz.

- 429 Low Temperature Degradation of Y-TZP Materials**
MTL TR 90-4* (January 1990)
J. J. Swab. U.S. Army Materials Technology Laboratory, Watertown, Mass.
- 430 Performance of Y-TZP Materials Between 800°C and 1200°C**
MTL TR 90-3* (January 1990)
J. J. Swab. U.S. Army Materials Technology Laboratory, Watertown, Mass.
- 431 Elevated-Temperature-Delayed Failure of Alumina Reinforced With 20 Vol % Silicon Carbide Whiskers**
J. Mater. Sci. **73**, pp. 91-96 (1990)
P. F. Becher, P. Angelini, W. H. Warwick, T. N. Tiegs. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 432 A New Method for Analyzing Data from Continuous Depth-Sensing Microindentation Tests**
J. Mater. Res. **5**, pp. 123-26 (1990)
D. L. Joslin. University of Tennessee, Knoxville, Tenn.
W. C. Oliver. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 433 Thermal Diffusivity/Conductivity of Alumina-Silicon Carbide**
J. Am. Ceram. Soc. **73**, pp. 461-64 (1990)
P. H. McCluskey. Alfred University, Alfred, N.Y.
R. K. Williams, R. S. Graves, T. N. Tiegs. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 434 Effect of Aspect Ratio and Liquid Phase Content on Densification of Alumina-SiC Whisker Composites**
J. Am. Ceram. Soc. **73**(5), pp. 1440-42 (1990)
T. N. Tiegs. Oak Ridge National Laboratory, Oak Ridge, Tenn.
D. M. Dillard. Georgia Institute of Technology, Atlanta, Ga.
- 435 Creep Behavior of an SiC-Whisker-Reinforced Alumina**
J. Am. Ceram. Soc. **73**, pp. 1378-81 (1990)
H. T. Lin, P. F. Becher. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 436 The Role of Interfaces in the Creep-Deformation of an SiC Whisker-Reinforced Si_3N_4 Composite**
Proceedings of the Twelfth International Congress for Electron Microscopy, Seattle, August 12-18, 1990, pp. 382-83 (San Francisco: San Francisco Press, Inc., 1990)
K. L. More. Oak Ridge National Laboratory, Oak Ridge, Tenn.
D. A. Koester, R. F. Davis. North Carolina State University, Raleigh, N.C.
- 437 Synthesis of High Purity Sinterable Silicon Carbide Powder**
ORNL/Sub/84-00214/1 (November 1989)
W. D. Boecker, B. L. Mehosky, R. S. C. Rogers, R. S. Storm, V. Venkateswaran. The Carborundum Company, Structural Ceramics Division, Niagara Falls, N.Y.
- 438 Ceramic Technology for Advanced Heat Engines Project Semiannual Progress Report for October 1988 Through March 1989**
ORNL/TM-11239 (August 1989)
D. R. Johnson. Oak Ridge National Laboratory, Oak Ridge, Tenn.

* Available from the U.S. Army Materials Technology Laboratory, Watertown, Mass. 02172-0001.

- 439 IEA/Annex II Powder Characterization Cooperative Program**
MTL TR 89-53* (June 1989)
T. M. Resetar, J. W. McCauley. U.S. Army Materials Technology Laboratory, Watertown, Mass.
G. E. Schaefer. W. R. Grace Company, Cambridge, Mass.
A. L. Dragoo, S. M. Hsu. National Institute of Standards and Technology, Gaithersburg, Md.
D. R. Johnson. Oak Ridge National Laboratory, Oak Ridge, Tenn.
H. Hausner. Technical University of Berlin, Berlin, FRG
R. Pompe. Swedish Institute for Silicate Research, Göteborg, Sweden
- 440 Life Prediction Methodology for Ceramic Components**
Proceedings of the 26th Automotive Technology Development Contractors' Coordination Meeting, Dearborn, Michigan, October 24-27, 1988, pp. 257-62
(Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1989)
D. L. Vaccari, P. K. Khandelwal. Allison Gas Turbine Div., General Motors Corp., Indianapolis, Ind.
- 441 Development of Silicon Carbide Whisker Reinforced Silicon Nitride Formed by Slip Casting**
Proceedings of the 26th Automotive Technology Development Contractors' Coordination Meeting, Dearborn, Michigan, October 24-27, 1988, pp. 251-55
(Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1989)
H. C. Yeh. Garrett Ceramic Components Division, Torrance, Calif.
J. L. Schienle. Garrett Auxiliary Power Div., Phoenix, Ariz.
K. R. Karasek, S. A. Bradley. Allied-Signal Engineered Materials Research Center, Des Plaines, Ill.
- 442 Silicon Carbide Whisker Reinforced Silicon Nitride**
Proceedings of the 26th Automotive Technology Development Contractors' Coordination Meeting, Dearborn, Michigan, October 24-27, 1988, pp. 243-50
(Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1989)
M. L. Huckabee, J. G. Baldoni, J. T. Neil, G. Zilberstein, S.-T. Buljan. GTE Laboratories, Inc., Waltham, Mass.
- 443 Material Development in the Silicon Nitride-Silicon Carbide Whisker System**
Proceedings of the 26th Automotive Technology Development Contractors' Coordination Meeting, Dearborn, Michigan, October 24-27, 1988, pp. 235-41
(Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1989)
N. D. Corbin, C. A. Willkens, J. L. Hammarstrom, V. K. Pujari, G. A. Rossi, K. N. Siebein. Norton Co., Northboro, Mass.
J. S. Hansen, C. L. Chang. Norton Co., Salt Lake City, Utah
- 444 Development of Improved Processing and Evaluation of Silicon Nitride**
Proceedings of the 26th Automotive Technology Development Contractors' Coordination Meeting, Dearborn, Michigan, October 24-27, 1988, pp. 227-34
(Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1989)
V. K. Pujari, K. E. Amin, P. H. Tewari, S. D. Hartline. Norton Co., Northboro, Mass.

* Available from the U.S. Army Materials Technology Laboratory, Watertown, Mass. 02172-0001.

- 445 Ceramic Coatings to Reduce Contact Stress Damage of Ceramics Performance Testing**
Proceedings of the 26th Automotive Technology Development Contractors' Coordination Meeting, Dearborn, Michigan, October 24-27, 1988, pp. 221-26 (Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1989)
D. W. Oblas, C. D'Angelo, H. E. Rebenne, V. K. Sarin. GTE Laboratories, Inc., Waltham, Mass.
- 446 Dynamic Contact of Ceramics in Ring-Cylinder Applications**
Proceedings of the 26th Automotive Technology Development Contractors' Coordination Meeting, Dearborn, Michigan, October 24-27, 1988, pp. 145-48 (Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1989)
K. F. Dufrane, P. A. Gaydos. Battelle Columbus Div., Columbus, Ohio
- 447 Wear Resistant Ceramic Coatings for Diesel Engine Components**
Proceedings of the 26th Automotive Technology Development Contractors' Coordination Meeting, Dearborn, Michigan, October 24-27, 1988, pp. 119-22 (Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1989)
M. Haselkom, F. Kelley, D. Weiss. Caterpillar, Inc., Peoria, Ill.
- 448 Development of Magnetic Resonance Imaging Technology for Imaging Binder Distribution in Ceramics**
Proceedings of the 26th Automotive Technology Development Contractors' Coordination Meeting, Dearborn, Michigan, October 24-27, 1988, pp. 211-17 (Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1989)
W. A. Ellingson, P. S. Wong. Argonne National Laboratory, Argonne, Ill.
J. L. Ackerman. Massachusetts General Hospital, Boston, Mass.
H. C. Yeh, J. P. Pollinger. Allied-Signal Aerospace Co., Torrance, Calif.
- 449 Confidence Bounds on Strength Estimates**
Proceedings of the 26th Automotive Technology Development Contractors' Coordination Meeting, Dearborn, Michigan, October 24-27, 1988, pp. 205-10 (Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1989)
W. T. Tucker, C. A. Johnson. GE Corporate R&D, Schenectady, N.Y.
- 450 Synthesis and Characterization of Ultra-Low Thermal Expansion Oxide Ceramics**
Proceedings of the 26th Automotive Technology Development Contractors' Coordination Meeting, Dearborn, Michigan, October 24-27, 1988, pp. 187-204 (Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1989)
R. E. Swanson, J. J. Brown. Virginia Polytechnic Institute and State University, Blacksburg, Va.
- 451 Strength and Fatigue of Silicon Nitride in Uniaxial Tension**
Proceedings of the 26th Automotive Technology Development Contractors' Coordination Meeting, Dearborn, Michigan, October 24-27, 1988, pp. 173-86 (Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1989)
J. Sankar, A. Kelkar, A. Sinha. North Carolina A&T State University, Greensboro, N.C.
K. C. Liu. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 452 Analytical and Experimental Evaluation of Joining Silicon Nitride to Metal and Silicon Carbide to Metal**
Proceedings of the 26th Automotive Technology Development Contractors' Coordination Meeting, Dearborn, Michigan, October 24-27, 1988, pp. 165-71
(Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1989)
E. M. Dunn, S. Kang. GTE Laboratories, Inc., Waltham, Mass.
H. Mizuhara. Wesgo Div., GTE Products Corp., Belmont, Calif.
K. S. Kim. University of Illinois, Urbana, Ill.
- 453 Analytical and Experimental Evaluation of Joining Silicon Carbide to Silicon Carbide and Silicon Nitride to Silicon Nitride for Advanced Heat Engine Applications**
Proceedings of the 26th Automotive Technology Development Contractors' Coordination Meeting, Dearborn, Michigan, October 24-27, 1988, pp. 157-63
(Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1989)
G. A. Rossi, D. O. Patten, G. J. Sundberg, C. H. Bates, F. J. Wu. Norton Co., Northboro, Mass.
- 454 Joining of Zirconia Ceramics with a CaO-TiO₂-SiO₂ Interlayer**
Proceedings of the 26th Automotive Technology Development Contractors' Coordination Meeting, Dearborn, Michigan, October 24-27, 1988, pp. 149-54
(Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1989)
S. L. Swartz, B. S. Majumdar, B. C. Mutsuddy. Battelle Columbus Div., Columbus, Ohio
- 455 Zirconia Toughened Ceramics for Heat Engine Applications Phase IIA**
Proceedings of the 26th Automotive Technology Development Contractors' Coordination Meeting, Dearborn, Michigan, October 24-27, 1988, pp. 133-44
(Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1989)
E. Lilley, G. A. Rossi. Norton Co., Northboro, Mass.
- 456 Influence of Diesel Engine Combustion on the Rupture Strength of Partially Stabilized Zirconia**
Proceedings of the 26th Automotive Technology Development Contractors' Coordination Meeting, Dearborn, Michigan, October 24-27, 1988, pp. 123-31
(Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1989)
C. R. Brinkman, G. M. Begun, O. B. Cavin, B. E. Foster, R. L. Graves, W. K. Kahl, K. C. Liu, W. A. Simpson. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 457 Development of Wear-Resistant Ceramic Coatings for Advanced Diesel Engines**
Proceedings of the 26th Automotive Technology Development Contractors' Coordination Meeting, Dearborn, Michigan, October 24-27, 1988, pp. 111-18
(Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1989)
M. G. S. Naylor, M. P. Fear. Cummins Engine Co., Inc., Columbus, Ind.
- 458 Ceramic Technology for Advanced Heat Engines Project Semiannual Progress Report for April Through September 1988**
ORNL/TM-11116 (March 1989)
D. R. Johnson. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 459 Properties of Yttria-Tetragonal Zirconia Polycrystal (Y-TZP) Materials After Long-Term Exposure to Elevated Temperatures**
MTL TR 89-21* (March 1989)
J. J. Swab. U.S. Army Materials Technology Laboratory, Watertown, Mass.

* Available from the U.S. Army Materials Technology Laboratory, Watertown, Mass. 02172-0001.

- 460 Ceramic Technology for Advanced Heat Engines Project Data Base: September 1988 Summary Report**
ORNL/M-755 (March 1989)
B. L. P. Booker. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 461 Thin Film and Near Surface Characterization Using Indentation Systems**
Proceedings NATO Advanced Study Institute on Structure-Property Relationships in Surface-Modified Ceramics, Ciocco, Italy, August 28-September 9, 1988, pp. 295-302 (Boston; Dordrecht, The Netherlands: Kluwer Academic Publishers, 1989)
D. L. Joslin. University of Tennessee, Knoxville, Tenn.
C. J. McHargue, W. C. Oliver. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 462 Exploratory High-Temperature Tensile and Cyclic Fatigue Characterization of Commercial MgO-PSZ**
Proceedings Third International Symposium on Ceramic Materials and Components, Las Vegas, November 27-30, 1988, pp. 841-55 (Westerville, Ohio: American Ceramic Society, 1989)
K. C. Liu, C. R. Brinkman. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 463 Pre-Pilot Synthesis of Low Carbon Si_3N_4**
Proceedings Second International Conference on Ceramic Powder Processing Science, Berchtesgaden, FRG, October 12-14, 1988, pp. 269-73 (Bad Honnef: Deutsche Keramische Gesellschaft, 1989)
G. M. Crosbie, J. M. Nicholson, R. L. Predmesky, E. D. Stiles. Ford Motor Company, Dearborn, Mich.
- 464 Laser Diffraction Methods for High Temperature Strain Measurements**
Proceedings Spring Conference on Experimental Mechanics, Cambridge, Mass., May 28-June 2, 1989, pp. 87-93 (Society of Experimental Mechanics, 1989)
H. Pih. University of Tennessee, Knoxville, Tenn.
K. C. Liu. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 465 Theoretical and Experimental Analysis of the Toughening Behavior of Whisker Reinforcement in Ceramic Matrix Composites**
Mater. Sci. Eng. A107, pp. 257-59 (1989)
P. F. Becher, C. H. Hsueh, P. Angelini, T. N. Tieg. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 466 Ceramic Technology for Advanced Heat Engines Project Semiannual Progress Report for October 1987 Through March 1988**
ORNL/TM-10838 (December 1988)
D. R. Johnson. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 467 Influence of Diesel Engine Combustion on the Rupture Strength of Partially Stabilized Zirconia**
ORNL-6513 (December 1988)
C. R. Brinkman, G. M. Begun, O. B. Cavin, B. E. Foster, R. L. Graves, W. K. Kahl, K. C. Liu, W. A. Simpson. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 468 Brazing Ceramic Oxides to Metals at Low Temperatures**
Weld. J., pp. 227s-32s (October 1988)
J. P. Hammond, S. A. David, M. L. Santella. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 469 Dispersoid-Toughened Silicon Nitride Composites**
ORNL/Sub/85-22011/1 (September 1988)
S.-T. Buljan, J. G. Baldoni, J. Neil, G. Zilberstein. GTE Laboratories, Inc., Waltham, Mass.

- 470 Processing of Sinterable Transformation Toughened Ceramics for Application in Ceramic Technology for Advanced Heat Engines Project. Final Report**
ORNL/Sub/85-22031/1 (September 1988)
G. A. Rossi, J. B. Blum, C. E. Knapp, K. E. Manwiller. Norton Co., Northboro, Mass.
- 471 Development of Toughened Si_3N_4 Composites by Glass Encapsulated Hot Isostatic Pressure. Final Report**
ORNL/Sub/86-95906/1 (August 1988)
N. D. Corbin, C. A. Willkens. Norton Co., Northboro, Mass.
- 472 Transformation-Toughened Silicon Nitride. Final Report**
ORNL/Sub/85-22009/1 (August 1988)
H. W. Carpenter. Rockwell International, Rockedye Division, Canoga Park, Calif.
- 473 Processing and Characterization of Transformation-Toughened Ceramics with Strength Retention to Elevated Temperatures. Final Report**
ORNL/Sub/85-22028/1 (July 1988)
R. A. Cutler, J. J. Hansen, D. W. Prouse, J. D. Bright. Ceramtec, Inc., Salt Lake City, Utah
A. V. Virkar, D. K. Shetty. University of Utah, Salt Lake City, Utah
- 474 Time-Dependent Mechanical Behavior of Partially Stabilized Zirconia for Diesel Engine Applications**
ORNL/Sub/85-27416/1 (July 1988)
M. K. Ferber. Oak Ridge National Laboratory, Oak Ridge, Tenn.
T. Hine. University of Illinois Urbana-Champaign, Urbana, Ill.
- 475 Analysis of Adhesion Test Methods and the Evaluation of Their Use for Ion-beam-mixed Metal/Ceramic Systems**
ORNL/TM-10468 (July 1988)
J. E. Pawel. Vanderbilt University, Nashville, Tenn.
- 476 Development of Ceramic Matrix Composites for Application in the Ceramic Technology for Advanced Heat Engines, Final Report**
ORNL/Sub/85-22008/1 (June 1988)
H. Yeh, J. Schienle, K. Karasek, S. Bradley. Garrett Ceramic Components Division, Torrance, Calif.
- 477 Thermal Conductivity of Oxide Ceramics**
Proc. 25th Automotive Technology Development Contractors' Coordination Meeting, pp. 233-38 (Warrendale, Pa.: Society of Automotive Engineers, April 1988)
R. K. Williams, R. S. Graves, D. W. Yarbrough. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 478 Ultrasonic Development for Advanced Structural Ceramics**
Proc. 25th Automotive Technology Development Contractors' Coordination Meeting, pp. 207-15 (Warrendale, Pa.: Society of Automotive Engineers, April 1988)
W. A. Simpson, R. W. McClung. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 479 Ceramic Coatings to Reduce Contact Stress Damage of Ceramics Thermodynamic Modeling**
Proc. 25th Automotive Technology Development Contractors' Coordination Meeting, pp. 199-206 (Warrendale, Pa.: Society of Automotive Engineers, April 1988)
H. E. Rebenne, V. K. Sarin. GTE Laboratories, Inc., Waltham, Mass.

- 480 Dynamic Tensile Cyclic Fatigue of Si_3N_4**
Proc. 25th Automotive Technology Development Contractors' Coordination Meeting, pp. 189-97 (Warrendale, Pa.: Society of Automotive Engineers, April 1988)
K. C. Liu, C. R. Brinkman. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 481 Testing and Evaluation of Si_3N_4 in Uniaxial Tension at Room Temperature**
Proc. 25th Automotive Technology Development Contractors' Coordination Meeting, pp. 175-86 (Warrendale, Pa.: Society of Automotive Engineers, April 1988)
R. Vaidyanathan, J. Sankar, V. S. Avva. North Carolina A&T State University, Greensboro, N.C.
- 482 Monolithic Si_3N_4 and SiC Whisker/ Si_3N_4 Matrix Composite**
Proc. 25th Automotive Technology Development Contractors' Coordination Meeting, pp. 153-60 (Warrendale, Pa.: Society of Automotive Engineers, April 1988)
K. Teng, H. Yeh. Garrett Ceramic Components Division, Allied-Signal Aerospace Co., Torrance, Calif.
H. Fang, J. Schienle. Garrett Auxiliary Power Division, Allied-Signal Aerospace Co., Phoenix, Ariz.
S. Bradley, K. Karasek. Allied-Signal Engineered Materials Research Center, Des Plaines, Ill.
- 483 Development of Toughened Si_3N_4 Composites by Glass Encapsulated Hot Isostatic Pressure**
Proc. 25th Automotive Technology Development Contractors' Coordination Meeting, pp. 145-51 (Warrendale, Pa.: Society of Automotive Engineers, April 1988)
C. A. Willkens, N. D. Corbin. Norton Co., Northboro, Mass.
- 484 SiC Whisker-Reinforced Si_3N_4**
Proc. 25th Automotive Technology Development Contractors' Coordination Meeting, pp. 137-44 (Warrendale, Pa.: Society of Automotive Engineers, April 1988)
S.-T. Buljan, J. G. Baldoni, M. L. Huckabee, J. T. Neil, G. Zilberstein. GTE Laboratories, Inc., Waltham, Mass.
- 485 An Assessment of the State of the Art in Predicting the Failure of Ceramics**
ORNL/Sub/86-57598/1 (March 1988)
J. A. M. Boulet. University of Tennessee, Knoxville, Tenn.
- 486 Ceramic Technology for Advanced Heat Engines Program Data Base: A Summary Report**
ORNL/M-462 (March 1988)
M. K. Booker. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 487 Ceramic Technology for Advanced Heat Engines Project Semiannual Progress Report for April 1987 Through September 1987**
ORNL/TM-10705 (March 1988)
D. R. Johnson. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 488 Studies of Dynamic Contact of Ceramics and Alloys for Advanced Heat Engines**
ORNL/Sub/84-00216/1 (March 1988)
K. F. Dufrane, W. A. Glaeser, A. R. Rosenfield. Battelle Columbus Laboratory, Columbus, Ohio

- 489 Toughening Behavior in Whisker-Reinforced Ceramic Matrix Composites**
J. Am. Ceram. Soc. 71, pp. 1050-61 (1988)
P. F. Becher, C. H. Hsueh, P. Angelini, T. N. Tiegs. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 490 Brazing of Titanium-Vapor-Coated Silicon Nitride**
Adv. Ceram. Mater. 3, pp. 457-62 (1988)
M. L. Santella. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 491 Comparison of Thermal Conductivity Data for Partially Stabilized Zirconia With Values Derived From Thermal Diffusivity Results**
Int. J. Thermophys. 9, pp. 587-98 (1988)
R. K. Williams, J. B. Bates, R. S. Graves, D. L. McElroy, F. J. Weaver. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 492 On-Line NDE for Control and Modeling of Ceramic Processing**
MRS Bull. 13, pp. 34-39 (1988)
R. W. McClung, D. R. Johnson. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 493 Temperature Dependence of Strengthening by Whisker Reinforcement: SiC Whisker Reinforced Alumina in Air**
Adv. Ceram. Mater. 3, pp. 148-53 (1988)
P. F. Becher, T. N. Tiegs. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 494 Use of the Scratch Test to Measure Changes in Adhesion of Cr/Al₂O₃ Due to Ion Beam Mixing**
J. Adhesion Sci. Technol. 2, pp. 385-93 (1988)
J. E. Pawel. Vanderbilt University, Nashville, Tenn.
C. J. McHargue. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 495 Testing of Adhesion of Thin Films to Substrates**
J. Adhesion Sci. Technol. 2, pp. 369-83 (1988)
J. E. Pawel. Vanderbilt University, Nashville, Tenn.
C. J. McHargue. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 496 Effect of Translucence of Engineering Ceramics on Heat Transfer in Diesel Engines**
ORNL/Sub/86-22042/1 (October 1987)
S. Wahiduzzaman, T. Morel. Integral Technologies, Inc., Westmont, Ill.
- 497 Computer Interfacing of a Raman Spectroscopy Facility for Application to Quantitative Analyses of Crystalline Phases in Transformation-Toughened Ceramics**
M.S. Thesis, Graduate Engineering and Research School of Engineering, University of Dayton, August 1987
S. J. Pruchnic, Jr. University of Dayton, Dayton, Ohio
- 498 Needs Assessment for Nondestructive Testing and Materials Characterization for Improved Reliability in Structural Ceramics for Heat Engines**
ORNL/TM-10354 (August 1987)
D. R. Johnson, R. W. McClung, M. A. Janney. Oak Ridge National Laboratory, Oak Ridge, Tenn.
W. M. Hanusiak. Consultant to Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 499 Ceramic Technology for Advanced Heat Engines Project Semiannual Progress Report for October 1986 through March 1987**
ORNL/TM-10469 (August 1987)
D. R. Johnson. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 500 Status of Experimental Studies on the Sol-Gel Synthesis of Ceramic Powders for High-Strength Ceramic Materials Applications**
ORNL/TM-9835 (May 1987)
W. D. Bond, G. D. Davis, P. Angelini, P. F. Becher, T. N. Tiegs. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 501 Application of Laser Raman Macro- and Microprobes Using Cylindrical Optics to the Study of Zirconia Ceramic Materials**
M.S. Thesis, Graduate Engineering and Research School of Engineering, University of Dayton, April 1987
M. L. Lander. University of Dayton, Dayton, Ohio
- 502 High Temperature Coating Study to Reduce Contact Stress Damage of Ceramics. Final Report**
ORNL/Sub/84-47992/1 (March 1987)
J. Schienle, J. Smyth. Garrett Turbine Engine Co., Phoenix, Ariz.
- 503 Ceramic Technology for Advanced Heat Engines Project Semiannual Progress Report for April through September 1986**
ORNL/TM-10308 (March 1987)
D. R. Johnson. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 504 Thermal Shock Behavior of an Alumina-SiC Whisker Composite**
J. Am. Ceram. Soc. **70**, pp. C109-111 (1987)
T. N. Tiegs, P. F. Becher. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 505 The Effects of Cr_2O_3 and Fe_2O_3 Additions on the Thermal Conductivity of Al_2O_3**
J. Appl. Physics **61**(10), pp. 4894-4901 (1987)
R. K. Williams, R. S. Graves, M. A. Janney, T. N. Tiegs, D. W. Yarbrough. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 506 Deformation Behavior of SiC Whisker-Reinforced Si_3N_4**
Advanced Structural Ceramics. Materials Research Society Symposia Proceedings 78, ed. P. F. Becher, M. V. Swain and S. Somiya, pp. 295-301 (Pittsburgh, Pa.: Materials Research Society, 1987)
R. Nixon, S. Chevacharoenkul, R. F. Davis. North Carolina State University, Raleigh, N.C.
M. L. Huckabee, S.-T. Buljan. GTE Laboratories, Inc., Waltham, Mass.
- 507 Evaluation of Commercially Available Transformation Toughened Zirconias**
Advanced Structural Ceramics. Materials Research Society Symposia Proceedings 78, ed. P. F. Becher, M. V. Swain and S. Somiya, pp. 137-46 (Pittsburgh, Pa.: Materials Research Society, 1987)
J. J. Swab. U.S. Army Materials Technology Laboratory, Watertown, Mass.
- 508 Microstructure Development in Si_3N_4 -Based Composites**
Advanced Structural Ceramics. Materials Research Society Symposia Proceedings 78, ed. P. F. Becher, M. V. Swain and S. Somiya, pp. 273-81 (Pittsburgh, Pa.: Materials Research Society, 1987)
S.-T. Buljan, G. Zilberstein. GTE Laboratories, Inc., Waltham, Mass.

- 509 *Si₃N₄-SiC Composites***
Bull. Am. Ceram. Soc. **66**(2), pp. 347-52 (1987)
S.-T. Buljan, J. G. Baldoni, M. L. Huckabee. GTE Laboratories, Inc., Waltham, Mass.
- 510 *Relation of Transformation Temperature to the Fracture Toughness of Transformation-Toughened Ceramics***
J. Mater. Sci. **22**, pp. 76-84 (1987)
P. F. Becher, M. K. Ferber. Oak Ridge National Laboratory, Oak Ridge, Tenn.
M. V. Swain. Advanced Materials Laboratory, CSIRO, Melbourne, Victoria, Australia
- 511 *Mechanical Behavior of MgO-Partially Stabilized ZrO₂ Ceramics at Elevated Temperatures***
J. Mater. Sci. **22**, pp. 973-80 (1987)
P. F. Becher, M. K. Ferber. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 512 *Sintered Al₂O₃-SiC-Whisker Composites***
Am. Ceram. Soc. Bull. **66**(2), pp. 339-42 (1987)
T. N. Tiegs, P. F. Becher. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 513 *Wear Mechanisms of Monolithic Ceramics Under Diesel Combustion Chamber***
Proceedings of the Third Berkeley Conference on Elevated Temperature Corrosion-Erosion-Wear of Materials, ed. A. V. Levy, pp. 333-51 (Houston, Texas: National Association of Corrosion Engineers, 1987)
W. A. Glaeser, K. F. Dufrane, A. R. Rosenfield. Battelle Columbus Laboratory, Columbus, Ohio
- 514 *Fracture Toughness Testing of Ceramics Using a Laser Interferometric Strain Gage***
Am. Ceram. Soc. Bull. **66**(12), pp. 1734-38 (1987)
M. G. Jenkins, A. S. Kobayashi, M. Sakai, K. W. White, R. C. Bradt. University of Washington, Seattle, Wash.
- 515 *Crack Initiation and Arrest in an SiC Whisker/Al₂O₃ Matrix Composite***
J. Am. Ceram. Soc. **70**(6), pp. 393-95 (1987)
M. G. Jenkins, A. S. Kobayashi, K. W. White, R. C. Bradt. University of Washington, Seattle, Wash.
- 516 *Dispersion-Toughened Si₃N₄***
Proc. 24th Automotive Technology Development Contractors' Coordination Meeting, Dearborn, Michigan, October 27-30, 1986, pp. 319-25 (Warrendale, Pa.: Society of Automotive Engineers, 1987)
M. Martin, H. Yeh. AiResearch Casting Co., Torrance, Calif.
J. Schienle. Garrett Turbine Engine Co., Phoenix, Ariz.
- 517 *Sintering of Silicon Nitride***
Proc. 24th Automotive Technology Development Contractors' Coordination Meeting, Dearborn, Michigan, October 27-30, 1986, pp. 295-98 (Warrendale, Pa.: Society of Automotive Engineers, 1987)
G. E. Gazza. U.S. Army Materials Technology Laboratory, Watertown, Mass.
D. W. Heichel. Geo-Centers, Inc., Newton Upper Falls, Mass.

- 518 Transformation Toughened Alumina with Improved Strength at Elevated Temperatures**
Proc. 24th Automotive Technology Development Contractors' Coordination Meeting, Dearborn, Michigan, October 27-30, 1986, pp. 285-93 (Warrendale, Pa.: Society of Automotive Engineers, 1987)
R. A. Cutler, J. D. Bright. Ceramtec, Inc., Salt Lake City, Utah
A. V. Virkar, D. K. Shetty. University of Utah, Salt Lake City, Utah
- 519 Modifications in Strength Distributions Due to Slow Crack Growth**
Proc. 24th Automotive Technology Development Contractors' Coordination Meeting, Dearborn, Michigan, October 27-30, 1986, pp. 233-39 (Warrendale, Pa.: Society of Automotive Engineers, 1987)
C. A. Johnson, W. T. Tucker. General Electric Corporate Research and Development, Schenectady, N.Y.
- 520 Environmental Effects on Transformation Toughened Ceramics**
Proc. 24th Automotive Technology Development Contractors' Coordination Meeting, Dearborn, Michigan, October 27-30, 1986, pp. 209-20 (Warrendale, Pa.: Society of Automotive Engineers, 1987)
N. L. Hecht, S. D. Jang, D. E. McCullum. University of Dayton Research Institute, Dayton, Ohio
- 521 Fatigue Behavior of Partially Stabilized Zirconia Ceramics**
Proc. 24th Automotive Technology Development Contractors' Coordination Meeting, Dearborn, Michigan, October 27-30, 1986, pp. 201-208 (Warrendale, Pa.: Society of Automotive Engineers, 1987)
M. K. Ferber. Oak Ridge National Laboratory, Oak Ridge, Tenn.
T. Hine. University of Illinois Urbana-Champaign, Urbana, Ill.
- 522 Tensile Cyclic Fatigue of Alumina at Room and Elevated Temperatures**
Proc. 24th Automotive Technology Development Contractors' Coordination Meeting, Dearborn, Michigan, October 27-30, 1986, pp. 191-200 (Warrendale, Pa.: Society of Automotive Engineers, 1987)
K. C. Liu, C. R. Brinkman. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 523 Development of Alumina- and Mullite-SiC Whisker Composites: High Temperature Properties**
Proc. 24th Automotive Technology Development Contractors' Coordination Meeting, Dearborn, Michigan, October 27-30, 1986, pp. 279-83 (Warrendale, Pa.: Society of Automotive Engineers, 1987)
T. N. Tiegs, P. F. Becher. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 524 Wear of Ceramics in Advanced Heat Engine Applications**
1987 Wear of Materials Conference, p. 285 (New York: American Society of Mechanical Engineers, 1987)
K. F. Dufrane, W. A. Glaeser. Battelle Columbus Laboratory, Columbus, Ohio
- 525 Determination of Phase Composition of Silicon Nitride Powders by Silicon-29 Magic Angle Spinning Nuclear Magnetic Resonance Spectroscopy**
Anal. Chem. 59(23), pp. 2794-97 (1987)
K. R. Carduner, R. O. Carter III, M. E. Milberg, G. M. Crosbie. Ford Motor Co., Dearborn, Mich.

- 526** *Transient Behavior of Structural Ceramics under Flexural Creep*
Proc. Third International Conference on Creep and Fracture of Engineering Materials and Structures, ed. B. Wiltshire and R. W. Evans (London: The Institute of Metals, 1987)
T. J. Chuang, S. M. Wiederhorn, C. F. Chen. National Bureau of Standards, Gaithersburg, Md.

ALTERNATIVE FUELS AND PROPULSION TECHNOLOGY

- 527 Federal Methanol Fleet Project. Final Report**
ORNL/TM-12278 (March 1993)
B. H. West, R. N. McGill, S. L. Hillis. Oak Ridge National Laboratory, Oak Ridge, Tenn.
J. W. Hodgson. University of Tennessee, Knoxville, Tenn.
- 528 Heat Transfer Effectiveness of a Thermal Barrier Coating with Different Fuel Compositions**
ORNL/TM-11816 (June 1991)
N. Domingo. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 529 Results from the Third Year of Operation of the Federal Methanol Fleet at Argonne National Laboratory**
ORNL/TM-11736 (January 1991)
B. H. West, R. N. McGill. Oak Ridge National Laboratory, Oak Ridge, Tenn.
S. L. Hillis, J. W. Hodgson. University of Tennessee, Knoxville, Tenn.
- 530 Neat Methanol Combustion in a DI Diesel Engine Using Catalytically Coated Glow Plugs**
Alternative Liquid Fuels in Transportation, pp. 97-105, proceedings of the International Fuels and Lubricants Meeting and Exposition, Toronto, Ontario, Canada, October 7-10, 1991, SAE Special Publication 889 (Warrendale, Pa.: Society of Automotive Engineers, 1991)
W. Mitchell, T. A. Litzinger, D. A. Santavicca. The Pennsylvania State University, University Park, Pa.
- 531 High-Alcohol Microemulsion Fuel Performance in a Diesel Engine**
SAE* Paper 902101, presented at the 1990 SAE International Fuels and Lubricants Meeting and Exposition, October 22-25, 1990, Tulsa, Oklahoma
B. H. West, A. L. Compere, W. L. Griffith. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 532 Interpretation of Engine Cycle-to-Cycle Variation by Chaotic Time Series Analysis**
SAE Paper 902103, presented at the 1990 SAE International Fuels and Lubricants Meeting and Exposition, October 22-25, 1990, Tulsa, Oklahoma
C. S. Daw, W. K. Kahl. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 533 Results from the Second Year of Operation of the Federal Methanol Fleet at Oak Ridge National Laboratory**
ORNL/TM-11622 (September 1990)
B. H. West, R. N. McGill. Oak Ridge National Laboratory, Oak Ridge, Tenn.
S. L. Hillis. University of Tennessee, Knoxville, Tenn.
- 534 Results from the Fourth Year of Operation of the Federal Methanol Fleet at Lawrence Berkeley Laboratory**
ORNL/TM-11590 (August 1990)
B. H. West, R. N. McGill. Oak Ridge National Laboratory, Oak Ridge, Tenn.
S. L. Hillis. University of Tennessee, Knoxville, Tenn.

*SAE papers are available from the Society of Automotive Engineers International, 400 Commonwealth Drive, Warrendale PA 15096-0001.

- 535 Heavy Duty Liquid and Gaseous Fuel Emissions Database Test Results from Four Alternative Fuel Configurations of the Caterpillar 3406 Engine**
ORNL/Sub/86-SB195/1 (June 1990)
D. J. Waldman. Caterpillar, Inc., Technical Center, Peoria, Ill.
- 536 Federal Methanol Fleet Update**
Proceedings Twenty-Seventh Automotive Technology Development Contractors' Coordination Meeting, Dearborn, Mich., October 23-26, 1989 P-230, pp. 11-15 (Warrendale, Pa.: Society of Automotive Engineers, April 1990)
R. N. McGill. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 537 Alternative Fuels R&D Needs Program Directions**
Proceedings Twenty-Seventh Automotive Technology Development Contractors' Coordination Meeting, Dearborn, Mich., October 23-26, 1989 P-230, pp. 7-9 (Warrendale, Pa.: Society of Automotive Engineers, April 1990)
R. L. Graves. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 538 Ignition Enhancement of the DDC Methanol Engine**
Proceedings of the Twenty-Seventh Automotive Technology Development Contractors' Coordination Meeting P-230, pp. 23-28 (Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1990)
P. M. Laing, R. E. Winsor. Detroit Diesel Corp., Detroit, Mich.
- 539 Heavy Duty Liquid and Gaseous Fuel Database Test Results from Four Alternative Configurations of the Caterpillar 3406 Engine**
Proceedings of the Twenty-Seventh Automotive Technology Development Contractors' Coordination Meeting P-230, pp. 29-41 (Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1990)
D. J. Waldman. Caterpillar, Inc., Peoria, Ill.
- 540 Photographic Visualization of the Ignition of Methanol in a Compression Ignition Engine**
Proceedings of the Twenty-Seventh Automotive Technology Development Contractors' Coordination Meeting P-230, pp. 17-22 (Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1990)
D. L. Abata. Michigan Technological University, Houghton, Mich.
- 541 Performance Comparisons of Insulated and Non-Insulated Diesel Engines**
Proceedings of the Twenty-Seventh Automotive Technology Development Contractors' Coordination Meeting P-230, pp. 75-80 (Warrendale, Pa.: Society of Automotive Engineers, Inc., April 1990)
W. K. Cheng, V. W. Wong, F. Gao. Massachusetts Institute of Technology, Cambridge, Mass.
- 542 Experimental Heat Transfer Efforts with Thermal Barrier Materials at ORNL**
Proc. Workshop on Coatings for Advanced Heat Engines, Castine, Maine, August 5-9, 1990, pp. IV-53-IV-60 (Washington, D.C.: Department of Energy, 1990)
N. Domingo, M. R. Cates. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 543 Low-Heat-Rejection Engine Research Status: Where Do We Go From Here?**
SAE Paper 900621, presented at the 1990 SAE International Congress and Exposition, February 26-March 2, 1990, Detroit, Michigan
C. S. Reddy. Union College, Schenectady, N.Y.
N. Domingo, R. L. Graves. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 544 Chemical Effect of Fuel Composition Changes on Emissions from a DI Diesel Engine. Final Report**
ORNL/Sub/86-SB020/1 (December 1989)
T. A. Litzinger. The Pennsylvania State University, University Park, Pa.
- 545 Abnormal Combustion in a Methanol Fueled Engine**
SAE paper no. 892162, presented at the 1989 SAE International Fuels and Lubricants Meeting and Exposition, September 1989, Baltimore, Md.
M. R. Swain, J. A. Blanco, M. N. Swain. University of Miami, Coral Gables, Fla.
- 546 Effects of Fuel/Air Mixture Preparation on Fuel Nitrogen Conversion in a Spark Ignition Engine**
SAE paper no. 892161, presented at the 1989 SAE International Fuels and Lubricants Meeting and Exposition, September 1989, Baltimore, Md.
J. W. Hodgson. University of Tennessee, Knoxville, Tenn.
R. N. McGill. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 547 The Effect of Hydro Treatment of Coal-Derived Synthetic Fuels on DI Diesel Emissions and Performance**
SAE paper no. 892132, presented at the 1989 SAE International Fuels and Lubricants Meeting and Exposition, September 1989, Baltimore, Md.
J. H. Palumbo, T. A. Litzinger. Pennsylvania State University, University Park, Pa.
- 548 Hydroprocessing of Direct Coal Liquefaction Product for Diesel Engine Fuel**
SAE paper no. 892131, presented at the 1989 SAE International Fuels and Lubricants Meeting and Exposition, September 1989, Baltimore, Md.
N. R. Sefer, J. Erwin. Southwest Research Institute, San Antonio, Texas
- 549 The Effect of Aromatics and Cycloparaffins on DI Diesel Emissions**
SAE paper no. 892130, presented at the 1989 SAE International Fuels and Lubricants Meeting and Exposition, September 1989, Baltimore, Md.
C. T. Flanigan, T. A. Litzinger. Pennsylvania State University, University Park, Pa.
R. L. Graves. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 550 Thermal Barrier Effects on Performance and Emissions of a Methanol Fueled DI Engine**
SAE paper no. 892163, presented at the 1989 SAE International Fuels and Lubricants Meeting and Exposition, September 1989, Baltimore, Md.
W. K. Kahl. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 551 Results from the Second Year of Operation of the Federal Methanol Fleet at Argonne National Laboratory**
ORNL/TM-11230 (August 1989)
R. N. McGill, B. H. West. Oak Ridge National Laboratory, Oak Ridge, Tenn.
S. L. Hillis, J. W. Hodgson. University of Tennessee, Knoxville, Tenn.
- 552 Results from the First Year of Operation of the Federal Methanol Fleet at Oak Ridge National Laboratory**
ORNL/TM-11229 (July 1989)
R. N. McGill, B. H. West. Oak Ridge National Laboratory, Oak Ridge, Tenn.
S. L. Hillis, J. W. Hodgson. University of Tennessee, Knoxville, Tenn.
- 553 Fuel Nitrogen Conversion in a Spark Ignition Engine Part II: Effects of Fuel/Air Mixture Preparation**
ORNL/Sub/87-07685/1 (February 1989)
J. W. Hodgson. University of Tennessee, Knoxville, Tenn.

- 554 Analysis of the Combustion of Four Alternate Fuels in a Diesel Engine Using High Speed Photography. Final Report**
ORNL/Sub/87-91333/1 (February 1989)
D. L. Abata, D. Masterson. Michigan Technological University, Houghton, Mich.
- 555 Evaluation of the Effects of Natural Gas Contaminants on Corrosion in Compressed Natural Gas Storage Systems—Phase II**
ORNL/Sub/85-22025/1 (January 1989)
F. F. Lyle, Jr. Southwest Research Institute, San Antonio, Texas
- 556 The Department of Energy's Federal Methanol Fleet—A Progress Report**
SAE paper no. 881629, presented at the 1988 SAE Fuels and Lubricants Meeting and Exposition, October 1988, Portland, Ore.
R. N. McGill. Oak Ridge National Laboratory, Oak Ridge, Tenn.
S. L. Hillis. University of Tennessee, Knoxville, Tenn.
- 557 Effect of Reduced Combustion Chamber Heat Loss on Alternative Fuels Combustion**
SAE paper no. 881628, presented at the 1988 SAE Fuels and Lubricants Meeting and Exposition, October 1988, Portland, Ore.
C. E. Hunter, E. E. Daby, I. J. Garwin, P. H. Havstad. Ford Motor Co., Dearborn, Mich.
- 558 Shale-Derived Diesel Test Fuels for Utilization Studies**
SAE paper no. 881627, presented at the 1988 SAE Fuels and Lubricants Meeting and Exposition, October 1988, Portland, Ore.
J. Erwin, N. R. Sefer. Southwest Research Institute, San Antonio, Texas
- 559 Engine and Constant Volume Bomb Studies of Diesel Ignition and Combustion**
SAE paper no. 881626, presented at the 1988 SAE Fuels and Lubricants Meeting and Exposition, October 1988, Portland, Ore.
T. W. Ryan III, T. J. Callahan. Southwest Research Institute, San Antonio, Texas
- 560 Results from the First Year of Operation of the Federal Methanol Fleet at Argonne National Laboratory**
ORNL/TM-10816 (October 1988)
R. N. McGill. Oak Ridge National Laboratory, Oak Ridge, Tenn.
S. L. Hillis. University of Tennessee, Knoxville, Tenn.
R. P. Larsen. Argonne National Laboratory, Argonne, Ill.
- 561 Research Program on Reduced Combustion Chamber Heat Loss Effects on Alternative Fuel Combustion**
ORNL/Sub/87-95918/1 (October 1988)
C. E. Hunter, P. H. Havstad, I. J. Garwin, E. E. Daby. Ford Motor Co., Dearborn, Mich.
- 562 Fuel Alcohol Formations**
DOE/CE/50181-H1* (Washington, D.C.: Department of Energy, September 1988)
Swedish Motor Fuel Technology Co., Stockholm, Sweden

* Available from the National Technical Information Service, U.S. Department of Energy, 5285 Port Royal Road, Springfield VA 22161.

- 563 Results from the Second Year of Operation of the Federal Methanol Fleet at Lawrence Berkeley Laboratory**
ORNL/TM-10815 (August 1988)
R. N. McGill. Oak Ridge National Laboratory, Oak Ridge, Tenn.
S. L. Hillis. University of Tennessee, Knoxville, Tenn.
- 564 Technical Highlights of the Alternative Fuels Utilization Program**
Proc. 25th Automotive Technology Development Contractors' Coordination Meeting, pp. 77-82 (Warrendale, Pa.: Society of Automotive Engineers, April 1988)
R. L. Graves. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 565 An Investigation of High Pressure/Late Cycle Injection of CNG as a Fuel for Rail Applications**
ORNL/Sub/85-22032/1 (April 1988)
J. F. Wakeriell, G. G. O'Neal, Q. A. Baker, C. M. Urban. Southwest Research Institute, San Antonio, Texas
- 566 Status of Alcohol Fuels Utilization Technology for Highway Transportation: A 1986 Perspective**
ORNL/Sub/85-22007/4 (February 1988)
R. L. Bechtold. Mueller Associates, Inc., Baltimore, Md.
- 567 A Guide to the Planning and Management of Vehicle Fleet Tests to Obtain Significant Results**
ORNL/Sub/85-22007/2 (February 1988)
R. L. Bechtold. Mueller Associates, Inc., Baltimore, Md.
- 568 Status of Alcohol Fuels Utilization Technology for Highway Transportation: A 1986 Perspective. Volume II Compression Ignition Systems**
ORNL/Sub/85-22007/3 (January 1988)
R. L. Bechtold. Mueller Associates, Inc., Baltimore, Md.
- 569 Engine Testing for Syntfuel Operation**
ORNL/Sub/85-28609/1 (January 1988)
D. W. Dickey, S. Vinyard, T. J. Callahan, T. W. Ryan III, M. A. Warner-Selph, N. R. Sefer. Southwest Research Institute, San Antonio, Texas
- 570 First Year Results from the Federal Methanol Fleet at the Lawrence Berkeley Laboratory**
SAE paper no. 872042, presented at the 1987 SAE International Fuels and Lubricants Meeting and Exposition, November 1987, Toronto, Ontario, Canada
R. N. McGill, J. L. Wantland. Oak Ridge National Laboratory, Oak Ridge, Tenn.
S. L. Hillis. University of Tennessee, Knoxville, Tenn.
- 571 High-Pressure Late Cycle Direct Injection of Natural Gas in a Rail Medium Speed Diesel Engine**
SAE paper no. 872041, presented at the 1987 SAE International Fuels and Lubricants Meeting and Exposition, November 1987, Toronto, Ontario, Canada
J. F. Wakenell, G. G. O'Neal. Southwest Research Institute, San Antonio, Texas
Q. A. Baker. Wilfred Baker Engineering, San Antonio, Texas
- 572 The Effect of Alternative Gasolines on Knock and Intake Valve Sticking**
SAE paper no. 872040, presented at the 1987 SAE International Fuels and Lubricants Meeting and Exposition, November 1987, Toronto, Ontario, Canada
M. R. Swain, M. N. Swain, J. A. Blanco, R. R. Adt. University of Miami, Coral Gables, Fla.

- 573 Fuel Nitrogen Conversion in a Spark Ignition Engine**
SAE paper no. 872039, presented at the 1987 SAE International Fuels and Lubricants Meeting and Exposition, November 1987, Toronto, Ontario, Canada
J. W. Hodgson, J. C. Denny. University of Tennessee, Knoxville, Tenn.
R. N. McGill. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 574 Production and Analysis of EDS Coal-Derived Middle Distillate Test Fuels from Hydrogenation at Three Levels of Severity**
SAE paper no. 872038, presented at the 1987 SAE International Fuels and Lubricants Meeting and Exposition, November 1987, Toronto, Ontario, Canada
J. Erwin, N. R. Sefer. Southwest Research Institute, San Antonio, Texas
B. Glavincevski. National Research Council of Canada, Ottawa, Ontario
- 575 A Comparison of Three Coal-Derived, Middle Distillate, Alternative Fuels in a Single-Cylinder DI Diesel Engine**
SAE paper no. 872037, presented at the 1987 SAE International Fuels and Lubricants Meeting and Exposition, November 1987, Toronto, Ontario, Canada
T. G. Buzza, T. A. Litzinger. Pennsylvania State University, University Park, Pa.
- 576 Ignition Delay as Determined in a Variable Compression Ratio Direct Injection Diesel Engine**
SAE paper no. 872036, presented at the 1987 SAE International Fuels and Lubricants Meeting and Exposition, November 1987, Toronto, Ontario, Canada
T. W. Ryan III. Southwest Research Institute, San Antonio, Texas
- 577 The Influence of Fuel Composition and Spray Characteristics on Soot Formation**
SAE paper no. 872035, presented at the 1987 SAE International Fuels and Lubricants Meeting and Exposition, November 1987, Toronto, Ontario, Canada
K. K. Rink, A. H. Lefebvre. Purdue University, West Lafayette, Ind.
R. L. Graves. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 578 The Effects of Fuel Composition on Ignition Delay in Homogeneous Charge and Direct Injection Compression Ignition Engines**
ORNL/Sub/84-89677/1 (November 1987)
D. E. Foster, P. M. Dimpelfeld, D. L. Boggs, R. E. Bair, G. L. Borman. University of Wisconsin, Madison, Wis.
- 579 Fuel Nitrogen Conversion in a Supercharged Spark Ignition Engine**
ORNL/Sub/85-97367/1 (October 1987)
J. W. Hodgson, J. C. Denny. University of Tennessee, Knoxville, Tenn.
- 580 Results from the First Year of Operation of the Federal Methanol Fleet at Lawrence Berkeley Laboratory**
ORNL/TM-10485 (August 1987)
R. N. McGill, J. L. Wantland. Oak Ridge National Laboratory, Oak Ridge, Tenn.
S. L. Hillis. University of Tennessee, Knoxville, Tenn.
- 581 Compendium of Significant Events in the Recent Development of Alcohol Fuels in the United States**
ORNL/Sub/85-22007/1 (June 1987)
R. L. Bechtold. Mueller Associates, Baltimore, Md.
- 582 Alternative Fuels Utilization Program Project Office Operating Plan for FY 1986-87**
ORNL/TM-10435 (June 1987)
R. L. Graves, R. N. McGill. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 583 Utilization of Alternative Fuels in Diesel Engines**
DOE/CE/0212* (Washington, D.C.: Department of Energy, June 1987)
Pennsylvania State University, University Park, Pa.
- 584 Pollutant Formation in Heterogeneous Mixtures of Fuel Drops in Air**
DOE/CE/50052-H1* (Washington, D.C.: Department of Energy, May 1987)
A. H. Lefebvre. Purdue University, West Lafayette, Ind.
- 585 A Comparison of Unburned Fuel and Aldehyde Emissions from a Methanol-Fueled Stratified Charge and Homogeneous Charge Engine**
ORNL/Sub/86-97366/1 (March 1987)
D. E. Foster, C. Kim, N. Scull. University of Wisconsin, Madison, Wis.
- 586 Alternative Fuel Performance and Emissions Characteristics**
DOE/CS/50028-H1* (Washington, D.C.: Department of Energy, January 1987)
University of Miami, Coral Gables, Fla.
- 587 Testing of Developmental Ceramic Materials in Diesel Engine Combustion Chambers**
Proceedings of the American Society of Mechanical Engineers Automotive Engine Technology Symposium, Dallas, Texas, February 16-18, 1987 (New York: ASME, 1987)
R. L. Graves, W. K. Kahl, E. L. Long, Jr. Oak Ridge National Laboratory, Oak Ridge, Tenn.

* Available from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield VA 22161.

MICROEMULSION FUELS

- 588 Correlating Microemulsion Fuel Composition, Structure, and Combustion Properties**
 ORNL/TM-11248 (September 1989)
 W. L. Griffith, A. L. Compere. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 589 Small Angle Scattering From Micelles of Potassium Salts of 18-Carbon Fatty Acids**
Langmuir 5, pp. 1191-95 (1989)
 J. S. Johnson, Jr., W. L. Griffith, A. L. Compere. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 590 Effect of Composition on Sizes of W/O Ethanolamine-Oleic Acid Microemulsions by Small-Angle Neutron Scattering**
Langmuir 5(2), pp. 357-63 (1989)
 E. Caponetti, R. Triolo, A. Lizzio. Istituto Chimica Fisica, University of Palermo, Palermo, Italy
 W. L. Griffith, J. S. Johnson, Jr., A. L. Compere. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 591 Analysis of Small-Angle Scattering Patterns from Precipitating Alloys**
Physical Review B 39(7), pp. 4588-94 (1989)
 R. Triolo, E. C. Caponetti. Istituto Chimica Fisica, University of Palermo, Palermo, Italy
 S. Spooner. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 592 Opportunities for Improved Energy Recovery in Pulp Mills**
Alternative Energy Sources VIII. Proceedings of the Eighth Miami International Conference, Miami, Fla., December 14-16, 1987, 2, pp. 755-68 (Washington, D.C.: Hemisphere Press, 1989)
 A. L. Compere, W. L. Griffith. Oak Ridge National Laboratory, Oak Ridge, Tenn.
 T. W. Joyce. North Carolina State University, Raleigh, N.C.
- 593 Energy Conservation Benefits Incidental to Microemulsion Fuel Use**
 ORNL/TM-10882 (July 1988)
 A. L. Compere, W. L. Griffith. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 594 Effect of Surfactant Neutralization of Hexadecane/Water-1-Pentanol/Oleic Acid/Ethanolamine Microemulsions A SANS Study**
Langmuir 4(3), pp. 606-10 (1988)
 E. Caponetti, R. Triolo. Istituto Chimica Fisica, University of Palermo, Palermo, Italy
 W. L. Griffith, J. S. Johnson, Jr., A. L. Compere. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 595 Effect of Possible Interferences on the Extraction of 1-butanol from Aqueous Solution by the Ethyl Esters of Soybean Oil Fatty Acids**
Separation Science and Technology 22(2&3), pp. 373-78 (1987)
 W. L. Griffith, A. L. Compere. Oak Ridge National Laboratory, Oak Ridge, Tenn.
 J. M. Googin. Y-12 Plant, Oak Ridge, Tenn.
- 596 Small-angle Neutron Scattering from Micelles of Alkylpolyoxyethylene Sulfate: Effect of Chain Length**
J. Solut. Chem. 16(4), pp. 295-306 (1987)
 E. Caponetti, R. Triolo. Istituto Chimica Fisica, University of Palermo, Palermo, Italy
 J. S. Johnson, Jr. Oak Ridge National Laboratory, Oak Ridge, Tenn.

597 Analytical Scattering Function of a Polydisperse Percus-Yevick Fluid with Schulz- (gamma-) Distributed Diameters

Physical Review A 35(5), pp. 2200-06 (1987)

W. L. Griffith, A. L. Compere. Oak Ridge National Laboratory, Oak Ridge, Tenn.

R. Triolo. Istituto Chimica Fisica, University of Palermo, Palermo, Italy

INDUSTRIAL CHEMICAL HEAT PUMPS

- 598 *Materials Corrosion in Ammonia/Solid Heat Pump in Working Media***
ORNL/TM-12004 (January 1992)
D F. Wilson, M. Howell, J. H. DeVan. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 599 *Methods for Predicting Properties and Tailoring Salt Solutions for Industrial Processes***
Technology 2002: Conference Proceedings, The Third National Technology Transfer Conference and Exposition, December 1-3, 1992, NASA-CP-3189 (Washington, D.C.: National Aeronautics and Space Administration, 1992)
M. R. Ally. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 600 *Refractive Indexes of Aqueous LiBr Solutions***
J. Chem. Eng. Data **37**, pp. 110-13 (1992)
A. Zaltash, M. R. Ally. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 601 *Validation of a PC Based Program for Single Stage Absorption Heat Pump***
ORNL/TM-11923 (September 1991)
A Zaltash, M. R. Ally. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 602 *Effect of Additives on the Film Heat Transfer Coefficients of (Li,K,Na)NO₃ and LiBr Aqueous Mixtures***
Proceedings of the XVIII International Congress of Refrigeration, Montreal, Quebec, August 10-15, 1991, paper no. 52 (Paris: International Institute of Refrigeration, 1991)
A. Zaltash, M. R. Ally, R. L. Linkous, R. H. Reiner. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 603 *Densities and Refractive Indexes of Aqueous (Li,K,Na)NO₃ Mixtures***
J. Chem. Eng. Data **36**, pp. 209-13 (1991)
M. R. Ally, L. N. Klatt, A. Zaltash, R. L. Linkous. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 604 *Measurements of Heat and Mass Transfer Coefficients During Absorption of Water Vapor by Lithium Bromide and (Li,K,Na)NO₃ Mixtures***
Heat Pump Design, Analysis, and Application **AES 26**, pp. 83-90 (New York: American Society of Mechanical Engineers, 1991)
A. Zaltash, M. R. Ally, R. L. Linkous, L. N. Klatt. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 605 *Corrosion of Materials in Chemical Heat Pump Working Fluids***
ORNL/TM-10896 (November 1988)
J. H. DeVan, J. S. Wolf. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 606 *Computer Simulation of Absorption Heat Pump Using Aqueous Lithium Bromide and Ternary Nitrate Mixtures***
ORNL/TM-10392 (June 1988)
M. R. Ally. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 607 *Vapor Liquid Equilibrium (VLE) and Enthalpy-Concentration-Temperature (H-X-T) Correlations for Ternary Nitrate Mixtures***
ASHRAE Trans **94(2)** (Atlanta: American Society of Heating, Refrigerating, and Air Conditioning Engineers, 1988)
M. R. Ally. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 608 Design Considerations for Fixed-Bed Metal Hydride Heat Pumps for High Temperature Boosts**
ASHRAE Trans 94(1), pp. 267-79 (Atlanta: American Society of Heating, Refrigerating, and Air Conditioning Engineers, 1988)
M. R. Ally. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 609 Simulated Performance of Absorption Heat Pumps Using a Mixed Aqueous Nitrate Working Fluid**
ASME* paper no. 87-WA/AES-2, presented at the ASME Winter Annual Meeting, Boston, Mass., December 13-18, 1987
M. R. Ally. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 610 Ideal Fluid Properties for Optimizing Absorption Heat Pump Performance**
ORNL/TM-10315 (April 1987)
H. Perez-Blanco, M. R. Patterson, J. Braunstein. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 611 Thermodynamic Properties of Aqueous Ternary Solutions Relevant to Chemical Heat Pumps. Final Report**
ORNL/TM-10258 (March 1987)
M. R. Ally. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 612 Carnot Thermal Efficiencies of Chemical Heat Pumps Operating Between Four Temperature Levels A Heuristic Approach**
ASHRAE Trans 93(2), pp. 2442-53 (Atlanta: American Society of Heating, Refrigerating, and Air Conditioning Engineers, 1987)
M. R. Ally. Oak Ridge National Laboratory, Oak Ridge, Tenn.

*Available from the American Society of Mechanical Engineers, 345 East 47th Street, New York, N.Y. 10017.

MATERIALS FOR ADVANCED INDUSTRIAL HEAT EXCHANGERS

- 613 High-Temperature Corrosion of Ceramic-Ceramic Composites in a Waste Incinerator Environment**
ORNL/TM-12212 (January 1993)
J. R. Keiser, J. I. Federer, T. J. Henson, D. L. Hindman. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 614 Development of a Zirconia-Mullite Based Ceramic for Recuperator Applications**
ORNL/Sub/86-22044/2 (December 1992)
J. M. Gonzalez, GTE Products Corp., Towanda, Pa.
- 615 Rheology of Zirconia-Alumina Gelcasting Slurries**
Proceedings of the Spring Meeting, Materials Research Society, San Francisco, April 27–May 1, 1992, 271, pp. 269–75 (Pittsburgh: Materials Research Society, 1992)
A. Bleier, O. O. Omatete, C. G. Westmoreland. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 616 Corrosion of SiC and Oxide-Composite Ceramics by a Simulated Steam-Reformer Atmosphere**
ORNL/TM-11828 (September 1991)
J. I. Federer, H. E. Kim, A. J. Moorhead. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 617 Corrosion Behavior of Continuous-Filament-Wound Ceramic Composite Tubes**
ORNL/TM-11691 (May 1991)
J. I. Federer. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 618 Gelcast Reaction-Bonded Silicon Nitride Composites**
Ceramic Engineering and Science Proceedings 12, proceedings of the 15th Annual Conference on Composites and Advanced Ceramic Materials, Cocoa Beach, Fla., January 13–16, 1991 (Westerville, Ohio: American Ceramic Society, 1991)
O. O. Omatete, T. N. Tiegs, A. C. Young. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 619 Construction and Testing of a Flue-Gas Corrosion Probe**
ORNL-6630 (August 1990)
J. I. Federer, J. A. McEvers. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 620 Design Methodology Needs for Fiber-Reinforced Ceramic Heat Exchangers**
ORNL/TM-11012 (August 1990)
J. J. Blass, M. B. Ruggles. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 621 Alumina-Base Coatings for Protection of SiC Ceramics**
J Mater. Eng. 12, pp. 141–49 (1990)
J. I. Federer. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 622 Selection of Corrosion Resistant Materials For Use In Molten Nitrate Salts**
ORNL/TM-11162 (October 1989)
P. F. Tortorelli, P. S. Bishop, J. R. DiStefano. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 623 Extrusion of Alumina-Silicon Carbide Whisker Composites**
ORNL/TM-10373 (October 1989)
M. A. Janney, E. S. Bomar, M. C. Vance. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 624 High-Temperature Corrosion of Metallic Alloys in an Oxidizing Atmosphere Containing NaCl**
ORNL/TM-11029 (February 1989)
J. I. Federer. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 625 Ceramic Heat Exchangers: Cost Estimates Using a Process-Cost Approach**
ORNL/TM-10684 (August 1988)
S. Das, T. R. Curlee, R. A. Whitaker. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 626 An Investigation of Ceramic Coatings for Protection of SiC from High-Temperature Corrosion**
ORNL/TM-10606 (February 1988)
J. I. Federer. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 627 Stress-Corrosion of SiC in an Oxidizing Atmosphere Containing NaCl**
Advanced Ceramic Materials 3, pp. 293-95 (1988)
J. I. Federer. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 628 Corrosion of SiC Ceramics by Na_2SO_4**
Advanced Ceramic Materials 3(1), pp. 56-61 (1988)
J. I. Federer. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 629 Degradation of Materials by Industrial Combustion Environments: II Metals**
Industrial Heating LIV(7), pp. 32-33 (July 1987)
J. I. Federer. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 630 Degradation of Materials by Industrial Combustion Environments: I Refractories**
Industrial Heating LIV(4), pp. 12-15 (April 1987)
J. I. Federer. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 631 Bibliography of Ceramic Extrusion and Plasticity**
ORNL-6363 (March 1987)
M. A. Janney, M. C. Vance, A. C. Jordan, M. P. Kertesz. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 632 Production of Fine, High-Purity, Beta SiC Powder**
Ceramic Powder Science. Proceedings of the Ceramic Powder Science and Technology: Synthesis, Processing, and Characterization Conference, August 3-6, 1986, Boston, Massachusetts, ed. Gary L. Messing et al., *Advances in Ceramics* 21, pp. 255-63 (Westerville, Ohio: American Ceramic Society, 1987)
P. T. B. Shaffer, K. A. Blakely. Advanced Refractory Techniques, Inc., Buffalo, N.Y.
M. A. Janney. Oak Ridge National Laboratory, Oak Ridge, Tenn.

ADVANCED INDUSTRIAL MATERIALS

- 633** *Weld Solidification Cracking in Cast Ni₃Al Alloys*
Scr. Metall. et Mater. 28(11), pp. 1305-10 (June 1, 1993)
 M. L. Santella. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 634** *Microstructural Effects on Surface Mechanical Properties of Ion Implanted Polymers*
J. Mater. Res. 8(4), pp. 927-33 (April 1993)
 G. R. Rao. Auburn University, Auburn, Ala.
 Z. L. Wang, E. H. Lee. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 635** *Hardness Measurements of Ar⁺-Beam Treated Polyimide by Depth-Sensing Ultra Low Load Indentation*
J. Mater. Res. 8(2), pp. 377-87 (February 1993)
 E. H. Lee, W. C. Oliver, L. K. Mansur. Oak Ridge National Laboratory, Oak Ridge, Tenn.
 Y. Lee. Korea Academy of Industrial Technology, Seoul, Korea
- 636** *Calculation of the Electronic Properties of Ni-P Amorphous Alloys*
Phys. Rev. B 47(1), pp. 107-14 (January 1, 1993-I)
 H. Yang, J. C. Swihart. Indiana University, Bloomington, Ind.
 D. M. Nicholson. Oak Ridge National Laboratory, Oak Ridge, Tenn.
 R. H. Brown. Luther college, Decorah, Iowa
- 637** *Chemical Vapor Infiltration of TiB₂ Composites*
 ORNL/TM-12214 (January 1993)
 T. M. Besmann, J. H. Miller, K. C. Cooley, R. A. Lowden, T. L. Starr. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 638** *Effects of Minor Alloying Elements on the Welding Behavior of FeAl Alloys for Structural and Weld-Overlay Cladding Applications*
Scr. Metall. et Mater. 27(12), pp. 1835-40 (December 15, 1992)
 P. J. Maziasz, G. M. Goodwin, C. T. Liu, S. A. David. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 639** *Chemical Vapor Deposition of Refractory Metals and Ceramics II: Symposium held December 4-6, 1991, Boston, Massachusetts*
Materials Research Society Symposium Proceedings, 250 (Pittsburgh: Materials Research Society, 1992)
 T. M. Besmann, ed. Oak Ridge National Laboratory, Oak Ridge, Tenn.
 B. M. Gallois, ed. Stevens Institute of Technology, Hoboken, N.J.
 J. W. Warren, ed. Composite Innovation Corp., Woodland Hills, Calif.
- 640** *Multikilowatt Variable Frequency Microwave Furnace*
Proceedings, Spring Meeting, Materials Research Society, San Francisco, April 27-May 1, 1992, 269, pp. 77-81 (Pittsburgh: Materials Research Society, 1992)
 D. W. Bible, R. J. Lauf. Oak Ridge National Laboratory, Oak Ridge, Tenn.
 C. A. Everleigh. Microwave Laboratories, Inc., Raleigh, N. C.
- 641** *Rheology of Zirconia-Alumina Gelcasting Slurries*
Proceedings, Spring Meeting, Materials Research Society, San Francisco, April 27-May 1, 1992, 271, pp. 269-75 (Pittsburgh: Materials Research Society, 1992)
 A. Bleier, O. O. Omatete, C. G. Westmoreland. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 642 Characterization of the Phase Transformations in the Shape Memory Alloy Ni-36 at% Al**
Proceedings, Fall Meeting, Materials Research Society, Boston, December 2-6, 1992
246, pp. 61-66 (Pittsburgh: Materials Research Society, 1992)
J. A. Horton, E. P. George, C. J. Sparks, O. B. Cavin. Oak Ridge National Laboratory, Oak Ridge, Tenn.
M. Y. Kao, P. Thoma. Johnson Controls, Inc., Milwaukee, Wis.
- 643 Microwave Processing of Ceramics: Guidelines Used at the Oak Ridge National Laboratory**
Proceedings, Spring Meeting, Materials Research Society, San Francisco, April 27-May 1, 1992, **269**, pp. 173-85 (Pittsburgh: Materials Research Society, 1992)
M. A. Janney, H. D. Kimrey, J. O. Kiggans. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 644 Microwave Sintering of Multilayer Ceramic Capacitors**
Proceedings, Spring Meeting, Materials Research Society, San Francisco, April 27-May 1, 1992, **269**, pp. 223-29 (Pittsburgh: Materials Research Society, 1992)
R. J. Lauf, C. Hamby. Oak Ridge National Laboratory, Oak Ridge, Tenn.
C. E. Holcombe. Y-12 Plant, Oak Ridge, Tenn.
- 645 Elevated-Temperature Environmental Embrittlement and Alloy Design of L1₂ Ordered Intermetallics**
Mater. Sci. Eng. A153, pp. 538-47 (1992)
M. Takeyama. National Research Institute for Metals, Tokyo, Japan
C. T. Liu. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 646 First Principles Theory of Alloy Phase Stability. Ordering and Pre-Martensitic Phenomena in Beta-Phase NiAl**
Proceedings, NATO Advanced Research Workshop on Ordered Intermetallics—Physical Metallurgy and Mechanical Behaviour, Irsee, Germany, June 23-29, 1991, pp. 15-36 (The Netherlands: Kluwer Publishers, 1992)
G. M. Stocks, W. A. Shelton, D. M. Nicholson. Oak Ridge National Laboratory, Oak Ridge, Tenn.
F. J. Pinski. University of Cincinnati, Cincinnati, Ohio
B. Ginatempo. University of Messina, Messina, Italy
A. Barbieri, B. L. Gyorffy. University of Bristol, Bristol, Great Britain
D. D. Johnson. Sandia National Laboratory, Livermore, Calif.
J. B. Staunton. University of Warwick, Coventry, Great Britain
P. E. A. Turchi, M. Sluiter. Lawrence Livermore National Laboratory, Livermore, Calif.
- 647 Cracking Behavior of FeAl (40 at. % Al) Alloys During Cutting Operations**
Scr. Metall. **26**, pp. 1669-74 (1992)
P. A. Ferguson. North Carolina State University, Raleigh, N.C.
C. T. Liu. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 648 The Role of Microscopy in the Alloy Design of Ni- and Fe-Based Aluminides**
Proceedings of the 50th Annual Meeting of the Electron Microscope Society of America, Boston, August 16-21, 1992, pp. 168-69 (San Francisco Press, 1992)
J. A. Horton. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 649 Multiple-Ion Irradiations: Facility Review and Highlights of Applications to Metals, Ceramics, and Polymers**
Proceedings of the 16th International Symposium on Effects of Radiation on Materials, Denver, June 21-22, 1992 (Philadelphia, Pa.: American Society for Testing and Materials, 1992)
L. K. Mansur, E. H. Lee, M. B. Lewis, S. J. Zinkle. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 650 Models for Heat Transport Through Assemblies of Uniform-Diameter Hollow Spheres**
ORNL/TM-11397 (April 1991)
D. W. Yarbrough, D. L. McElroy, F. J. Weaver. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 651 Ground State Properties and Magnetism in Substitutionally Disordered $Fe_{1-x}Cr_x$ Alloys**
Proceedings of the Spring Meeting, Materials Research Society, San Francisco, April 18-20, 1990 186, pp. 27-31 (Pittsburgh: Materials Research Society, 1991)
W. A. Shelton, Jr. Computational Physics, Inc., Annandale, Va.
F. J. Pinski. University of Cincinnati, Cincinnati, Ohio
D. D. Johnson. Sandia National Laboratory, Livermore, Calif.
D. M. Nicholson, G. M. Stocks. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 652 Crystal Growth and Deformation Behavior of TlAl Aluminides**
ORNL/TM-11159 (April 1990)
B. F. Oliver, B. Y. Huang. University of Tennessee, Knoxville, Tenn.
W. C. Oliver. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 653 Energy Applications of High-Temperature Superconductivity**
ER-6682, Volumes 1-2 (Palo Alto, Calif.: Electric Power Research Institute, 1990)
S. J. Dale. Oak Ridge National Laboratory, Oak Ridge, Tenn.
S. M. Wolf. Office of Conservation and Renewable Energy, U.S. Department of Energy, Washington, D. C.
T. R. Schneider. Electric Power Research Institute, Palo Alto, Calif.
- 654 Brittle Fracture and Grain Boundary Chemistry of Microalloyed NiAl**
J. Mater. Res., pp. 754-62 (1990)
E. P. George, C. T. Liu. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 655 The Effect of Processing on the Toughness of a Nickel Aluminide Alloy**
Scripta Met. 24, pp. 845-50 (1990)
D. J. Alexander. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 656 Brittle Fracture and Grain Boundary Chemistry of Microalloyed NiAl**
J. Mater. Res. 5, p. 754 (1990)
E. P. George, C. T. Liu. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 657 Temperature and Pressure Effects for Oxygen Adsorption and Oxidation of Ni₃Al Alloyed with Chromium and Zirconium**
Surface Science 225, pp. 195-205 (1990)
A. M. Venezia, C. M. Loxton. University of Illinois Urbana-Champaign, Champaign, Ill.
J. A. Horton. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 658 Superplasticity in an Ni_3Al Base Alloy with 8 wt % Cr**
J. Mater. Sci. **25**(7), pp. 3142-48 (1990)
A. Choudhury, A. K. Mukherjee. University of California, Davis, Calif.
V. K. Sikka. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 659 Ab Initio Study of the Cu-Pd One-Dimensional Long Period Superstructure Phase Diagram**
Acta Metall. Mater. **38**(11), pp. 2299-2308 (1990)
G. Ceder, D. de Fontaine. University of California, Berkeley, Calif.
H. Dreyse. Universite de Nancy, France
D. M. Nicholson, G. M. Stocks. Oak Ridge National Laboratory, Oak Ridge, Tenn.
B. L. Gyorffy. University of Bristol, United Kingdom
- 660 High Critical Current Densities in $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$ Films on Polycrystalline Zirconia**
Applied Physics Letters **57**, pp. 1164 (1990)
D. P. Norton, D. H. Lowndes, J. D. Budai, D. K. Christen. Oak Ridge National Laboratory, Oak Ridge, Tenn.
E. C. Jones. University of Tennessee, Knoxville, Tenn.
K. W. Lay, J. E. Tkaczyk. General Electric Company, Schenectady, N.Y.
- 661 Y-Ba-Cu-O Thin Films Grown on Rigid and Flexible Polycrystalline Yttria-Stabilized Zirconia by Pulsed Laser Ablation**
J. Applied Physics **68**, pp. 223-27 (1990)
D. P. Norton, D. H. Lowndes, J. D. Budai, D. K. Christen. Oak Ridge National Laboratory, Oak Ridge, Tenn.
J. W. McCamy, E. C. Jones. University of Tennessee, Knoxville, Tenn.
T. D. Ketcham, D. St. Julien. Corning, Corning, N.Y.
K. W. Lay, J. E. Tkaczyk. General Electric Company, Schenectady, N.Y.
- 662 Selection of Corrosion-Resistant Materials for Use in Molten Nitrate Salts**
ORNL/TM-11162 (October 1989)
P. F. Tortorelli, P. S. Bishop, J. R. DiStefano. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 663 An Investigation of Elastic Guided Waves for Ceramic Joint Evaluation**
ORNL/TM-10931 (October 1989)
W. A. Simpson, Jr., R. W. McClung. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 664 High-Temperature Ordered Intermetallic Alloys III**
ORNL/M-924 (August 1989)
C. T. Liu. Oak Ridge National Laboratory, Oak Ridge, Tenn.
A. I. Taub. General Electric Corp., Schenectady, N.Y.
N. S. Stoloff. Rensselaer Polytechnic Institute, Troy, N.Y.
C. C. Koch. North Carolina State University, Raleigh, N.C.
- 665 Alloy Development and Mechanical Properties of Nickel Aluminide (Ni_3Al) Alloys**
ORNL-6483 (August 1989)
C. T. Liu, V. K. Sikka, J. A. Horton, E. H. Lee. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 666 *Materials by Design: Assessment of Theoretical and Experimental Tools for Applied Research and Exploratory Development in Certain Energy Technologies***
ORNL/Sub/86-00210/1 (February 1989)
R. W. Broach, R. A. Eades. Allied-Signal Engineered Materials, Des Plaines, Ill.
J. J. Low. University of Wisconsin, Milwaukee, Wis.
T. L. Barr. Consultant to ORNL, Toulumne, Calif.
J. W. Frazer. Oak Ridge National Laboratory, Oak Ridge, Tenn.
J. A. Carpenter, Jr. National Institute for Standards and Technology, Gaithersburg, Md.
- 667 *Inorganic and Biomass-Derived Plastics: Viable Economic Alternatives to Petrochemical Plastics?***
ORNL/TM-10880 (February 1989)
T. R. Curlee. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 668 *The Feasibility of Recycling Plastic Wastes: An Update***
Journal of Environmental Systems 18, pp. 193-212 (1989)
T. R. Curlee. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 669 *Microstructures of Ni₃Al Alloys as a Function of Cr and Al Levels***
Proceedings of the 47th Annual Meeting, Electron Microscopy Society of America, San Antonio, Texas, August 6-11, 1989, pp. 306-307 (San Francisco: San Francisco Press, Inc., 1989)
J. A. Horton. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 670 *Fabrication and Mechanical Properties of Ni₃Al-Al₂O₃ Composites***
High-Temperature Ordered Intermetallic Alloys III: Symposium Held November 29-December 1, 1988, Boston, Massachusetts. Materials Research Society Symposia Proceedings 133, ed. C. T. Liu et al., pp. 607-14 (Pittsburgh: Materials Research Society, 1989)
C. G. McKamey, J. A. Horton, T. N. Tiegs, E. K. Ohriner. Oak Ridge National Laboratory, Oak Ridge, Tenn.
G. L. Povirk. Brown University, Providence, R.I.
- 671 *Structure Maps and Phase Stability in AlTi₃ Alloyed with Rare-Earth Elements***
High-Temperature Ordered Intermetallic Alloys III: Symposium Held November 29-December 1, 1988, Boston, Massachusetts. Materials Research Society Symposia Proceedings 133, ed. C. T. Liu et al., pp. 37-43 (Pittsburgh: Materials Research Society, 1989)
C. T. Liu, J. A. Horton. Oak Ridge National Laboratory, Oak Ridge, Tenn.
D. G. Pettifor. Imperial College of Science and Technology, London, England
- 672 *The Development of Alloys Based on Ni₃Si***
High-Temperature Ordered Intermetallic Alloys III: Symposium Held November 29-December 1, 1988, Boston, Massachusetts. Materials Research Society Symposia Proceedings 133, ed. C. T. Liu et al., pp. 397-402 (Pittsburgh: Materials Research Society, 1989)
W. C. Oliver. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 673 *Applications of the Quadratic Korringa-Kohn-Rostoker Band-Theory Method***
Phys. Rev. B 39, pp. 8187-92 (1989)
D. M. Nicholson. Oak Ridge National Laboratory, Oak Ridge, Tenn.
J. S. Faulkner. Florida Atlantic University, Boca Raton, Fla.

- 674 Analysis of Heat-Affected Zone Cracking in Ni_3Al Alloy Welds by Computer Modeling of Thermal Stresses**
Welding J. 68(1), pp. 19s-27s (1989)
M. L. Santella, S. A. David. Oak Ridge National Laboratory, Oak Ridge, Tenn.
M. C. Maguire. Colorado School of Mines, Golden, Colo.
- 675 Chemical Vapor Deposition in the Silicon-Carbon and Boron-Carbon-Nitrogen Systems**
ORNL/TM-10884 (November 1988)
T. M. Besmann. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 676 Assessment of the State of the Art in Machining and Surface Preparation of Ceramics**
ORNL/TM-10791 (November 1988)
D. P. Stinton. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 677 A Preliminary Study of the Use of Magnetohydrodynamic Forces to Remove Impurities from Molten Metals**
ORNL/TM-10747 (June 1988)
D. O. Hobson. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 678 Welding Behavior and Microstructure of an Ni_3Al Alloy**
Weld. Res. Suppl., pp. 63s-69s (March 1988)
M. L. Santella, J. A. Horton, S. A. David. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 679 Development of Nickel and Nickel-Iron Aluminides for Elevated-Temperature Structural Use**
MiCon 86: Optimization of Processing, Properties, and Service Performance Through Microstructural Control, ed. B. L. Bramfitt et al., pp. 222-37. ASTM Special Technical Publication 979 (Philadelphia: American Society for Testing and Materials, February 1988)
C. T. Liu. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 680 Assessment of Material Requirements for Advanced Steam Cycle Systems ($>1100^\circ F$)**
ORNL/TM-10489 (February 1988)
J. R. DiStefano, J. H. DeVan, L. C. Fuller. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 681 Initial Development of High-Temperature Titanium Silicide Alloys**
ORNL-6435 (January 1988)
C. T. Liu, E. H. Lee, T. J. Henson. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 682 Effect of Chromium on Early Stages of Oxidation of Ni_3Al Alloys at $600^\circ C$**
Oxid. Met. 29(3/4), pp. 347-65 (1988)
J. A. Horton, J. V. Cathcart, C. T. Liu. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 683 Engineering Processing and Properties of Nickel Aluminides**
Proceedings of Second International SAMPE Metals and Metals Processing Conference, Dayton, Ohio, August 2-4, 1988, Volume 2: Space Age Metals Technology, ed. F. H. Froes and R. A. Cull, pp. 62-75 (Covina, Calif.: Society for the Advancement of Material and Process Engineering, 1988)
V. K. Sikka. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 684 Innovations in Materials and Materials Processing: The Potential for Energy Conservation**
Materials and Society 12, pp. 1-45 (1988)
T. R. Curlee. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 685 Applications of Thermochemical Modeling to Chemical Vapor Deposition Processes**
Surface Modification Technologies. Proceedings of the First International Symposium, Phoenix, Arizona, January 1988, ed. T. S. Sudarshan and D. G. Bhat, pp. 311-25 (New York: The Metallurgical Society, 1988)
T. M. Besmann. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 686 The Role of Interfacial Reactions on the Mechanical Properties of Ceramic Brazements**
Ceramic Microstructures '86: Role of Interfaces, Proceedings of the Symposium, Berkeley, California, July 28-31, 1986, ed. J. A. Pask and A. G. Evans. *Materials Science Research* 21, pp. 949-58 (New York: Plenum Publishing Corp., 1988)
A. J. Moorhead, H. M. Henson, T. J. Henson. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 687 A Technique for Preparing Cross Section TEM Specimens from Ceramic Oxide Braze Joints**
Journal of Electron Microscopy Technique 8, pp. 211-15 (1988)
M. L. Santella, A. T. Fischer, C. P. Haltom. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 688 Hardening Behavior of Nickel Beryllides**
Scr. Metall. 22(9), pp. 1409-13 (1988)
T. G. Nieh, J. Wadsworth. Lockheed Research and Development Division, Palo Alto, Calif.
C. T. Liu. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 689 Applicability of Aerospace Thermal Insulation Technologies to the Civilian Sector**
ORNL/Sub/86-55951/1 (October 1987)
H. A. Fine. University of Kentucky, Lexington, Ky.
- 690 Plastics Recycling Faces Barriers**
Waste Age 18(7), pp. 55-60 (July 1987)
T. R. Curlee. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 691 Ultrasonic Techniques for the Evaluation of Ceramic Joints**
ORNL-6350 (April 1987)
W. A. Simpson, Jr., R. W. McClung. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 692 Annual Progress Report of the Materials Project of the Energy Conversion and Utilization Technologies (ECUT) Program for Fiscal Year 1983**
ORNL/TM-9695 (February 1987)
L. E. Morris, A. Jordan, J. A. Carpenter, Jr. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 693 Development of a Test for Determining Fracture Toughness of Brazed Joints in Ceramic Materials**
Weld. J. 66, pp. 26s-32s (January 1987)
A. J. Moorhead, P. F. Becher. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 694 Adaptation of DCB Test for Determining Fracture Toughness of Brazed Joints In Ceramic Materials**
J. Mater. Sci. 22(9), pp. 3297-3303 (1987)
A. J. Moorhead, P. F. Becher. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 695 Direct Brazing of Alumina Ceramics**
Adv. Ceram. Mater. 2(2), pp. 159-66 (1987)
A. J. Moorhead. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 696 Processing Technology for Nickel Aluminides**
Proceedings of the Materials Research Society Symposium, Boston, December 1-6, 1986, 81, pp. 487-93 (Pittsburgh: Materials Research Society, 1987)
V. K. Sikka. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 697 Secondary Reclamation of Plastics Waste Research Report Phase II. Evaluation of Industrial Processes: Financial Analysis and Potential Markets**
Lancaster, Pa.: Technomic Publishing Co., Inc., 1987
Plastics Institute of America, Inc. Hoboken, N.J.
- 698 Secondary Reclamation of Plastics Waste Research Report Phase I. Development of Techniques for Preparation and Formulation**
Lancaster, Pa.: Technomic Publishing Co., Inc., 1987
Plastics Institute of America, Inc. Hoboken, N.J.

TRIBOLOGY

- 699 Relating Laboratory Friction Coefficient Values to Practical Applications**
Proceedings of the Annual Automotive Technology Development Contractors' Coordination Meeting 1991 P-256, pp. 571-77 (Warrendale, Pa.: Society of Automotive Engineers, June 1992)
 P. J. Blau. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 700 Wear Mode Transition In a Silicon Nitride-Silicon Carbide Whisker Composite**
Proceedings of the Annual Automotive Technology Development Contractors' Coordination Meeting 1991 P-256, pp. 579-86 (Warrendale, Pa.: Society of Automotive Engineers, June 1992)
 C. S. Yust. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 701 Wear-Resistant Materials**
Advanced Materials and Processes Technological Forecast Issue, pp. 25-26 (January 1990)
 P. J. Blau. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 702 Sliding Friction and Wear Behavior of Nickel Aluminate Alloys**
Trib. International 23(4), pp. 226-34 (1990)
 P. J. Blau, C. E. DeVore. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 703 Friction Microprobe Studies of Composite Surfaces**
Tribology of Composite Materials, pp. 59-68 (Materials Park, Ohio: ASM International, 1990)
 P. J. Blau. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 704 Friction and Wear of Whisker-Reinforced Ceramic Composite Materials**
Tribology of Composite Materials, pp. 25-33 (Materials Park, Ohio: ASM International, 1990)
 C. S. Yust. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 705 Morphological Aspects of the Friction of Hot-Filament Grown Diamond Thin Films**
Mechanics of Coatings, pp. 399-408 (Elsevier Publ., 1990)
 P. J. Blau, C. S. Yust, L. J. Heatherly, R. E. Clausen. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 706 Elastic Behavior of Coated Rough Surfaces**
Mechanics of Coatings, pp. 157-68 (Elsevier Publ., 1990)
 J. I. McCool. MRC-SKF Aerospace, King of Prussia, Pa.
- 707 A Study of the Tribological and Surface Micromechanical Properties of $YBa_2Cu_3O_{7-x}$. Final Report**
 ORNL/TM-11053 (July 1989)
 P. J. Blau, C. E. DeVore, D. F. Wilson, J. R. Keiser. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 708 Friction and Wear Transitions of Materials: Break-In, Run-In, and Wear-In**
 Park Ridge, N.J.: Noyes Publications, 1989
 P. J. Blau. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 709 The Units of Wear Revisited**
Lubrication Engineering **45**, p. 609 (1989)
P. J. Blau. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 710 Temperature Effects on the Break-In of Nickel Aluminide Alloys**
Proceedings International Conference on Wear of Materials, Denver, Colo., April 8-11, 1989, ASME Book No. H0456A, Vol. 1, pp. 305-12 (New York: American Society of Mechanical Engineers, 1989)
P. J. Blau, C. E. DeVore. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 711 Interpretations of the Sliding Friction Break-In Curves of Alumina-Aluminum Couples**
Wear **129**, pp. 81-92 (1989)
P. J. Blau, C. E. DeVore. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 712 Development of a Theory of Wear of Ceramics. Final Report**
ORNL/Sub/84-7802/1 (July 1988)
W. O. Winer, B.-Y. Ting. Georgia Institute of Technology, Atlanta, Ga.
- 713 A Thermomechanical Wear Theory**
Ph.D. Dissertation, Georgia Institute of Technology, Atlanta, Ga., May 1988
B.-Y. Ting. Georgia Institute of Technology, Atlanta, Ga.
- 714 Development of X-Ray Methods for Analyzing Rough-Wear Surfaces on Ceramics. Technical Summary of Completed ORNL Subcontract 19B-07733B**
ORNL/TM-10710 (May 1988)
P. J. Blau. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 715 A Comparison of Methods for Determining Wear Volumes and Surface Parameters of Spherically Tipped Sliders**
Wear **124**, pp. 291-309 (1988)
E. P. Whiteman. National Institute of Standards and Technology, Gaithersburg, Md.
P. J. Blau. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 716 Initial Frictional Behavior During the Wear of Steel, Aluminum, and Poly(Methylmethacrylate)**
Wear **124**, pp. 1-20 (1988)
P. J. Blau. Oak Ridge National Laboratory, Oak Ridge, Tenn.
E. P. Whiteman, A. Shapiro. National Institute of Standards and Technology, Gaithersburg, Md.
- 717 Selection and Use of Wear Testing Methods for Ceramics**
ASTM Special Technical Publication 1010 (Philadelphia: American Society for Testing and Materials, 1988)
C. S. Yust, ed. Oak Ridge National Laboratory, Oak Ridge, Tenn.
R. G. Bayer, ed. IBM Corp., Endicott, N.Y.
- 718 The Distribution of Microcontact Area, Load, Pressure, and Flash Temperature Under the Greenwood-Williamson Model**
J. Trib. **110**, p. 106 (1988)
J. I. McCool. MRC-SKF Aerospace, King of Prussia, Pa.

- 719 A Study of the Friction and Wear-Related Properties of Ceramic Superconductors**
Engineered Materials for Advanced Friction and Wear Applications, ed. F. Smidt and P. J. Blau, pp. 231–41 (Metals Park, Ohio: ASM International, 1988)
P. J. Blau, C. E. DeVore. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 720 Engineered Materials for Advanced Friction and Wear Applications**
Metals Park, Ohio: ASM International, 1988
P. J. Blau, ed. Oak Ridge National Laboratory, Oak Ridge, Tenn.
F. Smidt, ed. Naval Research Laboratory, Washington, D.C.
- 721 Residual Strain Gradients in a Fully Stabilized Zirconia Sample**
J. Appl. Phys. 63(11), pp. 5351–56 (1988)
B. Hwang, C. R. Houska. Virginia Polytechnic Institute and State University, Blacksburg, Va.
G. E. Ice, A. Habenschuss. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 722 Calculation of X-Ray Intensity from a Rough Sample Based on a Statistical Model**
J. Appl. Phys. 63(11), pp. 5346–50 (1988)
B. Hwang, C. R. Houska. Virginia Polytechnic Institute and State University, Blacksburg, Va.
- 723 X-Ray Analysis of the Near-Surface Phase Distribution Applied to Wear on a PSZ Disk**
Adv. Ceramic Materials 3(2), pp. 180–83 (1988)
B. Hwang, C. R. Houska. Virginia Polytechnic Institute and State University, Blacksburg, Va.
G. E. Ice, A. Habenschuss. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 724 Sliding Behavior of Alumina/Nickel and Alumina/Nickel Aluminate Couples at Room and Elevated Temperature**
Journal of Tribology 110(4), pp. 646–52 (1988)
P. J. Blau, C. E. DeVore. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 725 Near Surface Wear Structure of Ceramics**
Ph.D. Dissertation, Virginia Polytechnic Institute and State University, Blacksburg, Va., May 1987
B.-H. Hwang. Virginia Polytechnic Institute and State University, Blacksburg, Va.
- 726 A Proposed Thermomechanical Wear Theory**
Approaches to Modeling Friction and Wear, ed. F. F. Ling (New York: Springer Verlag, 1987)
B.-Y. Ting, W. O. Winer. Georgia Institute of Technology, Atlanta, Ga.
- 727 An Experimental Study of the Hot Spots Occurring During the Oxidational Wear of Tool Steel on Sapphire**
J. Tribology 109(2), pp. 315–20 (1987)
T. F. J. Quinn, W. O. Winer. Georgia Institute of Technology, Atlanta, Ga.
- 728 Wear of an Alumina-Silicon Carbide Whisker Composite**
Wear Mater. 1, pp. 277–83 (1987)
C. S. Yust, J. M. Leitnaker, C. E. DeVore. Oak Ridge National Laboratory, Oak Ridge, Tenn.

ENERGY-RELATED INVENTIONS PROGRAM

- 729** *Government Promotion of Energy Innovations: An Evaluation of the Energy-Related Inventions Program*
Policy Studies Journal 20(1), pp. 87-101 (1992)
M. A. Brown. Oak Ridge National Laboratory, Oak Ridge, Tenn.
C. R. Wilson. University of Tennessee, Knoxville, Tenn.
- 730** *The Energy-Related Inventions Program: A Decade of Commercial Progress*
ORNL/CON-339 (December 1991)
M. A. Brown, C. A. Franchuk. Oak Ridge National Laboratory, Oak Ridge, Tenn.
C. R. Wilson. University of Tennessee, Knoxville, Tenn.
- 731** *Guidelines for Successfully Transferring Government-Sponsored Innovations*
Research Policy 20(2): pp. 121-43 (April 1991)
M. A. Brown, L. G. Berry, R. K. Goel. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 732** *The Energy-Related Inventions Program: Commercial Progress of Participants Through 1988*
ORNL/CON-301 (May 1990)
M. A. Brown. Oak Ridge National Laboratory, Oak Ridge, Tenn.
C. R. Wilson. University of Tennessee, Knoxville, Tenn.
- 733** *The Cost of Commercializing Energy Inventions*
Research Policy 19(2), pp. 147-55 (1990)
M. A. Brown. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 734** *Promoting the Commercialization of Energy Innovations: An Evaluation of the Energy-Related Inventions Program*
Proceedings of the National Energy Program Evaluation Conference, Chicago, August 23-25, 1989, pp. 33-38 (Argonne, Ill.: Argonne National Laboratory, August 1989)
M. A. Brown. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 735** *Commercializing Government-Sponsored Innovations: Twelve Successful Buildings Case Studies*
ORNL/CON-275 (January 1989)
M. A. Brown, L. G. Berry, R. K. Goel. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 736** *The Energy-Related Inventions Program: An Assessment of Recent Commercial Progress*
ORNL/CON-252 (October 1988)
M. A. Brown. Oak Ridge National Laboratory, Oak Ridge, Tenn.
S. A. Snell. University of Tennessee, Knoxville, Tenn.
- 737** *The Commercialization Process and Future Energy Options*
Proceedings of the International Symposium on Energy Options for the Year 2000: Contemporary Concepts in Technology and Policy, Wilmington, Delaware, September 14-17, 1988 2, pp. 225-34 (Newark, Delaware: Center for Energy and Urban Policy Research, University of Delaware, 1988)
M. A. Brown. Oak Ridge National Laboratory, Oak Ridge, Tenn.
S. A. Snell. University of Tennessee, Knoxville, Tenn.

738 *Evaluation of the Energy-Related Inventions Program: An Empirical Analysis of 204 Inventions*

ORNL/CON-225 (March 1987)

M. A. Brown, J. A. Morell, E. J. Soderstrom. Oak Ridge National Laboratory, Oak Ridge, Tenn.

S. Snell. University of Kentucky, Lexington, Ky.

W. Friggle. Consultation Systems, Inc., Philadelphia, Pa.

ELECTRIC ENERGY SYSTEMS

- 739** *Recommended Engineering Practice to Enhance the EMI/EMP Immunity of Electric Power Systems*
ORNL/Sub/91-SG913/1 (December 1992)
C. L. Wagner. Department of Energy, Washington, D. C.
W. E. Feero. Electric Research and Management, Inc., State College, Pa.
- 740** *Proceedings, Workshop on Real-Time Control and Operation of Electric Power Systems, November 19–21, 1991, Denver, Colorado*
CONF-9111173 (Oak Ridge, Tenn.: Oak Ridge National Laboratory, July 1992)
D. T. Rizy, ed. Oak Ridge National Laboratory, Oak Ridge, Tenn.
W. E. Myers, ed. Bonneville Power Administration, Portland, Ore.
L. E. Elts, C. L. Clemans. Western Area Power Administration, Golden, Colo.
- 741** *Experimental Investigation of Steep-Front, Short Duration (SFSD) Surge Effects on Power Systems Components*
ORNL/Sub/87-91345 (May 1992)
D. B. Miller. Mississippi State University, Mississippi State, Miss.
- 742** *Mitigation of Magnetohydrodynamic Electromagnetic Pulse (MHD-EMP) Effects from Commercial Electric Power Systems*
ORNL-6709 (March 1992)
P. R. Barnes. Oak Ridge National Laboratory, Oak Ridge, Tenn.
F. M. Tesche, E. F. Vance. Consultants to Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 743** *HEMP-Induced Transients In Electric Power Substations*
ORNL/Sub/88-SC863 (February 1992)
C. M. Wiggins, D. E. Thomas, T. M. Salas. BDM International Inc., Albuquerque, N. Mex.
- 744** *An Approach to Metering and Network Modeling*
Proceedings of the American Power Conference 54-II, pp. 1068–74 (Chicago: Illinois Institute of Technology, 1992)
M. M. Adibi. IRD Corporation, Bethesda, Md.
K. A. Clements. Worcester Polytechnic Institute, Worcester, Mass.
R. J. Kafka. Potomac Electric Power Company, Washington, D. C.
J. P. Stovall. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 745** *Transient Electric and Magnetic Fields Associated with Establishing a Finite Electrostatic Dipole, Revisited*
IEEE Transactions on Electromagnetic Compatibility 33(4), pp. 312–20 (November 1991)
M. Rubinstein, M. A. Uman. University of Florida, Gainesville, Fla.
- 746** *Maintaining Electric Power System Performance: Preparing for the Year 2020 Research Needs*
ORNL-6678 (November 1991)
S. J. Dale, J. P. Stovall. Oak Ridge National Laboratory, Oak Ridge, Tenn.
K. W. Klein. Department of Energy, Washington, D. C.

- 747 *Electric Utility Industry Experience with Geomagnetic Disturbances***
ORNL-6665 (September 1991)
P. R. Barnes, D. T. Rizy, B. W. McConnell. Oak Ridge National Laboratory, Oak Ridge, Tenn.
F. M. Tesche. Consultant to Oak Ridge National Laboratory, Oak Ridge, Tenn.
E. R. Taylor, Jr. ABB Power Systems, Inc., Pittsburgh, Pa.
- 748 *EMP Research on Electric Power Systems. Program Update***
ORNL/M-1392 (May 1991)
P. R. Barnes. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 749 *Assessment of Conducting Polymer Applications in Power Equipment Technology***
ORNL/Sub/87-SA681/1 (May 1991) K. F. Schoch, Jr., A. I. Bennett, R. R. Burghardt, A. H. Cookson, H. E. Saunders, J. D. B. Smith. Westinghouse Electric Corp., Pittsburgh, Pa.
W. N. Kennedy. ABB Power Transmission & Distribution Co., Pittsburgh, Pa.
T. V. Oommen. ABB Power Transmission & Distribution Co., Sharon, Pa.
R. E. Voshall. Gannon University, Erie, Pa.
E. M. Fort. Westinghouse Electric Corp., Orlando, Fla.
B. Robbins. Reynolds Metals Co., Richmond, Va.
- 750 *Impacts of a Nominal Nuclear Electromagnetic Pulse on Electric Power Systems. Phase III Final Report***
ORNL/Sub/83-43374/2 (April 1991)
V. J. Kruse, D. L. Nickel, J. J. Bonk, E. R. Taylor, Jr. ABB Power Systems, Inc., Advanced Systems Technology, Pittsburgh, Pa.
- 751 *Impact of Steep-Front Short-Duration Impulse on Electric Power System Insulation. Phase II: Laboratory Evaluation of Selected Power System Components***
ORNL/Sub/85-28611/2 (April 1991)
L. M. Burrage, E. F. Veverka, J. H. Shaw. Cooper Power Systems, Franksville, Wis.
B. W. McConnell. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 752 *System Reconfiguration Analysis Program (SYSRAP) User's Manual***
ORNL-6575 (April 1991)
J. B. Patton. Consultant to Oak Ridge National Laboratory, Oak Ridge, Tenn.
D. T. Rizy. Oak Ridge National Laboratory, Oak Ridge, Tenn.
J. S. Lawler. University of Tennessee, Knoxville, Tenn.
- 753 *On Estimation of Uncertainties in Analog Measurements***
IEEE Trans. Power Systems 5(4), pp. 1222-28 (November 1990)
M. M. Adibi. Consultant to Oak Ridge National Laboratory, Oak Ridge, Tenn.
J. P. Stovall. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 754 *Induced Voltage on an Overhead Line Due to Nearby Lightning***
IEEE Trans. Electromagnetic Compatibility 32(4), pp. 292-99 (November 1990)
G. Diendorfer. Technical University, Vienna, Austria
- 755 *An Improved Return Stroke Model with Specified Channel-Base Current***
Journal of Geophysical Research 95(D9), pp. 13,621-44 (August 20, 1990)
G. Diendorfer. Technical University, Vienna, Austria
M. A. Uman. University of Florida, Gainesville, Fla.

- 756 Updated Evaluation of Polymer Films for Electrical Insulation**
ORNL-6603 (August 1990)
H. E. McCoy, Jr. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 757 Polarization Currents in Varistors**
J. Appl. Phys. 68(1), pp. 339–45 (July 1990)
F. A. Modine. Oak Ridge National Laboratory, Oak Ridge, Tenn.
R. W. Major. University of Richmond, Va.
S.-I. Choi, L. B. Bergman, M. N. Silver. University of North Carolina, Chapel Hill, N.C.
- 758 Transient Response of a Distribution Circuit Recloser and Control Unit to a High-Altitude Electromagnetic Pulse (HEMP) and Lightning**
IEEE Trans. Electromagnetic Compatibility 32(2), pp. 113–24 (May 1990)
P. R. Barnes. Oak Ridge National Laboratory, Oak Ridge, Tenn.
F. M. Tesche. Consultant to Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 759 Pulse Response Characteristics of ZnO Varistors**
J. Appl. Phys. 67(10), pp. 6560–66 (May 1990)
F. A. Modine. Oak Ridge National Laboratory, Oak Ridge, Tenn.
R. B. Wheeler. Los Alamos National Laboratory, Los Alamos, N. Mex.
- 760 Load Flow Studies in the Presence of Magnetohydrodynamic Electromagnetic Pulse**
IEEE Trans. Power Delivery 5(2), pp. 1158–63 (April 1990)
V. J. Kruse, G. B. Rackcliffe. Westinghouse Electric Corp., Pittsburgh, Pa.
P. R. Barnes. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 761 Applications Software for Modeling Distribution Automation Operations on the Athens Utilities Board**
IEEE Trans. Power Delivery 5(2), pp. 1019–25 (April 1990)
J. B. Patton. Consultant to Oak Ridge National Laboratory, Oak Ridge, Tenn.
D. T. Rzy. Oak Ridge National Laboratory, Oak Ridge, Tenn.
J. S. Lawler. University of Tennessee, Knoxville, Tenn.
- 762 Flashover Vulnerability of Transmission and Distribution Lines to High-Altitude Electromagnetic Pulse (HEMP)**
IEEE Trans. Power Delivery 5(2), pp. 1164–69 (April 1990)
V. J. Kruse. Westinghouse Electric Corp., Pittsburgh, Pa.
P. R. Barnes. Oak Ridge National Laboratory, Oak Ridge, Tenn.
F. M. Tesche. Consultant to Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 763 The Effects of Steep-Front Short-Duration Impulses on Power Distribution Component**
IEEE Trans. Power Delivery 5(2), pp. 708–15 (April 1990)
D. B. Miller, A. E. Lux, S. Grzybowski. Mississippi State University, Mississippi State, Miss.
P. R. Barnes. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 764 On the Radiation Field Turn-on Term Associated with Traveling Current Discontinuities in Lightning**
Journal of Geophysical Research 95(D4), pp. 3711–13 (March 1990)
M. Rubinstein, M. A. Uman. University of Florida, Gainesville, Fla.

- 765 Analysis of Power Sector Efficiency Improvements for an Integrated Utility Planning Process in Costa Rica**
Proceedings 25th Intersociety Energy Conversion Engineering Conference 4, pp. 386-92 (New York: American Institute of Chemical Engineers, 1990)
D. B. Waddle, J. M. MacDonald. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 766 Measurement of Partial Discharges in Hexane Under DC Voltage**
IEEE Trans. Electr. Insul. **24**, pp. 1109-19 (December 1989)
E. F. Kelley, M. Nehmadi, R. E. Hebner. National Institute for Standards and Testing, Gaithersburg, Md.
M. O. Pace, A. L. Wintenberg, T. V. Blalock, J. V. Foust. University of Tennessee, Knoxville, Tenn.
- 767 Integrated Hierarchical Computer Systems for Adaptive Protective Relaying and Control of Electric Transmission Power Systems**
ORNL/Sub/85-22005/1 (November 1989)
A. G. Phadke. Virginia Polytechnic Institute and State University, Blacksburg, Va.
S. H. Horowitz. American Electric Power Company, Inc., Columbus, Ohio
J. S. Thorp. Cornell University, Ithaca, N.Y.
- 768 Adaptive Protective Relaying of Transmission Power Systems for Improved Reliability**
ORNL/Sub/85-22012/1 (September 1989)
G. D. Rockefeller, R. T. Byerly, W. E. Feero, C. L. Wagner. Electric Research and Management, Inc., State College, Pa.
K. L. Hicks. Stone & Webster Engineering Corp., Boston, Mass.
J. R. Linders. Consultant to Oak Ridge National Laboratory, Oak Ridge, Tenn.
J. Nichol. A. D. Little, Inc., Cambridge, Mass.
- 769 HEMP Test and Analysis of Selected Recloser-Control Units**
ORNL/Sub/88-00238/1 (August 1989)
T. K. Liu, S. H. Sands. LuTech, Inc., Oakland, Calif.
F. M. Tesche. E-Systems, Inc., Greenville, Texas
P. R. Barnes. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 770 Zinc Oxide Varistor Response Time**
Proceedings of the Second International Varistor Conference on Zinc Oxide Varistors: Science and Technology, Schenectady, New York, December 5-7, 1988 3, pp. 176-85 (Westerville, Ohio: American Ceramic Society, 1989)
F. A. Modine. Oak Ridge National Laboratory, Oak Ridge, Tenn.
R. W. Major. University of Richmond, Richmond, Va.
S.-I. Choi, L. B. Bergman, M. N. Silver. University of North Carolina, Chapel Hill, N.C.
- 771 Automating Electric Utility Distribution Systems: The Athens Automation and Control Experiment**
New York: Prentice Hall, 1989
P. A. Gnadt, J. S. Lawler. Consultants to Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 772 The HEMP Response of an Overhead Power Distribution Line**
IEEE Trans. Power Delivery 4, pp. 1937-44 (1989)
F. M. Tesche. E-Systems, Inc., Greenville, Texas
P. R. Barnes. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 773 Analysis of Water Heater Data from Athens Load Control Experiment**
IEEE Trans. Power Delivery 4, pp. 1232-38 (1989)
J. H. Reed. Oak Ridge National Laboratory, Oak Ridge, Tenn.
J. C. Thompson, R. P. Broadwater, A. Chandrasekaran. Tennessee Technological University, Cookeville, Tenn.
- 774 Pulsed Charge Transport in Polycrystalline Zinc Oxide**
Bulletin of the American Physical Society 34, p. 999 (1989)
J. F. Cordaro. Alfred University, Alfred, N.Y.
F. A. Modine. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 775 The Induced Current in Parallel Wires Over an Imperfect Ground From an Incident EMP**
Proceedings 1989 Southeastcon, IEEE Regional Meeting, University of South Carolina, Columbia, S.C., April 1989, Vol. 2 (New York: IEEE, 1989)
H. P. Neff, Jr. University of Tennessee, Knoxville, Tenn.
D. A. Reed. Consultant to Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 776 Spark Decomposition of SF₆: Chemical and Biological Studies**
IEEE Trans. Power Delivery 4, pp. 1541-551 (1989)
G. D. Griffin, I. Sauers, C. E. Easterly. Oak Ridge National Laboratory, Oak Ridge, Tenn.
K. Kurka. University of Tennessee, Knoxville, Tenn.
- 777 Distribution Automation Applications Software for the Athens Utilities Board**
IEEE Trans. Power Delivery 4, pp. 715-24 (1989)
D. T. Rizy. Oak Ridge National Laboratory, Oak Ridge, Tenn.
J. S. Lawler. University of Tennessee, Knoxville, Tenn.
J. B. Patton. Consultant to Oak Ridge National Laboratory, Oak Ridge, Tenn.
N. H. Fortson. Athens Utilities Board, Athens, Tenn.
- 778 Impact of Automation on the Reliability of the Athens Utilities Board's Distribution System**
IEEE Trans. Power Delivery 4, pp. 770-78 (1989)
L. D. Monteen. Athens Utilities Board, Athens, Tenn.
J. S. Lawler, J. S. Lai. University of Tennessee, Knoxville, Tenn.
J. B. Patton. Consultant to Oak Ridge National Laboratory, Oak Ridge, Tenn.
D. T. Rizy. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 779 A Multiconductor Model for Determining the Response of Power Transmission and Distribution Lines to a High Altitude Electromagnetic Pulse (HEMP)**
IEEE Trans. Power Delivery 4, pp. 1955-64 (1989)
F. M. Tesche. E-Systems, Inc., Greeneville, Texas
P. R. Barnes. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 780 Steep Front-Short Duration Voltage Surge Tests of Power Line Filters and Transient Voltage Suppressors**
IEEE Trans. Power Delivery 4, pp. 1029-36 (1989)
P. R. Barnes, T. L. Hudson. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 781 Instrumentation System Used to Determine the Effects of Steep Front-Short Duration Impulses on Electric Power System Insulation**
IEEE Trans. Power Delivery 4, pp. 938-41 (1989)
J. H. Shaw. McGraw-Edison Power Systems, Franksville, Wis.

- 782 Experimental Determination of the Effects of Steep Front-Short Duration Surges on 25 KVA Pole Mounted Distribution Transformers**
IEEE Trans. Power Delivery 4, pp. 1103-10 (1989)
C. H. Eichler, J. R. Legro. Westinghouse Electric Corp., Pittsburgh, Pa.
P. R. Barnes. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 783 Measuring and Analyzing the Impact of Voltage and Capacitor Control with High Speed Data Acquisition**
IEEE Trans. Power Delivery 4, pp. 704-14 (1989)
D. T. Rizy, W. R. Nelson. Oak Ridge National Laboratory, Oak Ridge, Tenn.
J. S. Lawler. University of Tennessee, Knoxville, Tenn.
J. B. Patton. Consultant to Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 784 Monitoring Load Control at the Feeder Level Using High Speed Monitoring Equipment**
IEEE Trans. Power Delivery 4, pp. 694-703 (1989)
J. H. Reed, W. R. Nelson, G. R. Wetherington, E. R. Broadaway. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 785 The Origin of the Pulse Response Characteristics of Zinc Oxide Varistors**
J. Appl. Phys. 66, pp. 5608-12 (1989)
F. A. Modine, R. B. Wheeler. Oak Ridge National Laboratory, Oak Ridge, Tenn.
Y. Shim, J. F. Cordaro. Alfred University, Alfred, N.Y.
- 786 Load Control Experiments With Heat Pumps During the Winter**
IEEE Trans. Power Delivery 4, pp. 646-52 (1989)
J. H. Reed. Oak Ridge National Laboratory, Oak Ridge, Tenn.
R. P. Broadwater, A. Chandrasekaran. Tennessee Technological University, Cookeville, Tenn.
- 787 Transmission Line Design Provides Options**
Transmission and Distribution Magazine, pp. 38-40 (October 1988)
J. R. Stewart. Power Technologies, Inc., Schenectady, N.Y.
S. J. Dale. Oak Ridge National Laboratory, Oak Ridge, Tenn.
K. W. Klein. U.S. Department of Energy, Washington, D.C.
- 788 A Remote Sensor for Three Components of Transient Electric Fields**
IEEE Trans. Industrial Electronics 35(3), pp. 426-33 (August 1988)
E. M. Thomson, P. J. Medelius, M. A. Uman. University of Florida, Gainesville, Fla.
- 789 Extrapolation of Measured Power System Response Data to High Altitude EMP Excitation**
IEEE Trans. Electromagnetic Compatibility 30(3), pp. 386-92 (August 1988)
F. M. Tesche. LuTech, Inc., Dallas, Texas
P. R. Barnes. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 790 Evaluation of New Metal-Insulator-Semiconductor Varistor. Final Report**
ORNL/TM-10886 (August 1988)
F. A. Modine. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 791 The Development of a Unique Power Converter**
ORNL/Sub/81-09079/1 (May 1988)
L. R. Suelzle. Helionetics, Inc., Irvine, Calif.

- 792 Characteristics of Twelve-Phase Power Transmission**
ORNL/Sub/85-00212/1 (April 1988)
J. R. Stewart. Power Technologies, Inc., Schenectady, N.Y.
- 793 Voltages Induced by Lightning on Electric Power Distribution Lines: Field Data and Analysis Results for the Period July 1984-86**
ORNL/Sub/84-89650/1 (March 1988)
M. A. Uman, E. M. Thomson, J. W. Stone, P. Medelius, M. Rubinstein. University of Florida, Gainesville, Fla.
- 794 Harmonic Considerations for Electrical Distribution Feeders**
ORNL/Sub/81-95011/4 (March 1988)
R. C. Dugan. McGraw-Edison Power Systems, Canonsburg, Pa.
D. T. Rzy. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 795 Differences Between Lightning and Nuclear Electromagnetic Pulse Interactions**
IEEE Trans. Electromagnetic Compatibility 30(1), pp. 54-62 (February 1988)
E. F. Vance. SRI International, Menlo Park, Calif.
M. A. Uman. University of Florida, Gainesville, Fla.
- 796 Role of Semiconducting Compounds in the Premature Aging of XLPE Cable Insulation**
Conference Record of the 1988 IEEE International Symposium on Electrical Insulation, Boston, June 5-8, 1988, pp. 314-20 (1988)
M. S. Mashikian, J. H. Groeger. University of Connecticut, Storrs, Conn.
S. J. Dale. Oak Ridge National Laboratory, Oak Ridge, Tenn.
E. Ildstad. University of Trondheim, Norway
- 797 Development of a New High-Altitude Electromagnetic Pulse (HEMP) Environment and Resulting Overhead Line Responses**
Electromagnetics 8(2-4), pp. 213-40 (1988)
F. M. Tesche. LuTech, Inc., Dallas, Texas
P. R. Barnes. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 798 Early-Time Response of an Infinitely Long Wire Above a Finitely Conducting Earth to a Transient Plane Wave**
Electromagnetics 8(2-4), pp. 159-70 (1988)
P. R. Barnes, R. A. Stevens. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 799 The Self-Energy of a Charge Near an Interface**
Surface Science 194, pp. 275-311 (1988)
F. Sols. University of Illinois, Urbana, Ill.
R. H. Ritchie. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 800 Biological Effects of Spark-Decomposed SF₆**
J. Electrochem. Soc. 35(8), p. 381C (1988)
G. D. Griffin, M. G. Nolan, C. E. Easterly, I. Sauers. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 801 By-Product Formation in Spark Breakdown of SF₆/O₂ Mixtures**
Plasma Chemistry and Plasma Processing 8(2), pp. 247-62 (1988)
I. Sauers. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 802 Ion Chemistry in SF₆ Corona**
Proceedings of the Ninth International Conference on Gas Discharges and Their Applications, Venice, Italy, Sept. 19–23, 1988, pp. 589–91 (1988)
I. Sauers. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 803 Production of S₂F₁₀ by SF₆ Spark Discharges**
Proceedings of the Ninth International Conference on Gas Discharges and Their Applications, Venice, Italy, Sept. 19–23, 1988, pp. 592–94 (1988)
I. Sauers, P. C. Votaw, G. D. Griffin. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 804 On S₂F₁₀ Formation in Spark Breakdown of SF₆**
Conference Record of the 1988 IEEE International Symposium on Electrical Insulation, IEEE 88CH92594-0-EI, pp. 112–15 (New York: IEEE, 1988)
I. Sauers, P. C. Votaw, G. D. Griffin, K. Kurka, C. E. Easterly. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 805 Horizontal Electric Fields from Lightning Return Strokes**
Journal of Geophysical Research 93(D3), pp. 2429–41 (1988)
E. M. Thomson, P. Medelius, M. Rubinstein, M. A. Uman, J. Johnson, J. W. Stone. University of Florida, Gainesville, Fla.
- 806 Steep-Front Short-Duration Low Voltage Impulse Performance of Distribution Transformers**
IEEE Trans. Power Delivery 2(4), pp. 1152–56 (October 1987)
B. W. McConnell. Oak Ridge National Laboratory, Oak Ridge, Tenn.
L. M. Burrage, E. F. Veverka. Cooper Industries, McGraw-Edison Power Systems, Franksville, Wis.
- 807 Electric Power System Harmonics Design Guide**
ORNL/Sub/81-95011/3 (September 1987)
R. C. Dugan, M. F. McGranaghan. McGraw-Edison Power Systems, Canonsburg, Pa.
D. T. Rizy, J. P. Stovall. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 808 The Effects of Corona on Current Surges Induced on Conducting Lines by EMP: A Comparison of Experiment Data with Results of Analytic Corona Models**
ORNL/Sub/85-27461/1 (September 1987)
J. P. Blanchard, F. M. Tesche. LuTech, Inc., Lafayette, Calif.
B. W. McConnell. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 809 Methodology for Control and Operation of Wind Arrays in Utility Systems**
ORNL/Sub/81-7242/1 (April 1987)
T. D. Younkins. General Electric Co., Schenectady, N.Y.
- 810 Review and Evaluation of the Department of Energy's Research and Development Program for Solid Dielectric and Synthetic Laminate Cable Insulations 1975–1986**
ORNL/Sub/83-39099/1 (March 1987)
S. P. Walldorf. Consultant to Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 811 Fault Current Limiter for Generator Bus Protection (27 kV, 600 A, 330 kA)**
ORNL/Sub/82-1743/1 (March 1987)
H. M. Pflanz. Phoenix Electric Corp., Boston, Mass.

- 812 Comparison of Costs and Benefits for DC and AC Transmission**
ORNL-6204 (February 1987)
J. P. Stovall, P. A. Gnadt. Oak Ridge National Laboratory, Oak Ridge, Tenn.
J. P. Bowles, C. C. Diamond, R. L. Sullivan. Consultants to Oak Ridge National Laboratory, Oak Ridge, Tenn.
R. A. Eaton. U.S. Department of Energy, Washington, D.C.
S. V. Heyer. Philadelphia Electric Co., Philadelphia, Pa.
R. H. Lasseter, W. F. Long. University of Wisconsin, Madison, Wis.
M. A. Lebow. Consolidated Edison Company of New York, New York, N.Y.
J. C. McIver, R. A. Walling. General Electric Co., Schenectady, N.Y.
E. C. Starr. Bonneville Power Administration, Portland, Ore.
- 813 A Nominal Set of High-Altitude EMP Environments**
ORNL/Sub/86-18417/1 (February 1987)
C. L. Longmire, R. M. Hamilton, J. M. Hahn. Mission Research Corp., Santa Barbara, Calif.
- 814 Assess the Impact of the Steep-Front, Short Duration Impulse on Electric Power System Insulation. Phase I-Final Report**
ORNL/Sub/85-28611/1 (February 1987)
L. M. Burrage, P. F. Hettwer, E. Howells, E. F. Veverka, I. D. Smith, J. K. Nelson, R. C. Dugan. McGraw-Edison Power Systems, Canonsburg, Pa.
- 815 Impact of Adaptive Protection on Power System Control**
Proceedings of the Ninth Power System Computation Conference, Cascais, Portugal, August 30–September 4, 1987, pp. 283–90 (Rochester, Great Britain: Staples Printers Rochester Ltd., 1987)
A. G. Phadke. Virginia Polytechnic Institute and State University, Blacksburg, Va.
J. S. Thorp. Cornell University, Ithaca, N.Y.
S. H. Horowitz. AEP Service Corporation, Columbus, Ohio
- 816 ELF Bioeffects: Use of Negative Data in a Structured Argument**
Proceedings of the Twenty-third Hanford Life Sciences Symposium, Richland, Washington, October 2–4, 1984, CONF-841041, pp. 543–52 (Richland, Wash.: Pacific Northwest Laboratory, 1987)
C. E. Easterly, T. E. Aldrich, M. D. Morris. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 817 Fast Pulse Response of Zinc Oxide Varistors**
J. Appl. Phys. **61**, p. 3093 (1987)
F. A. Modine, R. B. Wheeler. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 818 Investigations of the Toxicological Action of Spark-Decomposed SF₆ in Mammalian Cells**
Gaseous Dielectrics V, ed. L. G. Christophorou and D. W. Bouldin, pp. 174–81 (New York: Pergamon Press, 1987)
G. D. Griffin, K. Kurka, I. Sauers, C. E. Easterly. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 819 SOF₄ Production in Spark-Breakdown of SF₆/O₂ Mixtures**
Gaseous Dielectrics V, ed. L. G. Christophorou and D. W. Bouldin, pp. 205–12 (New York: Pergamon Press, 1987)
I. Sauers. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 820** *The Interaction Between an Electron and the Polarization Modes of a Metal-Insulator Interface*
Solid State Communications **63**, pp. 245-49 (1987)
F. Sols. University of Illinois, Urbana, Ill.
R. H. Ritchie. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 821** *Retardation of Annealing Embrittlement in Iron-Based Glasses by Microaddition of Cerium*
Acta Metall. **35**, pp. 989-1000 (1987)
D. M. Kroeger, G. S. Canright, C. G. McKamey, D. S. Easton, J. O. Scarbrough. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 822** *Transient and Harmonic Voltages Associated with Automated Capacitor Switching on Distribution Systems*
IEEE Trans. Power Systems **2**(3), pp. 713-23 (New York: Institute of Electrical and Electronic Engineers, 1987)
D. T. Rizy. Oak Ridge National Laboratory, Oak Ridge, Tenn.
E. W. Gunther, M. F. McGranaghan. McGraw-Edison Power Systems, Canonsburg, Pa.

SUPERCONDUCTING TECHNOLOGY PROGRAM FOR ELECTRIC ENERGY SYSTEMS

- 823** *Structural and Chemical Disorder Near the $Y_2BaCuO_5/YBa_2Cu_3O_{7-\delta}$ Interface and Its Possible Relation to the Flux-Pinning Behavior in Melt-Textured $YBa_2Cu_3O_{7-\delta}$*
Phys. Rev. B **47**(9), pp. 5373–82 (March 1, 1993)
 Z. L. Wang. University of Tennessee, Knoxville, Tenn.
 A. Goyal, D. M. Kroeger. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 824** *ORNL Superconducting Technology Program for Electric Energy Systems—Annual Report for FY 1992*
 ORNL/HTSPC-4 (February 1993)
 R. A. Hawsey. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 825** *Irradiation-Enhanced Pinning in $YBa_2Cu_3O_{7-x}$ Crystals*
JOM, pp. 60–64 (October 1992)
 L. Civale, T. K. Worthington, L. Krusin-Elbaum, A. D. Marwick, F. Holtzberg. IBM Thomas J. Watson Research Center, Yorktown Heights, N. Y.
 J. R. Thompson. Oak Ridge National Laboratory, Oak Ridge, Tenn.
 M. A. Kirk, R. Wheeler. Argonne National Laboratory, Argonne, Ill.
- 826** *Protection of a Test Magnet Wound with Ag-BSCCO High-Temperature Superconductor*
 ORNL/HTSPC-3 (October 1992)
 L. Dresner. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 827** *Superconducting Transport Properties of Epitaxial $YBa_2Cu_3O_{7-\delta}$ Thin Films: A Consistent Description Based on Thermally Activated Flux Motion*
Phys. Rev. B **46**(9), pp. 5576–80 (September 1, 1992)
 S. Zhu, E. C. Jones. University of Tennessee, Knoxville, Tenn.
 D. K. Christen, C. E. Klabunde, J. R. Thompson, R. Feenstra, D. H. Lowndes, D. P. Norton. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 828** *Transport Critical Currents in Spray Pyrolyzed Films of $TiBa_2Ca_2Cu_3O_z$ on Polycrystalline Zirconia Substrates*
Appl. Phys. Lett. **61**(5), pp. 610–12 (August 3, 1992)
 J. E. Tkaczyk, J. A. DeLuca, P. L. Karas, P. J. Bednarczyk, M. F. Garbaskas, R. H. Arendt, K. W. Lay. General Electric Corporate Research and Development, Schenectady, N. Y.
 J. S. Moodera. Francis Bitter National Magnet Laboratory, Massachusetts Institute of Technology, Cambridge, Mass.
- 829** *Powder Characteristics and Sintering Behavior of Ag-Doped $YBa_2Cu_3O_{7-x}$ Produced by Aerosol Decomposition*
J. Mater. Res. **7**(4), pp. 827–36 (April 1992)
 T. L. Ward, T. T. Kodas. University of New Mexico, Albuquerque, N. Mex.
 A. H. Carim. Pennsylvania State University, University Park, Pa.
 D. M. Kroeger, H. Hsu. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 830 Microstructure Within Domains of Melt-Processed $YB_{12}Cu_3O_{7-x}$ Superconductors**
Phys. Rev. B **45**, pp. 5622–27 (March 1992)
K. B. Alexander, A. Goyal, D. M. Kroeger. Oak Ridge National Laboratory, Oak Ridge, Tenn.
V. Selvamanickam, K. Salama. University of Houston, Houston, Texas
- 831 Proceedings of the HTS Wire Development Workshop, February 1990, 1992. DOE/Office of Utility Technologies Summary of Projects, Superconducting Technology Program for Electric Energy Systems**
CONF-920286 (Oak Ridge, Tenn.: Oak Ridge National Laboratory, February 1992)
R. A. Hawsey, ed. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 832 A Comprehensive Review of the XRD Data of the Primary and Secondary Phases Present in the BSCCO Superconductor System (Part II: Ca-Sr-Pb Oxides)**
ORNL/TM-11949 (February 1992)
B. J. Reardon, C. R. Hubbard. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 833 A Comprehensive Review of the XRD Data of the Primary and Secondary Phases Present in the BSCCO Superconductor System (Part I: Ca-Sr-Cu Oxides)**
ORNL/TM-11948 (January 1992)
B. J. Reardon, C. R. Hubbard. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 834 Phase Development in the $Bi_2Sr_2CaCu_2O_y$ System: Effects of Oxygen Pressure**
Physica C **202**, pp. 134–40 (1992)
F. A. List, H. Hsu, O. B. Cavin, W. D. Porter, C. R. Hubbard, D. M. Kroeger. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 835 Interface Microstructures in Melt-Textured $YBa_2Cu_3O_{7-\delta}$ on Ag-Pd and Flux Pinning Centers Introduced by Y_2BaCuO_5 Particles**
Proceedings 50th Annual Meeting, Electron Microscopy Society of America, Boston, August 16–21, 1992, pp. 72–73 (Electron Microscopy Society of America, 1992)
Z. L. Wang. University of Tennessee, Knoxville, Tenn.
A. Goyal, D. M. Kroeger. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 836 T_c - δ Relations in $YBa_2Cu_3O_{7-\delta}$ Thin Films: Effects of Oxygen Pressure During Growth**
Proceedings, Spring Meeting, Materials Research Society, 275, pp. 101–106 (Pittsburgh: Materials Research Society, 1992)
R. Feenstra, D. P. Norton, J. D. Budai, D. K. Christen, D. H. Lowndes. Oak Ridge National Laboratory, Oak Ridge, Tenn.
V. C. Matijasevic, C.-B. Eom, T. H. Geballe. Stanford University, Stanford, Calif.
E. S. Hellman, E. H. Hartford. AT&T Bell Labs, Murray Hill, N. J.
- 837 Thermodynamics of the Y-Ba-Cu-C-O-H System: Application to the Organometallic Chemical Vapor Deposition of the $YBa_2Cu_3O_{7-x}$ Phase**
J. Am. Ceram. Soc. **75**(10), pp. 2679–86 (1992)
C. Vahlas. Laboratoire Marcel Mathieu, France
T. M. Besmann. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 838 Enhanced Current Density J_c in Single Crystal $Bi_2Sr_2Ca_1Cu_2O_8$ via Linear Defects from Heavy Ion Irradiation**
Bull. Am. Phys. Soc. **37**, p. 172 (1992)
J. R. Thompson, H. R. Kerchner, D. K. Christen, B. C. Sales, B. C. Chakoumakos. Oak Ridge National Laboratory, Oak Ridge, Tenn.
Y. R. Sun, J. O. Thomson. University of Tennessee, Knoxville, Tenn.
L. Civale, A. D. Marwick. IBM Thomas J. Watson Research Center, Yorktown Heights, N. Y.
- 839 Flex Creep Studies in Grain-Aligned $YBa_2Cu_3O_{7-\delta}$ vs Oxygen Deficiency Δ**
Bull. Am. Phys. Soc. **37**, p. 118 (1992)
J. R. Thompson, D. K. Christen. Oak Ridge National Laboratory, Oak Ridge, Tenn.
J. G. Ossandon, Y. R. Sun. University of Tennessee, Knoxville, Tenn.
- 840 A Review of the XRD Data of the Phases Present in the CaO - SrO - PbO System**
Powder Diff. **7**(2), pp. 96-98 (1992)
B. J. Reardon. Alfred University, Alfred, N. Y.
C. R. Hubbard. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 841 Magnetization Studies of Irradiation Modified Single Crystal $Y_1Ba_2Cu_3O_7$ Superconductors: Flux Creep and Annealing Effects**
Physics and Materials Science of High Temperature Superconductors, II, pp. 573-93 (Dordrecht: Kluwer, 1992)
J. R. Thompson, D. K. Christen, H. R. Kerchner. Oak Ridge National Laboratory, Oak Ridge, Tenn.
Y. R. Sun. University of Tennessee, Knoxville, Tenn.
A. P. Malozemoff, L. Civale, A. D. Marwick, T. K. Worthington, L. Krusin-Elbaum, F. Holtzberg. IBM Thomas J. Watson Research Center, Yorktown Heights, N. Y.
- 842 Excess Heat Production in Composite Superconductors During Current Redistribution**
ORNL/TM-11827 (May 1991)
L. Dresner. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 843 The Structure and Chemistry of Grain Boundaries in Ceramic Superconductors**
Proceedings of the American Ceramic Society Second International Ceramic Science and Technology Congress, Orlando, Florida, November 12-15, 1990, **19**, pp. 365-72 (Westerville, Ohio: American Ceramic Society, 1991)
K. B. Alexander, R. K. Williams, D. M. Kroeger, J. Brynestad. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 844 Reduced Flux Motion via Creep Annealing in High- J_c Single-Crystal $Y_1Ba_2Cu_3O_7$**
Appl. Phys. Lett. **59**, pp. 2612-14 (1991)
J. R. Thompson, D. K. Christen, H. R. Kerchner. Oak Ridge National Laboratory, Oak Ridge, Tenn.
Y. R. Sun, J. G. Ossandon. University of Tennessee, Knoxville, Tenn.
A. P. Malozemoff, A. Marwick, F. Holtzberg. IBM Thomas J. Watson Research Center, Yorktown Heights, N. Y.

- 845 Long-Term, Nonlogarithmic Magnetic Relaxation in Single-Crystal $\text{YBa}_2\text{Cu}_3\text{O}_7$ Superconductor**
Phys. Rev. B **44**, pp. 458–61 (1991)
J. R. Thompson. Oak Ridge National Laboratory, Oak Ridge, Tenn.
Y. R. Sun. University of Tennessee, Knoxville, Tenn.
F. H. Holtzberg. IBM Thomas J. Watson Research Center, Yorktown Heights, N. Y.
- 846 Critical Current Enhancement by the Extended Vortex Confinement in YBaCuO Single Crystals**
Bull. Am. Phys. Soc. **36**, p. 669 (1991)
L. Civale, T. K. Worthington, L. Krusin-Elbaum, A. P. Malozemoff, F. Holtzberg, C. A. Feild. IBM Thomas J. Watson Research Center, Yorktown Heights, N. Y.
J. R. Thompson. Oak Ridge National Laboratory, Oak Ridge, Tenn.
M. A. Kirk. Argonne National Laboratory, Argonne, Ill.
- 847 Vortex Confinement by Columnar Defects in $\text{YBa}_2\text{Cu}_3\text{O}_7$ Crystals: Enhanced Pinning at High Fields and Temperatures**
Phys. Rev. Lett. **67**, pp. 648–51 (1991)
L. Civale, A. D. Marwick, T. K. Worthington, L. Krusin-Elbaum, F. H. Holtzberg. IBM Thomas J. Watson Research Center, Yorktown Heights, N. Y.
M. A. Kirk. Argonne National Laboratory, Argonne, Ill.
J. R. Thompson, Y. Sun. Oak Ridge National Laboratory, Oak Ridge, Tenn.
J. R. Clem. Iowa State University, Ames, Iowa
- 848 Critical Currents in Proton Irradiated $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ Crystals**
Progress in High Temperature Superconductivity **31**, pp. 25–43 (Singapore: World Scientific Publishing Co., 1991)
L. Civale, M. W. McElfresh, A. D. Marwick, T. K. Worthington, A. P. Malozemoff, F. Holtzberg, C. Feild. IBM Thomas J. Watson Research Center, Yorktown Heights, N. Y.
J. R. Thompson, D. K. Christen. Oak Ridge National Laboratory, Oak Ridge, Tenn.
M. A. Kirk. Argonne National Laboratory, Argonne, Ill.
- 849 The Hardness and Young's Modulus of Bulk $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$ (1:2:3) and $\text{YBa}_2\text{Cu}_4\text{O}_8$ (1:2:4) as Determined by Ultra Low Load Indentation**
J. Mater. Res. **6**, pp. 2519–22 (1991)
B. N. Lucas. University of Tennessee, Knoxville, Tenn.
W. C. Oliver, R. K. Williams, J. Brynestad. Oak Ridge National Laboratory, Oak Ridge, Tenn.
M. E. O'Hern. Nano Instruments, Inc., Knoxville, Tenn.
- 850 Anisotropic Thermal Expansion of the 1:2:4 Yttrium Barium Copper Oxide Superconductors**
Physica C **172**, pp. 486–90 (1991)
K. Doverspike, C. R. Hubbard, R. K. Williams, K. B. Alexander, J. Brynestad, D. M. Kroeger. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 851 Some Observations of the Effects of High Pressures and Temperatures on the Stability of $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$**
Journal of Applied Physics **67**(11), pp. 6934–39 (1990)
R. K. Williams, K. B. Alexander, J. Brynestad, T. J. Henson, D. M. Kroeger, T. B. Lindemer, G. C. Marsh, J. O. Scarbrough. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 852 Superconductivity, Inter- and Intra-grain Critical Current Densities of $Tl_2Ca_2Ba_2Cu_3O_{10+x}$ and $Tl_2CaBa_2Cu_2O_{8+x}$ Materials**
Phys. Rev. B **39**, pp. 6652-59 (April 1989)
J. R. Thompson, J. Brynestad, D. M. Kroeger, S. T. Sekula, D. K. Christen, E. D. Specht.
Oak Ridge National Laboratory, Oak Ridge, Tenn.
Y. C. Kin. University of Tennessee, Knoxville, Tenn.
- 853 Grain Boundaries and Critical Current Density in High Temperature Oxide Superconductors**
Journal of Metals **41**, pp. 14-17 (1989)
D. M. Kroeger. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 854 Effect of Oxygen Pressure on the Orthorhombic to Tetragonal Transition in the High Temperature Superconductor $YBa_2Cu_3O_7$**
Phys. Rev. B **37**, pp. 7426-34 (1988)
E. D. Specht, C. J. Sparks, A. G. Dhere, J. Brynestad, O. B. Cavin, D. M. Kroeger. Oak Ridge National Laboratory, Oak Ridge, Tenn.
H. A. Oye. U.S. Air Force Academy, Colorado Springs, Colo.
- 855 Effects of Small Deviations from Stoichiometry on Grain Boundary Compositions in $YBa_2Cu_3O_7$**
Interfacial Structure, Properties and Design. Materials Research Society Symposium Proceedings **122**, ed. M. H. Yoo, W. A. T. Clark and C. L. Briant, pp. 521-26 (Pittsburgh: Materials Research Society, 1988)
D. M. Kroeger, J. Brynestad, R. K. Williams, R. A. Padgett, J. O. Scarbrough. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 856 Changes in Fracture Surface Composition and Morphology with Time in Vacuum in $YBa_2Cu_3O_7$**
Appl. Phys. Lett. **52**, pp. 1266-67 (1988)
D. M. Kroeger, J. Brynestad, R. A. Padgett. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 857 Grain Boundary Compositions in $YBa_2Cu_3O_7$ from Auger Spectroscopy of Fracture Surfaces**
J. Appl. Phys. **64**, pp. 331-35 (1988)
D. M. Kroeger, J. Brynestad, R. K. Williams, R. A. Padgett. Oak Ridge National Laboratory, Oak Ridge, Tenn.
A. Choudhury. University of California, Davis, Calif.
W. A. Coghlan. Arizona State University, Tempe, Ariz.
- 858 Electron Microscopy of High-Temperature Oxide Superconductors**
Proceedings of the 45th Annual Meeting of the Electron Microscopy Society of America, Baltimore, August 2-7, 1987, ed. G. W. Bailey, pp. 52-53 (San Francisco: San Francisco Press, Inc., 1987)
J. Bentley, A. T. Fischer, C. P. Haltom, J. Brynestad, R. J. Lauf, R. K. Williams, D. M. Kroeger. Oak Ridge National Laboratory, Oak Ridge, Tenn.

THERMAL ENERGY STORAGE

- 859 Thermal Energy Storage Technical Progress Report April 1992–March 1993**
ORNL/TM-12384 (May 1993)
M. Olszewski. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 860 Thermal Energy Storage Technical Progress Report April 1990–March 1991**
ORNL/TM-12081 (March 1992)
J. J. Tomlinson. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 861 Development of a Complex Compound Chilli Storage System**
ORNL/Sub/85-57432/1 (August 1991)
U. Rockenfeller, L. Kirol. Rocky Research, Boulder City, Nev.
- 862 Turbo Refrigerating Company Ice Storage Test Report**
ORNL/TM-11657 (June 1991)
T. K. Stovall. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 863 Wallboard with Latent Heat Storage for Passive Solar Applications**
ORNL/TM-11541 (May 1991)
R. J. Kedl. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 864 Thermal Energy Storage Technical Progress Report April 1989–March 1990**
ORNL/TM-11819 (March 1991)
J. J. Tomlinson. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 865 Development of Composite Latent/Sensible Heat Storage Media**
ORNL/Sub/86-95011/1 (December 1990)
R. Petri, E. T. Ong, A. Kardas. Institute of Gas Technology, Chicago, Ill.
- 866 Thermal Energy Storage**
Mechanical Engineering 112(9) (September 1990)
J. J. Tomlinson. Oak Ridge National Laboratory, Oak Ridge, Tenn.
L. D. Kannberg. Battelle Pacific Northwest Laboratories, Richland, Wash.
- 867 Boiling/Evaporative Heat Transfer from Spheres in Packed-Bed Thermal Energy Storage Units. Final Report**
ORNL/Sub/86-7685/2 (May 1990)
R. V. Arimilli, C. A. Moy. University of Tennessee, Knoxville, Tenn.
- 868 Thermal Energy Storage Technical Progress Report April 1987–March 1988**
ORNL/TM-11233 (September 1989)
J. J. Tomlinson, R. J. Kedl. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 869 Development of Ice Self-Release Mechanisms. Final Report**
ORNL/Sub/87-SB064/1 (September 1989)
W. E. Stewart, Jr. University of Missouri-Columbia/Kansas City, Truman Campus, Independence, Mo.

- 870 Complex-Compound Low-Temperature TES System**
U.S. Department of Energy Thermal Energy Storage Research Activities Review 1989
Proceedings, CONF-890351, pp. 217-36 (1989)
U. Rockenfeller. Rocky Research Corp., Boulder City, Nev.
- 871 Preliminary TES Design Optimization Study for a Simple Periodic Brick Plant**
U.S. Department of Energy Thermal Energy Storage Research Activities Review 1989
Proceedings, CONF-890351, pp. 197-207 (1989)
J. B. Drake, M. Olszewski, M. J. Taylor, J. J. Tomlinson. Oak Ridge National Laboratory, Oak Ridge, Tenn.
A. D. Solomon. Consultant to Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 872 Thermal Energy Storage with Liquid-Liquid Systems**
U.S. Department of Energy Thermal Energy Storage Research Activities Review 1989
Proceedings, CONF-890351, pp. 146-70 (1989)
E. A. Santana, L. I. Stiel. New York Polytechnic Institute, Brooklyn, N.Y.
- 873 Self-Releasing Submerged Ice Maker**
U.S. Department of Energy Thermal Energy Storage Research Activities Review 1989
Proceedings, CONF-890351, pp. 128-45 (1989)
W. E. Stewart, Jr., M. E. Greer, L. A. Stickler. University of Missouri-Columbia/Kansas City, Truman Campus, Independence, Mo.
- 874 Computer and Graphics Modeling of Heat Transfer and Phase Change in a Wall with Randomly Imbibed PCM**
U.S. Department of Energy Thermal Energy Storage Research Activities Review 1989
Proceedings, CONF-890351, pp. 124-27 (1989)
A. D. Solomon. Consultant to Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 875 Development of PCM Wallboard for Heating and Cooling of Residential Buildings**
U.S. Department of Energy Thermal Energy Storage Research Activities Review 1989
Proceedings, CONF-890351, pp. 97-123 (1989)
I. Salyer, A. Sircar. University of Dayton Research Institute, Dayton, Ohio
- 876 Development of a Direct Contact Ice Storage System**
U.S. Department of Energy Thermal Energy Storage Research Activities Review 1989
Proceedings, CONF-890351, pp. 93-96 (1989)
C. Poirier. CBI Industries, Plainfield, Ill.
- 877 Effects of Dopants on Crystal Structure and Thermal Properties of Pentaglycerine**
U.S. Department of Energy Thermal Energy Storage Research Activities Review 1989
Proceedings, CONF-890351, pp. 58-75 (1989)
D. Chandra, W. Ding. University of Nevada, Reno, Nev.
- 878 Evaporative Heat Transfer in Beds of Sensible Heat Pellets**
U.S. Department of Energy Thermal Energy Storage Research Activities Review 1989
Proceedings, CONF-890351, pp. 26-57 (1989)
R. V. Arimilli, C. A. Moy. University of Tennessee, Knoxville, Tenn.
- 879 Overview of the Diurnal and Industrial Thermal Energy Storage Programs**
U.S. Department of Energy Thermal Energy Storage Research Activities Review 1989
Proceedings, CONF-890351, pp. 19-25 (1989)
J. J. Tomlinson. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 880 Activities in Support of the Wax-Impregnated Wallboard Concept**
U.S. Department of Energy Thermal Energy Storage Research Activities Review 1989
Proceedings, CONF-890351, pp. 75-91 (1989)
R. J. Kedl, T. K. Stovall. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 881 Hypereutectic Heat Storage Alloy Final Report: Silicon Shell Integrity in Molten Al-Si Eutectic**
ORNL/TM-10380 (June 1988)
M. R. Bennett, J. Braunstein. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 882 Thermal Energy Storage Technical Progress Report April 1986-March 1987**
ORNL/TM-10715 (February 1988)
J. J. Tomlinson, M. J. Taylor. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 883 First and Second Law Studies on Packed Bed Energy Storage Systems Utilizing Phase-Change Materials**
Proceedings ASME Winter Annual Meeting HTD-97, pp. 9-18 (New York: American Society of Mechanical Engineers, 1988)
G. A. Adebisi. Mississippi State University, Mississippi State, Miss.
- 884 Mechanical Energy Storage**
Mech. Eng. 110, pp. 50-58 (1988)
M. Olszewski. Oak Ridge National Laboratory, Oak Ridge, Tenn.
N. Beachley. University of Wisconsin, Madison, Wis.
D. B. Eisenhaure. Satcon Technology Corp., Cambridge, Mass.
J. A. Kirk. University of Maryland, College Park, Md.
- 885 Heats of Mixing for Thermal Energy Storage Systems, Phase I: Selection of Suitable Liquid-Liquid Mixtures**
ORNL/Sub/86-27470/1 (July 1987)
L. I. Stiel. New York Polytechnic Institute, Brooklyn, N.Y.
- 886 Thermal Energy Storage Technical Progress Report April 1985-March 1986**
ORNL/TM-10247 (February 1987)
J. F. Martin. Oak Ridge National Laboratory, Oak Ridge, Tenn.

BIOFUELS FEEDSTOCK DEVELOPMENT

- 887** *Biofuels Feedstock Development Program Annual Progress Report for 1991*
ORNL-6742 (July 1992)
L. L. Wright, J. H. Cushman, A. R. Ehrenshaft, S. B. McLaughlin, W. A. McNabb, J. W. Ranney, G. A. Tuskan, A. F. Turhollow. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 888** *Environmental Emissions and Socioeconomic considerations in the Production, Storage, and Transportation of Biomass Energy Feedstocks*
ORNL/TM-12030 (July 1992)
R. D. Perlack, J. W. Ranney, L. L. Wright. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 889** *Development of Biomass Energy Crops*
Proceedings of the Annual Automotive Technology Development Contractors' Coordination Meeting 1991 P-256, pp. 687-89 (Warrendale, Pa.: Society of Automotive Engineers, June 1992)
L. L. Wright, J. H. Cushman. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 890** *Genetic Improvement of Hybrid Poplars for Short Rotation Biomass Production*
Proceedings of the Annual Automotive Technology Development Contractors' Coordination Meeting 1991 P-256, pp. 691-92 (Warrendale, Pa.: Society of Automotive Engineers, June 1992)
R. F. Stettler, T. M. Hinckley, H. D. Bradshaw, Jr. University of Washington, Seattle, Wash.
P. E. Heilman. Washington State University, Seattle, Wash.
- 891** *Selection and Breeding of Pest-Resistant Clones of Populus for Biomass Energy Production in the North Central Region*
Proceedings of the Annual Automotive Technology Development Contractors' Coordination Meeting 1991 P-256, pp. 693-702 (Warrendale, Pa.: Society of Automotive Engineers, June 1992)
R. B. Hall, E. R. Hart, H. S. McNabb, Jr., B. G. McMahon, R. D. Hanna. Iowa State University, Ames, Iowa
- 892** *Biofuels Feedstock Production Research Directions for 1992*
Proceedings of the Annual Automotive Technology Development Contractors' Coordination Meeting 1991 P-256, pp. 703-707 (Warrendale, Pa.: Society of Automotive Engineers, June 1992)
J. H. Cushman. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 893** *Selection of Herbaceous Energy Crops for Production in Double Cropping Systems*
Proceedings of the Annual Automotive Technology Development Contractors' Coordination Meeting 1991 P-256, pp. 709-12 (Warrendale, Pa.: Society of Automotive Engineers, June 1992)
D. R. Buxton, I. C. Anderson. Iowa State University, Ames, Iowa

- 894 Short Rotation Woody Crop Trials for Energy Production in North Central U.S.**
Proceedings of the Annual Automotive Technology Development Contractors' Coordination Meeting 1991 P-256, pp. 715-16 (Warrendale, Pa.: Society of Automotive Engineers, June 1992)
E. A. Hansen. USDA Forest Service, North Central Experiment Station, Rhinelander, Wis.
- 895 Environmental Considerations in Biomass Resource Management for a Greenhouse-Constrained Society**
Technologies for a Greenhouse-Constrained Society, ed. M. A. Kuliasha, A. Zucker, and K. J. Ballew, pp. 519-45 (Chelsea, Mich.: Lewis Publishers, Inc., 1992)
J. W. Ranney. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 896 Photosynthesis, Water Relations, and Growth of Two Hybrid Populus Genotypes During a Severe Drought**
Can. J. For. Res. 22(8), pp. 1094-1106 (1992)
D. I. Dickmann, Z. Liu, P. V. Nguyen, K. S. Pregitzer. Michigan State University, East Lansing, Mich.
- 897 Nursery Establishment, Phenology and Growth of Silver Maple Related to Provenance**
Biomass and Bioenergy 3, pp. 1-7 (1992)
W. C. Ashby, D. F. Bresnan, P. L. Roth, J. E. Preece, C. A. Huetteman. Southern Illinois University, Champagne, Ill.
- 898 Genetic Variation and Productivity of Populus trichocarpa T. & G. and Its Hybrids: V. The Influence of Ramet Position on Three-Year Growth Variables**
Can. J. For. Res. 23, pp. 349-57 (1992)
J. D. Dunlap, R. F. Stettler. University of Washington, Seattle, Wash.
P. E. Heilman. Washington State University, Puyallup, Wash.
- 899 Environmental and Genetic Influences on Short-Rotation Biomass Production of Black Locust (Robinia pseudoacacia L.) in the Georgia Piedmont**
For. Ecol. Manag. 55, pp. 315-31 (1992)
B. C. Bongarten, D. A. Huber, D. K. Apsley. University of Georgia, Athens, Ga.
- 900 Genetic and Physiological Investigations of Seedling Development and Steckling Growth for American Sycamore (Platanus occidentalis L.)**
Doctoral dissertation, Mississippi State University, 1992
Z. Tang. Mississippi State University, Mississippi State, Miss.
- 901 Biomass Energy Development in Yunnan Province, China. Preliminary Evaluation**
ORNL/TM-11791 (June 1991)
R. D. Perlack, J. W. Ranney, M. Russell. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 902 Development of a Farm-Firm Modelling System for Evaluation of Herbaceous Energy Crops**
ORNL/Sub/88-SC616/2 (March 1991)
B. C. English, R. R. Alexander, K. H. Loewen, S. A. Coady, G. V. Cole, W. R. Goodman. Department of Agricultural Economics and Rural Sociology, University of Tennessee, Knoxville, Tenn.

- 903 *Chilling and Bud Break in Silver Maple***
J. Environ. Hort. 9, pp. 1–4 (1991)
W. C. Ashby, D. F. Bresnan, C. A. Huetteman, J. E. Preece, P. I. Roth. Southern Illinois University, Champagne, Ill.
- 904 *Registration of 'Rebel' Rapeseed***
Crop Sci. 31, pp. 485–86 (1991) D. L. Auld, K. A. Mahler, D. C. Thrill, D. A. Erickson, P. L. Raymer, D. C. Bridges, J. L. Butler. University of Idaho, Moscow, Idaho
- 905 *Registration of Two Rapeseed Germplasm Populations***
Crop Sci. 31, pp. 493–94 (1991)
D. L. Auld, K. A. Mahler, D. C. Thrill, D. A. Erickson, P. L. Raymer, J. L. Sernyk. University of Idaho, Moscow, Idaho
- 906 *Biomass Energy: Exploring the Risks of Commercialization in the United States of America***
Bioresource Technology 35, pp. 1–13 (1991)
R. A. Cantor, C. G. Rzy. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 907 *Land Application of Sludge to Forest and Herbaceous Energy Crops***
Ames Forester, pp. 24–30 (1991)
J. P. Colletti, C. Mize, D. Schultz, L. Rule, A. Skadberg, R. Hall, P. Wray. Iowa State University, Ames, Iowa
- 908 *Agroforestry Systems for the Midwest***
Ames Forester, pp. 10–13 (1991)
J. P. Colletti, L. Rule, A. Skadberg, D. Schultz, C. Mize, R. Hall, P. Wray. Iowa State University, Ames, Iowa
- 909 *Selecting Herbaceous Energy Crops for the Southeast and Midwest/Lake States***
Energy from Biomass and Wastes XIV, ed. D. L. Klass, pp. 465–480 (Chicago, Ill.: Institute of Gas Technology, 1991)
J. H. Cushman, A. F. Turhollow. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 910 *Leaves as Regulators of Stress Response***
Response of Plants to Multiple Stresses, ed. H. A. Mooney et al., pp. 3–34 (San Diego, Calif.: Academic Press, Inc., 1991)
R. E. Dickson, J. G. Isebrands. USDA Forest Service, North Central Experiment Station, Rhinelander, Wis.
- 911 *The Short Rotation Woody Crops Program Data Base***
Bioresource Technology 36, pp. 241–246 (1991)
A. R. Ehrenshaft, L. L. Wright. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 912 *Biomass Crop Production on Representative Southeastern U.S. Farms: Farm Profitability, Erosion Control and the 1985 Food Security Act***
Bioresource Technology 36, pp. 207–214 (1991)
W. R. Goodman, S. A. Coady, B. C. English. University of Tennessee, Knoxville, Tenn.
- 913 *Dormancy Induction Treatment Influence on Western Hemlock Seedlings. I. Seedling Development and Stock Quality Assessment***
Can. J. For. Sci. 21, pp. 164–174 (1991)
S. C. Grossnickle, J. T. Amott, J. E. Major, T. J. Tschaplinski. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 914 Activity of the *Fenusa dohrnii* (Hymenoptera: tenthredinidae) on *Alnus* in the Northcentral United States**
Environ. Entomol. **20**, pp. 534–539 (1991)
E. R. Hart, D. G. Petty, R. B. Hall, D. A. Herms, R. D. Hanna, J. N. Kean. Iowa State University, Ames, Iowa
- 915 Dispersal of *Fenusa dohrnii* (Hymenoptera: tenthredinidae) from an *Alnus* Short-Rotation Forest Plantation**
Great Lakes Entomologist **24**, pp. 63–68 (1991)
E. R. Hart, R. B. Hall, R. D. Hanna, Iowa State University, Ames, Iowa
- 916 Effects of Nitrate on In vitro Nitrate Reductase Activity of Seedlings from Three Open-Pollinated Families of *Robinia pseudoacacia***
Tree Physiology **8**, pp. 381–389 (1991)
K. H. Johnson, B. C. Bongarten, L. R. Boring. University of Georgia, Athens, Ga.
- 917 Fuel Ethanol from Cellulosic Biomass**
Science **251**, pp. 1318–1323 (1991)
L. R. Lynd. Thayer School of Engineering, Dartmouth College, Hanover, N. H.
J. H. Cushman. Oak Ridge National Laboratory, Oak Ridge, Tenn.
R. J. Nichols. Ford Motor Company, Dearborn, Mich.
C. E. Wyman. National Energy Research Laboratory, Golden, Colo.
- 918 Biological Markers in Animals and Plants to Establish Exposure to, and Effects of, Atmospheric Toxicants**
Ecological Exposure and Effects of Airborne Toxic Chemicals: An Overview, ed. T. J. Moser, J. R. Baker, and D. T. Tingey, pp. 107–127 (Corvallis, Ore.: U.S. Environmental Protection Agency, 1991)
J. F. McCarthy, T. J. Tschaplinski. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 919 Disease and Insect Resistance: A Key to Successful Short Rotation Woody Crops Systems**
Ames Forester **78**, pp. 31–33 (1991)
H. S. McNabb, Jr., E. R. Hart, R. B. Hall. Iowa State University, Ames, Iowa
- 920 A Field Trial of Transgenic Hybrid Poplar Trees: Establishment and Growth Through The Second Season**
Biological Monitoring of Genetically Engineered Plants and Microbes, ed. D. R. MacKenzie and S. C. Henry, pp. 155–159 (Bethesda, Md.: Agricultural Research Institute, 1991)
H. S. McNabb, Jr., N. B. Klopfenstein, R. D. Hanna, R. B. Hall, E. R. Hart, S. A. Heuchelin, R. W. Thornbur. Iowa State University, Ames, Iowa
- 921 A Five-Year Study of Herbaceous Energy Crops**
Proc., Energy from Biomass and Wastes XIV, ed. D. L. Klass, pp. 447–464 (Chicago, Ill.: Institute of Gas Technology, 1991)
D. J. Parrish, D. D. Wolf, W. L. Daniels, J. S. Cundiff, D. H. Vaughan. Virginia Polytechnic Institute and State University, Blacksburg, Va.
- 922 Micro- and Cutting Propagation of Silver Maple. I. Results with Adult and Juvenile Propagules**
J. Amer. Soc. Hort. Sci. **116**, pp. 142–148 (1991)
J. E. Preece, C. A. Huetteman, W. C. Ashby, P. L. Roth. Southern Illinois University, Champagne, Ill.

- 923 Energy from Biomass**
The Energy Sourcebook: a Guide to Technology, Resources and Policy, pp. 299–311 (New York: American Institute of Physics, 1991)
J. W. Ranney, J. H. Cushman. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 924 Carbon Storage and Recycling in Short-Rotation Energy Crops**
Proc., Bioenergy and the Greenhouse Effect, ed. C. P. Mitchell, pp. 39–60 (Stockholm, Sweden: International Energy Agency and National Energy Administration of Sweden, 1991)
J. W. Ranney, L. L. Wright, C. P. Mitchell. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 925 Woody Biomass Production Costs in the United States: An Economic Summary of Commercial Populus Plantation Systems**
Proc., Energy from Biomass and Wastes XIV, ed. D. L. Klass, pp. 359–369 (Chicago, Ill.: Institute of Gas Technology, 1991)
C. H. Strauss. Pennsylvania State University, University Park, Pa.
L. L. Wright. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 926 Influence of Timing and Method of Harvest on Rapeseed Yield**
J. Production Agriculture 4, pp. 266–272 (1991)
D. L. Thomas, M. A. Breve, P. L. Raymer. University of Georgia, Athens, Ga.
- 927 Biomass and Soil Nitrogen Relationships of a One-Year-Old Sycamore Plantation**
Soil Sci. Am. J. 55, pp. 841–847 (1991)
T. J. Tschaplinski, R. J. Norby, D. E. Todd. Oak Ridge National Laboratory, Oak Ridge, Tenn.
D. W. Johnson. Desert Research Institute, Reno, Nev.
- 928 Physiological Indicators of Nitrogen Response in Short Rotation Sycamore Plantations. I. CO₂ Assimilation, Photosynthetic Pigments, and Soluble Carbohydrates**
Physiol. Plant. 82, pp. 117–126 (1991)
T. J. Tschaplinski, R. J. Norby. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 929 Screening Herbaceous Lignocellulosic Energy Crops in Temperate Regions of the United States**
Bioresource Technology 36, pp. 247–252 (1991)
A. F. Turhollow. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 930 Windbreak Species Performance and Management Practices as Reported by Montana and North Dakota Landowners**
J. Soil and Water Conservation May–June, pp. 225–228 (1991)
G. A. Tuskan. Oak Ridge National Laboratory, Oak Ridge, Tenn.
K. Laughlin. University of Idaho, Sandpoint, Idaho
- 931 Role of New Wood Energy Crops in Mitigation of Fossil CO₂ Emissions**
Proc., 1990 Conference on Biomass for Utility Applications, pp. 87–112 (Palo Alto, Calif.: Electric Power Research Institute, 1991)
L. L. Wright. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 932 The Economic Viability of Short Rotation Woody Crops**
Policy Implications of Greenhouse Warming Report of the Mitigation Panel. Appendix H: Biomass, pp. H-1–H-7 (Washington, D. C.: National Academy Press, 1991)
L. L. Wright. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 933 Herbaceous Energy Crops Program: Annual Progress Report for FY 1988**
ORNL-6639 (November 1990)
A. F. Turhollow, J. H. Cushman, J. W. Johnston. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 934 Screening of Herbaceous Species for Energy Crop Production. Final Report 1985-1990**
ORNL/Sub/85-27411/5 (November 1990)
N. Wright. Geophyta, Vickery, Ohio
- 935 Evaluation of Potential Herbaceous Biomass Crops on Marginal Crops Lands: 2) Economic Potential. Final Report 1985-1989**
ORNL/Sub/85-27412/5&P2 (November 1990)
C. L. Dobbins, P. Preckel, A. Mdafri, J. Lowenberg-DeBoer, D. Stucky. Purdue University, West Lafayette, Ind.
- 936 Screening and Selection of Herbaceous Species for Biomass Production in the Midwest/Lake States. Final Report 1985-1989**
ORNL/Sub/85-27410/5 (November 1990)
R. A. Pfeifer, G. W. Fick, D. J. Lathwell, C. Maybee. New York State College of Agriculture and Life Sciences, Cornell University, Ithaca, N.Y.
- 937 Short Rotation Woody Crops Program: Annual Progress Report for 1989**
ORNL-6625 (August 1990)
L. L. Wright, A. R. Ehrenshaft. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 938 Modifying Woody Plants for Efficient Conversion to Liquid and Gaseous Fuels**
ORNL/Sub/88-SC006/1 (July 1990)
R. J. Dinus, D. R. Dimmel, R. P. Feirer, M. A. Johnson, E. W. Malcolm. Institute of Paper Science and Technology, Atlanta, Ga.
- 939 Evaluation of Potential Herbaceous Biomass Crops on Marginal Crop Lands: 1) Agronomic Potential. Final Report 1985-1989**
ORNL/Sub/85-27412/5&P1 (July 1990)
J. H. Cherney, K. D. Johnson, J. J. Volenec, E. J. Klavivko, D. K. Greene. Department of Agronomy, Purdue Univ., West Lafayette, Ind.
- 940 Evaluation of the Potential for Using Old-Field Vegetation as an Energy Feedstock: Biomass Yield, Chemical Composition, Environmental Concerns, and Economics**
ORNL/TM-11615 (July 1990)
J. W. Johnston, Jr. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 941 Selection and Improvement of Herbaceous Energy Crops for the Southeastern USA. Final Report on a Field and Laboratory Research Program for the Period March 15, 1985 to March 14, 1990**
ORNL/Sub/85-27409/5 (July 1990)
D. I. Bransby, S. E. Sladden, D. D. Kee. Dept. of Agronomy and Soils, Auburn University, Auburn University, Ala.
- 942 Perennial Species for Optimum Production of Herbaceous Biomass in the Piedmont. Final Report 1985-1989**
ORNL/Sub/85-27413/5 (July 1990)
D. J. Parrish, D. D. Wolf, W. L. Daniels, D. H. Vaughan, J. S. Cundiff. Virginia Polytechnic Institute and State University, Blacksburg, Va.

- 943 *Improving Rapeseed Production Practices in the Southeastern United States***
ORNL/Sub/86-91324/1 (April 1990)
D. L. Thomas, M. A. Breve, P. L. Raymer, N. A. Minton, D. R. Sumner. University of Georgia, Coastal Plain Experiment Station, Tifton, Ga.
- 944 *CO₂ Emissions from Production and Combustion of Fuel Ethanol from Corn***
ORNL/TM-11180 (May 1990)
G. Marland, A. Turhollow. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 945 *International Transfer of Agnus, Populus, and Cellos***
Biomass 22, pp. 49–62 (1990)
A. Ager, N. E. Nordh, S. Ledin, M. Ostry, M. Carlson, A. Ronnberg-Wastljung. USDA Forest Service, North Central Forest Experiment Station, Rhinelander, Wis.
- 946 *Mechanization of the Operational Aspects of Short-Rotation Forestry***
Biomass 22, pp. 123–33 (1990)
N. S. Christopherson, J. A. Mattson. USDA Forest Service, North Central Forest Experiment Station, Rhinelander, Wis.
- 947 *Chemical Control of Adventitious Root Formation in Cuttings***
PGRSA Quarterly 18, pp. 1–17 (1990)
T. D. Davis, B. E. Haissig. USDA Forest Service, North Central Forest Experiment Station, Rhinelander, Wis.
- 948 *Evaluation of Agnus Species and Hybrids***
Biomass 22, pp. 21–34 (1990)
R. B. Hall, D. Burgess. Iowa State University, Ames, Iowa
- 949 *Genetic Variation and Productivity of Populus trichocarpa and Its Hybrids. IV. Performance in Short-Rotation Coppice***
Can. J. For. Res. 20, pp. 1257–64 (1990)
P. E. Heilman. Washington State University, Puyallup, Wash.
R. F. Stettler. University of Washington, Seattle, Wash.
- 950 *Validating the Regional Applicability of a Whole-Plant Ecophysiological Growth Process Model of Juvenile Poplar***
Proceedings, Forest Simulation Systems, ed. L. C. Wensel and G. S. Biging, pp. 97–106 (University of California, 1990)
G. E. Host, H. M. Rauscher. USDA Forest Service, North Central Forest Experiment Station, Rhinelander, Wis.
- 951 *Fuel Ethanol from Cellulosic Biomass***
Science 251, pp. 1318–23 (1990)
L. R. Lynd. Thayer School of Engineering, Dartmouth College, Hanover, N.H.
J. H. Cushman. Oak Ridge National Laboratory, Oak Ridge, Tenn.
R. J. Nichols. Ford Motor Company, Dearborn, Mich.
C. E. Wyman. Solar Energy Research Institute, Golden, Colo.
- 952 *The Microcomputer Scientific Series #6: The ECOPHYS User's Manual***
General Technical Report NC-141 (St. Paul, Minn.: U.S. Forest Service, North Central Forest Experiment Station, 1990)
G. E. Host, H. M. Rauscher, J. G. Isebrands, R. E. Dickson, T. R. Crow, D. A. Michael. USDA Forest Service, North Central Forest Experiment Station, Rhinelander, Wis.
D. I. Dickmann. Michigan State University, East Lansing, Mich.

- 953 Accelerating Energy Crop Growth via Genetic Techniques**
Energy from Biomass and Wastes XIII, pp. 397–424 (Chicago: Institute of Gas Technology, 1990)
P. A. Layton, L. L. Wright, T. W. Doyle, J. W. Ranney, J. H. Cushman, A. F. Turhollow. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 954 Economic Evaluations of Optimum Rotation Age for SRIC Plantations**
Energy from Biomass and Wastes XIII, pp. 295–307 (Chicago: Institute of Gas Technology, 1990)
C. H. Strauss, S. C. Grado, P. R. Blankenhorn, T. W. Bowersox. The Pennsylvania State University, University Park, Pa.
- 955 Commercialization of Short-Rotation Intensive Culture Tree Production in North America**
Energy from Biomass and Wastes XIII, pp. 309–29 (Chicago: Institute of Gas Technology, 1990)
L. L. Wright. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 956 ATP Concentrations in *Pinus banksiana* Cuttings During Adventitious Rooting**
J. Plant Physiol. 136, pp. 499–502 (1990)
B. E. Haissig. USDA Forest Service, North Central Forest Experiment Station, Rhinelander, Wis.
- 957 Reduced Irradiance and Applied Auxin Influence Carbohydrate Relations in *Pinus banksiana* Cuttings During Propagation**
Physiologia Plantarum 78, pp. 455–61 (1990)
B. E. Haissig. USDA Forest Service, North Central Forest Experiment Station, Rhinelander, Wis.
- 958 Photosynthesis Patterns During the Establishment Year Within two *Populus* Clones**
Tree Physiology 6, pp. 11–27 (1990)
D. A. Michael, J. G. Isebrands, N. D. Nelson. USDA Forest Service, North Central Forest Experiment Station, Rhinelander, Wis.
D. I. Dickmann. Michigan State University, East Lansing, Mich.
- 959 Minimizing Disease Injury to Hybrid Poplars**
J. Environ. Hort. 8, pp. 96–98 (1990)
M. E. Ostry. USDA Forest Service, North Central Forest Experiment Station, Rhinelander, Wis.
H. E. McNabb, Jr. Iowa State University, Ames, Iowa
- 960 Cost Parameters Affecting Multiple Rotation SRIC Biomass Systems**
Appl. Biochem. Biotech. 24/25, pp. 721–33 (1990)
C. H. Strauss, S. C. Grado, P. R. Blankenhorn, T. W. Bowersox. The Pennsylvania State University, University Park, Pa.
- 961 Woody Biomass Production Costs in the United States: An Economic Summary of Commercial *Populus* Plantation Systems**
Solar Energy 45, pp. 105–10 (1990)
C. H. Strauss. The Pennsylvania State University, University Park, Pa.
L. L. Wright. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 962 A Review of Biomass Quality Research Relevant to the Use of Poplar and Willow for Energy Conversion**
Biomass 21, pp. 163-88 (1990)
W. A. Kenney. University of Toronto, Ontario, Canada
L. Sennerby-Forsse. Swedish University of Agricultural Sciences, Uppsala, Sweden
P. A. Layton. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 963 Economic Evaluations for Short-Rotation Biomass Production Systems**
Biomass 22, pp. 135-44 (1990)
D. C. Lothner. USDA Forest Service, North Central Forest Experiment Station, Rhinelander, Wis.
- 964 Coppicing Success of Young Eucalyptus saligna in Hawaii**
Biomass 23, pp. 137-48 (1990)
T. W. Bowersox. The Pennsylvania State University, University Park, Pa.
T. H. Schubert, R. F. Strand. USDA Forest Service, Pacific Northwest Forest Experiment Station, Portland, Ore.
C. D. Whitesell. BioEnergy Development Corp., Hilo, Hawaii
- 965 National Winter Rapeseed Variety Trial 1988-89**
Miscellaneous Series No. 130 (Moscow, Idaho: University of Idaho, 1990)
K. A. Mahler, D. L. Auld, comps. University of Idaho, Moscow, Idaho
- 966 Biotechnology in Biomass Crop Production. The Relationship of Biomass Production and Plant Genetic Engineering**
ORNL/M-978 (December 1989)
D. E. Harry. University of Illinois Urbana-Champaign, Urbana, Ill.
R. R. Sederoff. North Carolina State University, Raleigh, N.C.
- 967 Short Rotation Woody Crops Program: Annual Progress Report for 1988**
ORNL-6594 (October 1989)
L. L. Wright, T. W. Doyle, P. A. Layton, J. W. Ranney. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 968 Improved Conversion of Herbaceous Biomass to Biofuels: Potential for Modification of Key Plant Characteristics. Final Report on a Literature Review and Survey**
ORNL/Sub/88-SC011/1 (October 1989)
S. E. Sladden, D. I. Bransby. Auburn University, Auburn, Ala.
- 969 The SRWCP Database Management System: Users Guide, Data Definitions, and Source Code**
ORNL/TM-10820 (February 1989)
A. R. Ehrenshaft, L. L. Wright. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 970 Short Rotation Woody Crops Program Publications and Presentations**
ORNL/TM-10848 (February 1989)
A. R. Ehrenshaft. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 971 Herbaceous Energy Crops Program: Annual Progress Report for FY 1987**
ORNL-6514 (January 1989)
J. H. Cushman, A. F. Turhollow, J. W. Johnston. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 972 Quick Estimates of Root Length, Using a Video Image Analyzer**
Canadian Journal of Forest Research 19, pp. 335-40 (1989)
M. Cunningham. University of Tennessee, Knoxville, Tenn.
M. B. Adams, R. J. Luxmoore, W. M. Post, D. L. DeAngelis. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 973 No-Till Establishment of Perennial, Warm-Season Grasses for Biomass Production**
Biomass 20, pp. 209-17 (1989)
D. D. Wolf, D. J. Parrish, W. L. Daniels, J. R. McKenna. Virginia Polytechnic Institute and State University, Blacksburg, Va.
- 974 Herbaceous Crops on Marginal Sites Erosion and Economics**
Biomass 29, pp. 199-208 (1989)
D. H. Vaughan, J. S. Cundiff, D. J. Parrish. Virginia Polytechnic Institute and State University, Blacksburg, Va.
- 975 Allozyme Variation in Black Locust (*Robinia pseudoacacia*)**
Can. J. For. Research 19, pp. 471-79 (1989)
S. E. Sures, J. L. Hamrick, B. C. Bongarten. University of Georgia, Athens, Ga.
- 976 Shoot Culture Dynamics of Six *Populus* Clones**
Tree Physiology 5, pp. 219-27 (1989)
J. C. Sellmer, B. E. Haissig. USDA Forest Service, North Central Forest Experiment Station, Rhinelander, Wis.
B. H. McCown. University of Wisconsin, Madison, Wis.
- 977 Species Screening and Biomass Trials of Woody Plants in the Semi-Arid Southwest United States**
Biomass 18, pp. 15-29 (1989)
R. D. Kirmse, J. T. Fisher. Energy/Development International, Washington, D.C.
- 978 Physiological, Morphological and Anatomical Components of Hybrid Vigor in *Populus***
Structural and Functional Responses to Environmental Stresses, ed. K. H. Kreeb, H. Richter, and T. M. Hinckley, pp. 199-217 (The Hague, The Netherlands: SPB Academic Publishing bV, 1989)
T. M. Hinckley, R. Ceulemans, J. M. Dunlap, A. Figliola, P. E. Heilman, J. G. Isebrands, G. Scarascia-Mugnozza, P. J. Schulte, B. Smith, R. F. Stettler, E. Van Volkenburg, B. M. Wiard. University of Washington, Seattle, Wash.
- 979 Using *N₂*-fixing *Albizia* to Increase Growth of Eucalyptus Plantations in Hawaii**
Forest Science 35, pp. 64-75 (1989)
D. S. DeBell, C. D. Whitesell, T. H. Schubert. USDA Forest Service, Pacific Northwest Station, Portland, Ore.
- 980 Biomass Production from Selected Herbaceous Species in the Southeastern USA**
Biomass 20, pp. 187-97 (1989)
D. I. Bransby, C. Y. Ward, P. A. Rose, S. E. Sladden, D. D. Kee. Auburn University, Auburn, Ala.

- 981 *The Potential of Vegetable Oil as an Alternate Source of Liquid Fuel for Agriculture in the Pacific Northwest VI***
Miscellaneous Series No. 121 (Moscow, Idaho: University of Idaho, 1989)
D. L. Auld, R. A. Korus, C. L. Peterson. University of Idaho, Moscow, Idaho
- 982 *Ethanol Production and the Environment***
Energy 14, pp. 451-68 (1989)
D. B. Hunsaker, Jr., J. F. McBrayer. Oak Ridge National Laboratory, Oak Ridge, Tenn.
J. L. Elmore. PEER Consultants, Oak Ridge, Tenn.
- 983 *Photosynthetic Reinvigoration of Leaves Following Shoot Decapitation and Accelerated Growth of Coppice Shoots***
Physiol. Plant. 75, pp. 157-65 (1989)
T. J. Tschaplinski. Automated Sciences Group, Inc., Oak Ridge, Tenn.
T. J. Blake. University of Toronto, Toronto, Ontario, Canada
- 984 *The Role of Sink Demand in Carbon Partitioning and Photosynthetic Reinvigoration Following Shoot Decapitation***
Physiol. Plant. 75, pp. 166-73 (1989)
T. J. Tschaplinski. Automated Sciences Group, Inc., Oak Ridge, Tenn.
T. J. Blake. University of Toronto, Toronto, Ontario, Canada
- 985 *Comparisons Among Populus Clones and Intensive Culture Conditions Using an Energy Conversion Model***
Forest Ecology and Management 27, pp. 129-47 (1989)
J. J. Landsberg. Commonwealth Scientific and Industrial Research Organization, Australia
L. L. Wright. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 986 *Water Stress Tolerance and Late-Season Organic Solute Accumulation in Hybrid Poplar***
Can. J. Bot. 67, pp. 1681-88 (1989)
T. J. Tschaplinski. Automated Sciences Group, Inc., Oak Ridge, Tenn.
T. J. Blake. University of Toronto, Toronto, Ontario, Canada
- 987 *Correlation Between Early Root Production, Carbohydrate Metabolism, and Subsequent Dry Matter Production in Hybrid Poplar***
Can. J. Bot. 67, pp. 2168-74 (1989)
T. J. Tschaplinski. Automated Sciences Group, Inc., Oak Ridge, Tenn.
T. J. Blake. University of Toronto, Toronto, Ontario, Canada
- 988 *Commercialization of Short-Rotation Intensive Culture Tree Production in North America***
Energy from Biomass and Wastes XII, ed. D. L. Klass, pp. 261-74 (Chicago: Institute of Gas Technology, 1989)
L. L. Wright. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 989 *Water Relations and Photosynthetic Capacity as Determinants of Productivity in Hybrid Poplar Cultivars***
Can. J. Bot. 67, pp. 1689-97 (1989)
T. J. Tschaplinski. Automated Sciences Group, Inc., Oak Ridge, Tenn.
T. J. Blake. University of Toronto, Toronto, Ontario, Canada

- 990 *Cattail (Typha Spp.) Biomass Production. Stand Management and Sustainable Yields***
ORNL/Sub/84-89674/1 (December 1988)
D. C. Pratt, D. R. Dubbe, E. G. Garver, W. D. Johnson. University of Minnesota, St. Paul and Crookston, Minn.
- 991 *Productivity of Wet Soils: Biomass of Cultivated and Natural Vegetation***
ORNL/Sub/84-18435/1 (December 1988)
C. A. Johnston. Environmental Consulting, Duluth, Minn.
- 992 *Short Rotation Woody Crops Program Annual Progress Report for 1987***
ORNL-6440 (August 1988)
J. W. Ranney, A. R. Ehrenshaft, P. A. Layton, W. A. McNabb, L. L. Wright. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 993 *Hydrocarbons and Energy from Plants, Final Report 1984-1987***
ORNL/Sub/84-90435/1 (August 1988)
M. Calvin, J. W. Otvos, S. E. Taylor, E. K. Nemethy, C. L. Skurud, D. R. Hawkins, R. Lago. University of California and Lawrence Berkeley Laboratory, Berkeley, Calif.
- 994 *Second-Year Growth and Productivity for Potential Herbaceous Energy Crops in the Southeast and Midwest/Lake States***
ORNL/TM-10626 (July 1988)
A. F. Turhollow. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 995 *Economics of Vegetable Oil Processing***
ORNL/Sub/87-SA185/1 (May 1988)
R. Scheithauer, K. Dripchak. JAYCOR, Vienna, Va.
- 996 *Woody Species for Biomass Production in Florida: Final Report 1983-1988***
ORNL/Sub/81-09050/7 (February 1988)
D. L. Rockwood, D. R. Dippon, M. S. Lesney. University of Florida, Gainesville, Fla.
- 997 *The Potential of Biotechnology in the Biomass Production Program***
ORNL/M-606 (January 1988)
D. D. Ellis, B. H. McCown. University of Wisconsin, Madison, Wis.
- 998 *Impact and Control of Septoria musiva on Hybrid Poplars***
Gen. Tech. Rep. NC-133 (St. Paul, Minn.: USDA Forest Service, 1988)
M. E. Ostry, L. F. Wilson. USDA Forest Service, North Central Forest Experiment Station, Rhinelander, Wis.
H. S. McNabb, Jr. Iowa State University, Ames, Iowa
- 999 *Linking Energy Crop Production to Conversion: The Case of Herbaceous Lignocellulosic Crops to Ethanol***
FERIC International Energy Journal 10, pp. 41-49 (1988)
A. F. Turhollow, J. W. Johnston, J. H. Cushman. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 1000 *A Cost Analysis of Alternate Biomass Supply Systems***
For. Prod. 38, pp. 47-51 (1988)
C. H. Strauss, P. R. Blankenhorn, T. W. Bowersox, S. C. Grado. The Pennsylvania State University, University Park, Pa.

- 1001 Increased Herbicide Tolerance of In vitro Selected Hybrid Poplar**
Somatic Cell Genetics of Woody Plants, pp. 183–89 (Dordrecht, The Netherlands: Kluwer Academic Publishers, 1988)
C. H. Michler, B. E. Haissig. USDA Forest Service, North Central Experiment Station, Rhinelander, Wis.
- 1002 Production of Cattail (*Typha* spp.) Biomass in Minnesota, USA**
Biomass 17, pp. 79–104 (1988)
D. R. Dubbe, E. G. Garver, D. C. Pratt. University of Minnesota, St. Paul, Minn.
- 1003 Chemical Composition of Herbaceous Grass and Legumes Species**
Biomass 17, pp. 215–39 (1988)
J. H. Cherney, K. D. Johnson, J. J. Volenec, K. S. Anliker. Purdue University, West Lafayette, Ind.
- 1004 SRIC: Integration of Production and Harvesting System Costs**
Proceedings of the International Energy Agency Workshop on Economic Evaluations of Short-Rotation Biomass Energy Systems, IEA/BA/Task II, Duluth, Minn., August 11–13, 1987, pp. 115–50 (Toronto: University of Toronto Press, 1988)
S. L. Woodfin, D. T. Curtin. Tennessee Valley Authority, Norris, Tenn.
L. L. Wright. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 1005 Validation and Standardization of SRIC Production Costs**
Proceedings of the International Energy Agency Workshop on Economic Evaluations of Short-Rotation Biomass Energy Systems, IEA/BA/Task II, Duluth, Minn., August 11–13, 1987, pp. 230–37 (Toronto: University of Toronto Press, 1988)
L. L. Wright, J. W. Ranney. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 1006 Influence of Site Condition, Fertilization and Spacing on Short Rotation Hardwood Coppice and Seedling Yields**
Biomass 16, pp. 183–98 (1988)
S. J. Torreano, D. J. Frederick. North Carolina State University, Raleigh, N.C.
- 1007 Populus trichocarpa x Populus deltoides Hybrids for Short Rotation Culture: Variation Patterns and Four-Year Field Performance**
Can. J. For. Res. 18(6), pp. 745–53 (1988)
R. F. Stettler, R. C. Fenn, P. E. Heilman, B. J. Stanton. University of Washington, Seattle, Wash.
- 1008 Nutrient Relations in Coppiced Black Cottonwood and Red Alder**
Plant and Soil 106, pp. 171–77 (1988)
M. A. Radwan, D. S. DeBell. USDA Forest Service, Pacific Northwest Experiment Station, Portland, Ore.
- 1009 Growth and Development During the Establishment Year of Two Populus Clones With Contrasting Morphology and Phenology**
Tree Physiology 4, pp. 139–52 (1988)
D. A. Michael, J. G. Isebrands, N. D. Nelson. USDA Forest Service, North Central Experiment Station, Rhinelander, Wis.
D. I. Dickmann. Michigan State University, East Lansing, Mich.
- 1010 Silver Maple Seed Sources for Increased Biomass Production**
North. J. Appl. For. 5(3), pp. 180–84 (1988)
R. F. Kopp, W. A. Geyer, W. R. Lovett. Kansas State University, Manhattan, Kans.

- 1011 Nitrogen Fertilization of Young Yellow-Poplar and Loblolly Pine Plantations at Differing Frequencies**
Soil Sci. Soc. Am. J. 52, pp. 1468-77 (1988)
D. W. Johnson, D. E. Todd. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 1012 The Effects of Leaching and Whole-Tree Harvesting on Catlon Budgets of Several Forests**
J. Environ. Qual. 17, pp. 418-24 (1988)
D. W. Johnson, J. M. Kelly, H. Van Miegroet. Oak Ridge National Laboratory, Oak Ridge, Tenn.
W. T. Swank. Coweeta Hydrologic Lab., Otto, N.C.
D. W. Cole. University of Washington, Seattle, Wash.
J. W. Hornbeck, R. S. Pierce. USDA Forest Service, Northeastern Forest Experiment Station, Durham, N.H.
D. Van Lear. Clemson University, Clemson, S.C.
- 1013 Genetic Variation in Photosynthetic Traits Among Populus Clones in Relation to Yield**
Plant Physiol. Biochem. 26(4), pp. 427-37 (1988)
J. G. Isebrands. USDA Forest Service, North Central Experiment Station, Rhinelander, Wis.
R. Ceulemans, B. Wiard. University of Washington, Seattle, Wash.
- 1014 Biomass and Nitrogen Dynamics of Hybrid Poplar on Two Different Soils: Implications for Fertilization Strategy**
Can. J. For. Res. 18, pp. 233-30 (1988)
E. A. Hansen, R. A. McLaughlin. USDA Forest Service, North Central Experiment Station, Rhinelander, Wis.
P. E. Pope. Purdue University, West Lafayette, Ind.
- 1015 Irrigating Short Rotation Intensive Culture Hybrid Poplars**
Biomass 16, pp. 237-50 (1988)
E. A. Hansen. USDA Forest Service, North Central Experiment Station, Rhinelander, Wis.
- 1016 Comparison of Seedling Containers on Growth and Survival of Prosopis alba and Leucaena leucocephala in Semi-Arid Conditions**
For. Ecol. Manage. 24, pp. 177-82 (1988)
P. Folker, C. Wiesman, D. Smith. Texas A&I University, Kingsville, Texas
- 1017 A Guide to Using Regression Equations for Estimating Tree Biomass**
North. J. Appl. For. 5, pp. 15-22 (1988)
T. R. Crow. USDA Forest Service, North Central Experiment Station, Rhinelander, Wis.
- 1018 National Winter Rapeseed Variety Trial 1986-87**
Misc. Series Bull. No. 113 (Moscow, Idaho: University of Idaho, 1988)
K. A. Mahler, D. L. Auld, comps. University of Idaho, Moscow, Idaho
- 1019 Effects of Management Strategy and Site on Selected Properties of First Rotation Populus Hybrid NE-388**
Wood Fiber Sci. 20(1): pp. 74-81 (1988)
P. R. Blankenhorn, T. W. Bowersox, C. H. Strauss, G. L. Stimely, L. R. Stover, M. L. DiCola. Pennsylvania State University, University Park, Pa.

- 1020 Financial and Energy Costs of Supplying Woody Biomass to Conversion Sites**
Appl. Biochem. Biotech. 18, pp. 217-30 (Clifton, New Jersey: Humana Press, 1988)
C. H. Strauss, P. R. Blankenhorn, T. W. Bowersox, S. C. Grado. Pennsylvania State University, University Park, Pa.
- 1021 Effects of Whole-Tree and Stem-Only Clear-Cutting on Postharvest Hydrologic Losses, Nutrient Capital, and Site Productivity**
Forest Sci. 42, pp. 412-28 (1988)
L. K. Mann, D. W. Johnson, D. C. West. Oak Ridge National Laboratory, Oak Ridge, Tenn.
D. W. Cole. College of Forest Resources, Seattle, Wash.
J. W. Hornbeck. USDA Forest Service, Northeastern Forest Experiment Station, Durham, N.H.
C. W. Martin. Hubbard Brook Experimental Forest, Campton, N.H.
H. Riekerk. School of Forest Resources and Conservation, Gainesville, Fla.
C. T. Smith. University of New Hampshire, Durham, N.H.
W. T. Swank. Coweeta Hydrologic Laboratory, Otto, N.C.
L. M. Tritton. Consultant to Oak Ridge National Laboratory, Oak Ridge, Tenn.
D. H. Van Lear. Department of Forestry, Clemson, S.C.
- 1022 Cultural and Management Practices for the Chinese Tallow Tree as a Biomass Fuel Source**
ORNL/Sub/81-09059/1 (December 1987)
J. R. Cowles, H. W. Scheid. University of Houston, Houston, Texas
- 1023 Short Rotation Woody Crops Program: Annual Progress Report for 1986**
ORNL-6348 (November 1987)
J. W. Ranney, L. L. Wright, P. A. Layton, W. A. McNabb. Oak Ridge National Laboratory, Oak Ridge, Tenn.
C. R. Wenzel. Science Applications International Corp., Oak Ridge, Tenn.
D. T. Curtin. Tennessee Valley Authority, Norris, Tenn.
- 1024 Herbaceous Energy Crops Program: Annual Progress Report for FY 1986**
ORNL-6369 (May 1987)
J. H. Cushman, A. F. Turhollow, J. W. Johnston, Jr. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 1025 Characterization of the Southwest United States for the Production of Biomass Energy Crops**
ORNL/TM-10203 (March 1987)
M. S. Salk. Oak Ridge National Laboratory, Oak Ridge, Tenn.
A. G. Folger. Solar Energy Research Institute, Golden, Colo.
- 1026 Early Growth and Nutrient Status of Eucalyptus saligna as Affected by Nitrogen and Phosphorus Fertilization**
Aust. For. Res. 17, pp. 203-14 (1987)
R. S. Yost, D. S. DeBell. USDA Forest Service, Pacific Northwest Experiment Station, Portland, Ore.
C. D. Whitesell, S. C. Miyasaka. BioEnergy Development Corp., Hilo, Hawaii

- 1027 Abscissic Acid Relations and the Response of *Populus trichocarpa* Stomata to Leaf Water Potential**
Tree Physiol. 3, pp. 103-113 (1987)
P. J. Schulte. University of Washington, Seattle, Wash.
T. M. Hinckley. USDA Forest Service, North Central Experiment Station, Rhinelander, Wis.
- 1028 A Simple Method for Evaluating Whole-Plant Cold Hardiness**
Tree Plant. Notes 38(2), pp. 16-18 (1987)
W. J. Rietveld, R. W. Tinus. USDA Forest Service, North Central Experiment Station, Rhinelander, Wis.
- 1029 Biomass Energy and Soil Erosion: Assessment of Resource Costs**
Biomass 14, pp. 15-38 (1987)
D. Pimentel, J. Krummel. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 1030 Wood Energy Plantation Economics in the Great Plains**
J. Energy Engineering 13(3), pp. 92-101 (1987)
R. D. Perlack. Oak Ridge National Laboratory, Oak Ridge, Tenn.
W. A. Geyer. Kansas State University, Manhattan, Kans.
- 1031 Development of Eucalyptus Clones for a Summer Rainfall Environment with Periodic Severe Frosts**
New For. 3, pp. 197-205 (1987)
G. F. Meskimen, D. L. Rockwood, K. V. Reddy. Florida State University, Gainesville, Fla.
- 1032 Influence of Auxins, Thiamine and Fungal Drenches on the Rooting of *Prosopis alba* Clone B2V50 Cuttings**
J. Hortic. Science 62(1), pp. 97-100 (1987)
S. Klass, J. Wright, P. Felker. Texas A&I University, Kingsville, Texas
- 1033 Variation in Growth of Red Alder Families in Relation to Shallow Water Table Levels**
For. Sci. 33(1), pp. 224-29 (1987)
D. D. Hook, M. D. Murray, D. S. DeBell, B. C. Wilson. USDA Forest Service, Pacific Northwest Experiment Station, Portland, Ore.
- 1034 Determining CO₂ Exchange Rate as a Function of Photosynthetic Photon Flux Density**
Photosynthetica 21, pp. 98-101 (1987)
P. H. Hansen. Oak Ridge National Laboratory, Oak Ridge, Tenn.
R. E. McRoberts, J. G. Isebrands. USDA Forest Service, North Central Experiment Station, Rhinelander, Wis.
R. K. Dixon. University of Minnesota, St. Paul, Minn.
- 1035 Trends in the Use of Tissue Culture in Forest Improvement**
Biotechnology 5, pp. 52-59 (1987)
B. E. Haissig, N. D. Nelson, G. H. Kidd. USDA Forest Service, North Central Experiment Station, Rhinelander, Wis.
- 1036 Correlations Between Biomass Productivity and Soil and Plant Tissue Nutrient Concentrations for *Leucaena leucocephala* (K-8) Growing on Calcareous Soils**
For. Ecol. Manage. 18, pp. 241-50 (1987)
E. L. Glumac, P. Felker, I. Reyes. Texas A&I University, Kingsville, Texas

- 1037 A Comparison of Cold Tolerance and Biomass Production in *Leucaena leucocephala*, *L. pulverulenta* and *L. retusa***
For. Ecol. Manage. 18, pp. 251-71 (1987)
E. L. Glumac, P. Felker, I. Reyes. Texas A&I University, Kingsville, Texas
- 1038 Preemergent Herbicide Trials With Direct-Seeded Black Locust Grown In Different Soils**
J. Arboriculture 13(4), pp. 105-07 (1987)
W. A. Geyer, L. Melichar, C. E. Long. Kansas State University, Manhattan, Kans.
- 1039 Agrobacterium Mediated Transformation and Regeneration of Populus**
Mol. Gen. Genet. 206, pp. 192-99 (1987)
D. J. Frederick, T. Tew, A. Clark III, D. R. Phillips. North Carolina State University, Raleigh, N.C.
- 1040 Diurnal Changes in Leaf Chemical Constituents and ¹⁴C-Partitioning in Cottonwood**
Tree Physiol. 3, pp. 157-71 (1987)
R. E. Dickson. USDA Forest Service, North Central Experiment Station, Rhinelander, Wis.
- 1041 A Regional Carbon Storage Simulation for Large-Scale Biomass Plantations 1**
Ecological Modelling 36, pp. 171-80 (1987)
W. P. Cropper, Jr., K. C. Ewel. Florida State University, Tallahassee, Fla.
- 1042 Nutrient Export by Leaching and Whole-Tree Harvesting in a Loblolly Pine and Mixed Oak Forest**
Plant & Soil 102, pp. 99-109 (1987)
D. W. Johnson, D. E. Todd. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 1043 The Location Theory of the Plantation**
J. Reg. Sci. 27, pp. 157-82 (1987)
D. W. Jones, J. R. Krummel. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 1044 Nitrogen Cycling Models and Their Application to Forest**
Proceedings of the IEA/BA Task II Workshop on Productivity, Technology, Economics, and Nutrient Cycling, Kingston, Ontario, Canada, May 20-23, 1986, pp. 27-36 (Canadian Forestry Service, 1987)
D. W. Johnson, V. H. Dale. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 1045 Biomass and Nitrogen Dynamics in an Irrigated Hybrid Poplar Plantation**
Forest Ecology and Management 18, pp. 169-88 (1987)
R. A. McLaughlin, E. A. Hansen. USDA Forest Service, North Central Experiment Station, Rhinelander, Wis.
P. E. Pope. Purdue University, West Lafayette, Ind.
- 1046 Hardwood Energy Crops: The Technology of Intensive Culture**
J. For. 85, pp. 17-28 (1987)
J. W. Ranney, L. L. Wright, P. A. Layton. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 1047 Economics of Short Rotation Intensive Culture for the Production of Wood Energy Feedstocks**
Energy 12, pp. 1217-26 (1987)
R. D. Perlack, J. W. Ranney. Oak Ridge National Laboratory, Oak Ridge, Tenn.

1048 Landscape Patterns in a Disturbed Environment

OIKOS 48, pp. 321-24 (1987)

J. R. Krummel. Argonne National Laboratory, Argonne, Ill.

R. H. Gardner, R. V. O'Neill, P. R. Coleman. Oak Ridge National Laboratory, Oak Ridge, Tenn.

G. Sugihara. University of Southern California, San Diego, Calif.

1049 Prospects for Commercialization of Eucalyptus Biomass Plantations in Florida

Energy from Biomass and Wastes X, ed. D. L. Klass, pp. 233-49 (Chicago: Institute of Gas Technology, 1987)

D. L. Rockwood, D. R. Dippon. University of Florida, Gainesville, Fla.

1050 The Role of Genetic Improvement in the Short Rotation Woody Crops Program

Energy from Biomass and Wastes X, ed. D. L. Klass, pp. 133-54 (Chicago: Institute of Gas Technology, 1987)

P. A. Layton, L. L. Wright. Oak Ridge National Laboratory, Oak Ridge, Tenn.

1051 Research Strategy for Attaining High Yielding Populus Energy Plantations

Energy from Biomass and Wastes X, ed. D. L. Klass, pp. 121-32 (Chicago: Institute of Gas Technology, 1987)

E. A. Hansen. USDA Forest Service, North Central Experiment Station, Rhinelander, Wis.

1052 Tissue Culture-Based Biotechnology for Populus Clones

Energy from Biomass and Wastes X, ed. D. L. Klass, pp. 155-76 (Chicago: Institute of Gas Technology, 1987)

B. E. Haissig. USDA Forest Service, North Central Experiment Station, Rhinelander, Wis.

BIOTECHNOLOGY

- 1053 *Advanced Bioprocessing Concepts: Technology Needs and R&D Opportunities Preliminary Assessment***
 ORNL/M-2629 (January 15, 1993)
 B. H. Davison, C. D. Scott, T. C. Scott. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 1054 *A Proposed Biparticle Fluidized-Bed for Lactic Acid Fermentation and Simultaneous Adsorption***
Biotechnology and Bioengineering 39(3), pp. 365–68 (1992)
 B. H. Davison, C. D. Scott. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 1055 *Technoeconomic Evaluation of the Extractive Fermentation of Butanol as a Guide to Research in This Area of Biotechnology***
 ORNL/TM-11851 (September 1991)
 R. M. Busche. Bio En-Gene-Er Assoc., Inc., Wilmington, Del.
- 1056 *The Ultimate Ethanol: Technoeconomic Evaluation of Ethanol Manufacture, Comparing Yeast vs Zymomonas Bacterium Fermentations***
 ORNL/TM-11852 (August 1991)
 R. M. Busche. Bio En-Gene-Er Associates, Inc., Wilmington, Del.
 C. D. Scott, B. H. Davison. Oak Ridge National Laboratory, Oak Ridge, Tenn.
 L. R. Lynd. Dartmouth College, Hanover, N.H.
- 1057 *Phase Holdup and Dispersion in a Three-Phase Fluidized-Bed Bioreactor with Low-Density Gel Beads***
Annals of the New York Academy of Sciences 589, pp. 670–77 (1990)
 B. H. Davison. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 1058 *Use of Immobilized Microbial Membrane Fragments to Reduce Oxygen Content and Enhance the Acetone-Butanol Fermentation***
Biotechnol. Prog. 6, pp. 210–13 (1990)
 F. Godia. Unitat d'Enginyeria Quimica, Universitat Autonoma de Barcelona, Spain
 H. I. Adler. Oak Ridge Associated Universities, Oak Ridge, Tenn.
 B. H. Davison, C. D. Scott. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 1059 *Gas Holdup in Three-Phase Immobilized Cell Bioreactors***
Appl. Biochem. Biotech. 24/25, pp. 485–96 (1990)
 R. Bajpai. University of Missouri–Columbia, Columbia, Mo.
 J. E. Thompson, B. H. Davison. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 1060 *Corn Products as Chemical Feedstocks: The Corn Refinery***
Proceedings First Annual Corn Utilization Conference, St. Louis, Mo., June 11–12, 1987, pp. 286–99 (National Corn Growers Association, 1989)
 C. D. Scott. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 1061 *Dispersion and Holdup in a Three-Phase Fluidized-Bed Bioreactor***
Appl. Biochem. Biotechnol. 20-21, pp. 449–60 (Clifton, N.J.: Humana Press, 1989)
 B. H. Davison. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 1062 *Solute Diffusion in Biocatalyst Gel Beads Containing Biocatalysts and Other Additives***
Enzyme Microb. Technol. 11, pp. 258–63 (1989)
 C. D. Scott, J. A. Woodward, J. E. Thompson. Oak Ridge National Laboratory, Oak Ridge, Tenn.

- 1063 Operability and Feasibility of Ethanol Production by Immobilized *Zymomonas mobilis* in a Fluidized-Bed Bioreactor**
Appl. Biochem. Biotechnol. **18**, pp. 19–34 (Clifton, N.J.: Humana Press, 1988)
B. H. Davison, C. D. Scott. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 1064 Proceedings of the Ninth Symposium on Biotechnology for Fuels and Chemicals**
Appl. Biochem. Biotechnol. **17-18** (Clifton, N.J.: Humana Press, 1988)
C. D. Scott, ed. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 1065 Plant Cell Tissue Culture A Potential Source of Chemicals**
ORNL/TM-10521 (August 1987)
C. D. Scott. Oak Ridge National Laboratory, Oak Ridge, Tenn.
D. K. Dougall. University of Tennessee, Knoxville, Tenn.
- 1066 Dispersed-Phase Adsorbents for Biotechnology Applications**
Presented at the Second International Conference on Separation Technology, Schloss Elmau, Kais, Federal Republic of Germany, April 26–30, 1987
C. D. Scott. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 1067 Techniques for Producing Monodispersed Biocatalyst Beads for Use in Columnar Bioreactors**
Ann. N.Y. Acad. Science **501**, pp. 487–93 (1987)
C. D. Scott. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 1068 Immobilized Cells: A Review of Recent Literature**
Enzyme Microb. Technol. **9**, pp. 66–73 (1987)
C. D. Scott. Oak Ridge National Laboratory, Oak Ridge, Tenn.

CONTINUOUS CHROMATOGRAPHY IN MULTICOMPONENT SEPARATIONS

- 980 *Advanced Techniques for Energy-Efficient Industrial-Scale Continuous Chromatography***
ORNL/TM-11282 (November 1989)
J. P. DeCarli II. Dow Chemical Company, Midland, Mich.
G. Carta. University of Virginia, Charlottesville, Va.
C. H. Byers. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 981 *Large-Scale Separation of Amino Acids by Continuous Displacement Chromatography***
DOE/OR/21400-T468* (October 1989)
J. P. DeCarli II. Dow Chemical Company, Midland, Mich.
G. Carta. University of Virginia, Charlottesville, Va.
C. H. Byers. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 982 *An Economic and Energy Evaluation of the Replacement of Conventional Technology with Continuous Chromatography in the Dump Leaching of Copper Ores***
DOE/OR/21400-T35* (February 1989)
C. H. Byers, J. M. Begovich. Oak Ridge National Laboratory, Oak Ridge, Tenn.
J. M. Holmes. JMH Associates, Knoxville, Tenn.
- 983 *Novel Applications of Continuous Annular Chromatography: Separation of Sugars***
New Directions in Sorption Technology, ed. G. E. Keller II and R. T. Yang, pp. 342-49 (Stoneham, Mass.: Butterworth, 1989)
A. J. Howard. University of Florida, Gainesville, Fla.
G. Carta. University of Virginia, Charlottesville, Va.
C. H. Byers. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 984 *Pilot-Scale Studies of Sugar Separations by Continuous Chromatography***
Appl. Biochem. Biotechnol. 20-21, pp. 635-54 (Clifton, N.J.: Humana Press, 1989)
C. H. Byers, W. G. Sisson. Oak Ridge National Laboratory, Oak Ridge, Tenn.
J. P. DeCarli, G. Carta. University of Virginia, Charlottesville, Va.
- 985 *The Use of Gradient Elution in Optimizing Continuous Annular Ion Exchange Chromatography with Applications to Metal Separations***
Ion Exchange for Industry, Proceedings IEX '88, Cambridge, Great Britain, July 17-22, 1988, ed. M. Streat, pp. 424-42 (Chichester: E. Horwood, 1989)
C. H. Byers, W. G. Sisson. Oak Ridge National Laboratory, Oak Ridge, Tenn.
J. P. DeCarli. University of Virginia, Charlottesville, Va.
- 986 *Separation of Metals by Continuous Annual Chromatography with Step Elution***
Chem. Eng. Comm. 79, pp. 207-27 (1989)
J. P. DeCarli, G. Carta. University of Virginia, Charlottesville, Va.
C. H. Byers, W. G. Sisson. Oak Ridge National Laboratory, Oak Ridge, Tenn.

*Available from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22151.

- 987** *An Economic and Energy Evaluation of the Replacement of Conventional Technology with Continuous Chromatography in the Production of High-Fructose Sugar*
DOE/OR/21400-T352* (October 1988)
C. H. Byers. Oak Ridge National Laboratory, Oak Ridge, Tenn.
J. M. Holmes. JMH Associates, Knoxville, Tenn.
- 988** *Application of Continuous Annular Chromatography to Size-Exclusion Separations*
CHEMTECH 18, pp. 498-502 (August 1988)
W. G. Sisson, J. M. Begovich, C. H. Byers, C. D. Scott. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 989** *An ASPEN Simulation of Fuel Production by Hydrolysis of Woody Biomass*
Journal of Applied Biochemistry and Biotechnology 18, pp. 143-57 (January 1988)
C. H. Byers. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 990** *Separation of Sugars by Continuous Annular Chromatography*
ORNL/TM-10318 (August 1987)
A. J. Howard. University of Florida, Gainesville, Fla.
G. Carta. University of Virginia, Charlottesville, Va.
C. H. Byers. Oak Ridge National Laboratory, Oak Ridge, Tenn.

*Available from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22151.

SENSORS FOR ELECTROLYTIC CELLS

- 1080** *Temperature Measurement by Observation of the Raman Spectrum of Diamond*
Appl. Spectrosc. **46**, pp. 375–77 (1992)
S. Dai, J. P. Young, G. M. Begun. Oak Ridge National Laboratory, Oak Ridge, Tenn.
G. Mamantov. University of Tennessee, Knoxville, Tenn.
- 1081** *Measurement of Radical Cation UV-Visible Spectrum in a Polycrystalline Freon Matrix at Liquid Nitrogen Temperature by Diffuse Reflectance Spectroscopy*
Appl. Spectrosc. **46**, pp. 377–78 (1992)
S. Dai, J. P. Young. Oak Ridge National Laboratory, Oak Ridge, Tenn.
G. Mamantov, J. T. Wang, F. Williams. University of Tennessee, Knoxville, Tenn.
- 1082** *A New Sample Cell for Diffuse Reflectance IR Spectroscopy of Air-Sensitive Solid Samples*
Appl. Spectrosc. **45**, pp. 1056–58 (1991)
S. Dai, J. P. Young. Oak Ridge National Laboratory, Oak Ridge, Tenn.
G. Mamantov. University of Tennessee, Knoxville, Tenn.

HYDROPOWER ENVIRONMENTAL MITIGATION

- 1083** *Use of a Reservoir Water Quality Model to Simulate Global Climate Change Effects on Fish Habitat*
Clim. Change 20, pp. 277–96 (1992)
 L. H. Chang, S. F. Railsback. Oak Ridge National Laboratory, Oak Ridge, Tenn.
 R. T. Brown. Jones & Stokes Assoc., Sacramento, Calif.
- 1084** *Environmental Mitigation at Hydroelectric Projects. Volume 1. Current Practices for Instream Flow Needs, Dissolved Oxygen, and Fish Passage*
 DOE/IE-10360* (December 1991)
 M. J. Sale, G. F. Cada, L. H. Chang, S. W. Christensen, S. F. Railsback. Oak Ridge National Laboratory, Oak Ridge, Tenn.
 J. E. Francfort, B. N. Rinehart, G. L. Sommers. Idaho National Engineering Laboratory, Idaho Falls, Idaho
- 1085** *A New Look at Environmental Mitigation Practices*
Hydro Review, pp. 58–66 (July 1991)
 M. J. Sale, S. F. Railsback. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 1086** *Environmental Impacts of Increased Hydroelectric Development at Existing Dams*
 ORNL/TM-11673 (April 1991)
 S. F. Railsback, G. F. Cada, C. H. Petrich, M. J. Sale, J. A. Shaakir-Ali, J. A. Watts, J. W. Webb. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 1087** *Review of Mitigation Methods for Fish Passage, Instream Flows, and Water Quality*
Waterpower '91, Proceedings of the International Conference on Hydropower, Denver, Colorado, July 24–26, 1991, ed. D. D. Darling, 1, pp. 209–18 (New York: American Society of Civil Engineers, 1991)
 S. F. Railsback, G. F. Cada, L. H. Chang, M. J. Sale. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 1088** *Effects of Hydroelectric Turbine Passage on Fish Early Life Stages*
Waterpower '91, Proceedings of the International Conference on Hydropower, Denver, Colorado, July 24–26, 1991, ed. D. D. Darling, pp. 318–26 (New York: American Society of Civil Engineers, 1991)
 G. F. Cada. Oak Ridge National Laboratory, Oak Ridge, Tenn.
- 1089** *Distribution and Stability of Potential Salmonid Spawning Gravels in Steep Boulder-Bed Streams of the Eastern Sierra Nevada*
Transactions of the American Fisheries Society 120(2), pp. 177–86 (1991)
 G. M. Kondolf, G. F. Cada, M. J. Sale. Oak Ridge National Laboratory, Oak Ridge, Tenn.
 T. Felando. INYO National Forest, Bishop, Calif.
- 1090** *Improving the Assessment of Instream Flow Needs for Fish Populations*
Waterpower '91, Proceedings of the International Conference on Hydropower, Denver, Colorado, July 24–26, 1991, ed. D. D. Darling, 1, pp. 76–84 (New York: American Society of Civil Engineers, 1991)
 M. J. Sale. Oak Ridge National Laboratory, Oak Ridge, Tenn.
 R. G. Otto. R. G. Otto & Associates, Arlington, Va.

* Available from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161.

1091 *A Review of Studies Relating to the Effects of Propeller-Type Turbine Passage on Fish Early Life Stages*

North American Journal of Fisheries Management 10, pp. 418–26 (1990)

G. F. Cada. Oak Ridge National Laboratory, Oak Ridge, Tenn.

ENVIRONMENTAL CONTROL TECHNOLOGY

1092 *Alternative Non-CFC Mobile Air Conditioning*

ORNL/CON-335 (September 1992)

V. C. Mei, F. C. Chen, D. M. Kyle. Oak Ridge National Laboratory, Oak Ridge, Tenn.

CONTINUOUS FIBER CERAMIC COMPOSITE TECHNOLOGY

- 1093** *The Relative Residual Fiber Displacement After Indentation Loading and Unloading of Fiber-Reinforced Ceramic Composites*
J. Mater. Sci. 28(8), pp. 2227–32 (April 15, 1993)
C. H. Hsueh, M. K. Ferber, A. A. Wereszczak. Oak Ridge National Laboratory, Oak Ridge, Tenn.

AUTHOR INDEX

A

Abata, D. L. 540, 554
 Ackerman, J. L. 448
 Ackermann, R. A. .. 161, 162, 176, 177, 185
 Adams, M. B. 972
 Adəbiyi, G. A. 882
 Adibi, M. M. 744, 753
 Adler, H. I. 1058
 Adt, R. R. 572
 Ager, A. 945
 Ahman, J. 374
 Alam, M. S. 122
 Aldrich, T. E. 816
 Alexander, D. J. 655
 Alexander, K. B. 830, 843, 850, 851
 Alexander, R. R. 902
 Allard, L. F. 419
 Ally, M. R. 599–604, 606–609, 611–12
 Amin, K. E. 444
 Amirkhanian, K. R. 280
 Anderson, I. C. 893
 Anderson, R. W. 198
 Anderson-Batiste, G. J. 54
 Angelini, P. 431, 465, 489, 500
 Anliker, K. S. 1003
 Apsley, D. K. 899
 Arendt, R. H. 828
 Arimilli, R. V. 867, 878
 Arnott, J. T. 913
 Aronson, E. 91
 Asetine, M. 98, 284
 Ashby, W. C. 897, 903, 922
 Auld, D. L. 904, 905, 965, 981, 1018
 Avva, V. S. 481

B

Bair, R. E. 578
 Bajer, E. R. 339
 Bajpai, R. 1059
 Baker, Q. A. 565, 571
 Baldoni, J. G. . 378, 426, 442, 469, 484, 509
 Bales, E. 247, 255
 Barbieri, A. 646
 Barito, M. O. 220
 Barito, R. W. 220
 Barnes, M. H. 286

Barnes, P. R. 742, 747, 748,
 758, 760, 762, 763, 769,
 772, 779, 780, 782, 789, 797, 798
 Barr, T. L. 666
 Bates, C. H. 453
 Bates, J. B. 491
 Baugh, R. N. 180
 Baxter, V. D. 134
 Bayer, R. G. 717
 Beachley, N. 884
 Beal, D. J. 61
 Beale, W. T. 151, 152
 Becher, P. F. 419, 431, 435,
 465, 489, 493, 500,
 504, 510–12, 523, 693, 694
 Bechtold, R. L. 566–68, 581
 Beck, J. V. 249
 Bėdnarczyk, P. J. 828
 Beecher, D. T. 188
 Begovich, J. M. 1071, 1077
 Begun, G. M. 412, 456, 467, 1080
 Behi, M. 353, 367
 Bennett, A. I. 749
 Bennett, M. N. 100
 Bennett, M. R. 881
 Bentley, J. 858
 Berchowitz, D. M. 116
 Berens, A. P. 409, 413
 Bergman, L. B. 757, 770
 Bergoust, D. G. 339
 Berry, L. G. 37, 50, 56, 290,
 291, 299, 344, 731, 735
 Beschen, D. A., Jr. 293, 295, 298
 Besmann, T. M. 637, 639, 675, 685, 837
 Beyer, M. A. 295
 Bible, D. W. 640
 Bishop, P. S. 622, 662
 Blake, T. J. 983, 984, 986, 987, 989
 Blakely, K. A. 632
 Blalock, T. V. 766
 Blanchard, J. P. 808
 Blanco, J. A. 545, 572
 Blankenhorn, P. R. 954, 960,
 1000, 1019, 1020
 Blass, J. J. 620
 Blau, P. J. 364, 399, 699, 701–703,
 705, 707–11, 714–16, 720, 724
 Bledsoe, J. L. 276, 344
 Bleier, A. 615, 641

Blum, J. B.	470
Boercker, F. D.	330
Boggs, D. L.	578
Bomar, E. S.	623
Bond, W. D.	500
Bongarten, B. C.	899, 916, 975
Bonk, J. J.	750
Booker, B. L. P.	460
Booker, M. K.	486
Boring, L. R.	916
Borman, G. L.	578
Boulet, J. A. M.	376, 383, 485
Bowersox, T. W.	954, 960, 964, 1000, 1019, 1020
Bowles, J. P.	812
Bradley, S.	379, 441, 476, 482
Bradshaw, H. D., Jr.	890
Bradt, R. C.	514, 515
Bransby, D. I.	941, 968, 980
Braun, A. T.	122
Braunstein, J.	610, 881
Bresnan, D. F.	897, 903
Breve, M. A.	926, 943
Bridges, D. C.	904
Bright, J. D.	473, 518
Brinkman, C. R.	412, 424, 456, 462, 467, 480, 522
Broach, R. W.	666
Broadaway, E. R.	784
Broadwater, R. P.	773, 786
Brontman, B. H.	15
Bross, J. M.	339
Brown, J. J.	366, 377, 450
Brown, M. A.	14, 27, 30, 32, 40, 44, 46, 53, 63, 65, 68, 72, 79, 80, 81, 83, 95, 99, 291, 293-96, 298, 299, 322, 729-38
Brown, R. H.	636
Brown, R. T.	1083
Brynstad, J.	843, 849-52, 854-58
Bryson, J. W., Jr.	286
Buckels, L. S.	96
Budai, J. D.	660, 661, 836
Buljan, S.-T.	378, 426, 442, 469, 484, 506, 508, 509
Burgess, D.	948
Burghardt, R. R.	749
Burns, R.	309
Burrage, L. M.	751, 806, 814
Busche, R. M.	1055, 1056
Busching, H. W.	278, 280
Butler, J. L.	904
Buxton, D. R.	893

Buzza, T. G.	575
Byerly, R. T.	768
Byers, C. H.	1069-79

C

Cada, G. F.	1084, 1086, 1087-89, 1091
Cagle, S. L.	94
Callahan, T. J.	559, 569
Calvin, M.	993
Canright, G. S.	821
Cantor, R. A.	67, 906
Caponetti, E. C.	590, 591, 594, 596
Caputo, A.	261
Carduner, K. R.	525
Carim, A. H.	829
Carlsmith, R. S.	43
Carlson, J. D.	202
Carlson, M.	945
Carmody, J.	204, 211, 267
Carpenter, H. W.	472
Carpenter, J. A., Jr.	666, 692
Carroll, W. L.	282, 283
Carta, G.	1069, 1070, 1072, 1073, 1075, 1079
Carter, D. G.	339
Carter, R. O., III	525
Cartor, R. A.	86
Cates, M. R.	542
Cathcart, J. V.	682
Cavin, O. B.	456, 467, 642, 834, 854
Cawley, J.	374
Ceder, G.	659
Ceulemans, R.	978, 1013
Chakoumakos, B. C.	838
Chandler, W. U.	43
Chandra, D.	877
Chandrasekaran, A.	773, 786
Chang, C. L.	373, 443
Chang, L. H.	1083, 1084, 1087
Chen, C. F.	526
Chen, F. C.	101, 113, 123, 139, 142, 155, 166, 184, 189, 1092
Chen, G. L.	140, 142, 145, 150-52
Cheng, W. K.	541
Cherney, J. H.	939, 1003
Chevacharoenkul, S.	506
Chia, K.	370
Childs, K. W.	208, 220, 230, 265, 266, 272
Childs, P. W.	195, 201, 231, 251
Choi, S.-I.	757, 770

Choudhury, A. 658, 857
 Christen, D. K. 660, 661, 827, 836,
 838, 839, 841, 844, 848, 852
 Christensen, S. W. 1084
 Christian, J. E. 192, 196, 200, 202, 203,
 210-12, 214-18, 226, 248, 254, 273, 276
 Christopherson, N. S. 946
 Chu, W. 220
 Chuang, T. J. 526
 Chuck, L. 361, 423
 Civale, L. 825, 838, 841, 846-48
 Clark, A., III 1039
 Clausing, R. E. 705
 Clem, J. R. 847
 Clemans, C. L. 740
 Clements, K. A. 744
 Clinch, J. M. 185
 Coady, S. A. 902, 912
 Coghlan, W. A. 857
 Cole, D. W. 1012, 1021
 Cole, G. V. 902
 Coleman, P. R. 1048
 Colietti, J. P. 907, 908
 Collier, R. K., Jr. 101
 Comfort, A. M. 428
 Compere, A. L. .. 531, 588-90, 592-95, 597
 Conklin, J. C. 107, 117-20, 128
 Consumer Energy Council of America
 Research Foundation 97
 Cookson, A. H. 749
 Cooley, K. C. 637
 Corbin, N. D. .. 354, 373, 422, 443, 471, 483
 Cordaro, J. F. 774, 785
 Courville, G. E. 195, 212, 215, 223, 230,
 231, 237, 238, 240, 246, 249, 250, 251, 278
 Cowles, J. R. 1022
 Cranmer, D. C. 357
 Creswick, F. A. 149, 158, 165
 Cropper, W. P., Jr. 1041
 Crosbie, G. M. 410, 420, 463, 525
 Crosswhite, R. N. 137
 Crow, T. R. 952, 1017
 Cuccio, J. S. 356, 428
 Cundiff, J. S. 921, 942, 974
 Cunningham, M. 972
 Curlee, T. R. .. 390, 625, 667, 668, 684, 690
 Curtin, D. T. 1004, 1023
 Cushman, J. H. 887, 889, 892, 909, 917,
 923, 933, 951, 953, 971, 999, 1024
 Cutler, R. A. 473, 518

D

D'Angelo, C. 381, 445
 Daby, E. E. 557, 561
 Dai, S. 1080-82
 Dale, S. J. 653, 746, 787, 796
 Dale, V. H. 1044
 Daniels, W. L. 921, 942, 973
 Darley, J. M. 91
 Das, S. 390, 625
 David, S. A. 468, 638, 674, 678
 Davis, G. D. 500
 Davis, R. F. 403, 404, 436, 506
 Davis, S. C. 4, 24, 54, 68
 Davis, T. D. 947
 Davison, B. H. 1053, 1054,
 1056-59, 1061, 1063
 Daw, C. S. 532
 de Fontaine, D. 659
 DeAngelis, D. L. 972
 DeBell, D. S. 979, 1008, 1026, 1033
 DeCarli, J. P. 1073-75
 DeCarli, J. P., II 1069, 1070
 DeGrush, D. 175
 Delmas, A. A. 197
 DeLuca, J. A. 828
 Denny, J. C. 573, 579
 Deonigi, D. E. 44
 Desjarlais, A. O. 192, 195, 222, 260
 DeVan, J. H. 598, 605, 680
 DeVault, R. C. 124, 136, 141
 DeVore, C. E. 702, 707, 710,
 711, 719, 724, 728
 Dhere, A. G. 854
 Diamond, R. C. 304, 329
 Dickey, D. W. 569
 Dickmann, D. I. 896, 952, 958, 1009
 Dickson, R. E. 910, 952, 1040
 DiCola, M. L. 1019
 Didion, D. A. 135, 181
 Diemond, C. C. 812
 Diendorfer, G. 754, 755
 Dillard, D. M. 434
 Dimmel, D. R. 938
 Dimplefeld, P. M. 578
 Dinan, T. M. 84
 Ding, W. 877
 Dinus, R. J. 938
 Dippon, D. R. 996, 1049
 DiStefano, J. R. 622, 662, 680

Dixon, R. K.	1034
Dobbins, C. L.	935
Domanski, P. A.	181
Domingo, N.	528, 542, 543
Doshi, D.	368
Dougall, D. K.	1065
Doverspike, K.	850
Downing, D. J.	335
Doyle, T. W.	953, 967
Dragoo, A. L.	439
Drake, J. B.	871
Dresner, L.	826, 842
Dreyse, H.	659
Dripchak, K.	995
Dubbe, D. R.	990, 1002
Dufrane, K. F.	385, 418, 446, 488, 513, 524
Dugan, R. C.	794, 807, 814
Dunlap, J. D.	898
Dunlap, J. M.	978
Dunn, E. M.	452
Dvorchak, M.	278

E

Eades, R. A.	666
Easterly, C. E.	776, 800, 804, 816, 818
Easton, D. S.	821
Eaton, R. A.	812
Eden, A.	338
Ehrenshaft, A. R.	887, 911, 937, 969, 970, 992
Eichler, C. H.	782
Eilts, L. E.	740
Eisenberg, J. F.	294
Eisenhaure, D. B.	884
Elkassabgi, Y.	126
Ellingson, W. A.	365, 448
Ellis, D. D.	997
Elmore, J. L.	982
English, B. C.	902
Eom, C.-B.	836
Erickson, D. A.	904, 905
Erwin, J.	548, 558, 574
Eto, J.	42
Evans, D. M.	230
Everleigh, C. A.	640
Ewel, K. C.	1041

F

Fagan, T. J.	188
Fairchild, P. D.	102, 111, 143
Fang, H. T.	356, 482
Faulkner, J. S.	673
Fear, M. P.	416, 457
Federer, J. I.	613, 616, 617, 619, 621, 624, 626-30
Feenstra, R.	827, 836
Feero, W. E.	739, 768
Feild, C. A.	846, 848
Feirer, R. P.	938
Felando, T.	1089
Felker, P.	1016, 1032, 1036, 1037
Fenn, R. C.	1007
Ferber, M. K.	346, 358, 398, 419, 425, 427, 474, 510, 511, 521, 1093
Ferguson, P. A.	647
Fick, G. W.	936
Figliola, A.	978
Fine, H. A.	156, 208, 213, 219, 220, 689
Fischer, A. T.	687, 858
Fischer, S. K.	102, 104, 105, 108, 110, 111, 132, 133, 149, 158, 159, 165
Fisher, J. T.	977
Fiskum, R. J.	122
Fitzpatrick, G. L.	15
Flanigan, C. T.	549
Floyd, S. D.	94
Foley, M. R.	354, 380
Folger, A. G.	1025
Fort, E. M.	749
Fortson, N. H.	777
Foster, B. E.	456, 467
Foster, D. E.	578, 585
Foust, J. V.	766
Francfort, J. E.	1084
Franchuk, C. A.	730
Frank, J. C.	233
Fraser, J.	392
Frazer, J. W.	666
Frederick, D. J.	1006, 1039
Freeman, E.	290
Freeman, E. C.	339
Freeman, L.	322
Friggle, W.	738
Fulkerson, W.	143
Fuller, L. C.	336, 680

G

Gadoth, D.	115
Gallois, B. M.	639
Gao, F.	541
Gao, J.	359
Garbauskas, M. F.	828
Gardner, R. H.	1048
Garg, A. K.	354
Garver, E. G.	990, 1002
Garwin, I. J.	557, 561
Gaydos, P. A.	385, 418, 446
Gazza, G. E.	517
Geballe, T. H.	836
Geller, E. W.	139
George, E. P.	642, 654, 656
Gettings, M. B.	22, 287, 289, 297, 300, 320, 330, 332
Geyer, W. A.	1010, 1030, 1038
Gillette, G.	88
Ginatempo, B.	646
Glaeser, W. A.	488, 513, 524
Glavincevski, B.	574
Glicksman, L. R.	235, 243, 258
Glumac, E. L.	1036, 1037
Gnadt, P. A.	771, 812
Godia, F.	1058
Goel, R. K.	27, 731, 735
Goeltz, R. T.	89, 93
Goewey, P.	313
Goins, L. F.	229
Goldberg, L. F.	308
Goldman, C.	33, 59, 60
Gommed, K.	115
Gonzalez, J. M.	614
Gonos, J.	322
Goodman, W. R.	902, 912
Goodrich, S. M.	361, 409, 413, 423
Goodwin, G. M.	638
Googin, J. M.	595
Goyal, A.	823, 830, 835
Grado, S. C.	954, 960, 1000, 1020
Granryd, E.	118, 128
Grant, D.	409, 413
Graves, G. A.	409, 413
Graves, R. L.	412, 456, 467, 537, 543, 549, 564, 577, 582, 587
Graves, R. S.	199, 207–209, 212–15, 224, 225, 227, 241, 244, 245, 279, 433, 477, 491, 505
Greene, D. K.	939
Greene, D. L.	71

Greer, M. E.	873
Griffin, F. P.	154
Griffin, G. D.	776, 800, 803, 804, 818
Griffith, W.	180
Griffith, W. L.	531, 588–90, 592–95, 597
Griggs, E. I.	234, 240, 268
Groeger, J. H.	796
Grossman, G.	115
Grossnickle, S. C.	913
Grzybowski, S.	763
Gunther, E. W.	822
Gutraj, J. M.	160, 179
Gyorffy, B. L.	646, 659

H

Habenschuss, A.	721, 723
Haberl, J. S.	338
Hackner, R. J.	163
Hahn, J. M.	813
Haissig, B. E.	947, 956, 957, 976, 1001, 1035, 1052
Hall, J. A.	317, 324
Hall, R. B.	891, 907, 908, 914, 915, 919, 920, 948
Hallett, F.	114
Haltom, C. P.	687, 858
Hamby, C.	644
Hamilton, R. M.	813
Hammarstrom, J. L.	373, 443
Hammond, J. P.	468
Hamrick, J. L.	975
Han, B. J.	264
Hanna, R. D.	891, 914, 915, 920
Hansen, E. A.	894, 1014, 1015, 1045, 1051
Hansen, J. J.	473
Hansen, J. S.	373, 422, 443
Hansen, P. H.	1034
Hanusiak, W. M.	498
Harry, D. E.	966
Hart, E. R.	891, 914, 915, 919, 920
Hartford, E. H.	836
Hartline, S. D.	444
Haselkorn, M. H.	363, 387, 417, 447
Hauser, D.	374
Hausner, H.	439
Havstad, P. H.	557, 561
Hawkins, D. R.	993
Hawsey, R. A.	824, 831
Hayes, F. C.	103
Hayes, J.	63

Haynes, H. D.	154	Hough, R. E.	309
Heatherly, L. J.	705	Houska, C. R.	721-23
Hebner, R. E.	766	Howard, A. J.	1072, 1079
Hecht, N. L.	361, 409, 413, 423, 520	Howell, M.	598
Hefter, J.	378	Howells, E.	814
Heichel, D. W.	517	Hsu, H.	829, 834
Heilman, P. E.	890, 898, 949, 978, 1007	Hsu, S. M.	439
Hellman, E. S.	836	Hsueh, C. H.	465, 489, 1093
Henson, H. M.	686	Hu, P. S.	19, 21, 24, 38, 54
Henson, T. J.	613, 681, 686, 851		57, 61, 70, 92, 96, 313, 325, 327
Hermes, D. A.	914	Huang, B. Y.	652
Hettwer, P. F.	814	Huang, Y. J.	267
Heuchelin, S. A.	920	Hubbard, C. R.	832, 833, 834, 840, 850
Hewett, M. J.	308	Hubbard, M. S.	292
Hewitt, D. C.	333	Huber, D. A.	899
Heyer, S. V.	812	Huckabee, M. L.	378, 442, 484, 506, 509
Hicks, E. G.	15	Hudson, T. L.	780
Hicks, K. L.	768	Huetteman, C. A.	897, 903, 922
Hill, D. H.	91	Hughes, P. J.	102, 106, 111, 112, 163
Hill, L. J.	6, 16, 23, 25	Hunsaker, D. B., Jr.	982
Hillis, S. L.	527, 529, 533, 534, 551, 552, 556, 560, 563, 570, 580	Hunter, C. E.	557, 561
Hilton, S.	409, 413	Huntley, W. R.	239
Hinckley, T. M.	890, 978, 1027	Hwang, B.-H.	721-23, 725
Hindman, D. L.	613	Hwang, H. L.	303
Hine, T.	474, 521		I
Hirschfeld, D. A.	366	Ice, G. E.	721, 723
Hirst, E.	1-3, 6, 8-12, 15, 17, 18, 20, 22, 23, 25, 26, 28, 29, 31-36, 39, 41, 42, 45, 47-49, 51, 52, 56, 58-60, 62, 64, 66, 69, 74-78, 87, 90, 91, 93	Ildstad, E.	796
Ho, C. M.	139	Isebrands, J. G.	910, 952, 958, 978, 1009, 1013, 1034
Hobson, D. O.	677		J
Hockey, B. J.	402, 426	Jackins, G. A., Jr.	339
Hodgson, J. W.	527, 529, 546, 551-53, 573, 579	Jackson, W. L.	159
Hoenigman, J. R.	409, 413	Jang, S. D.	413, 520
Hoffman, M. G.	15	Janney, M. A.	401, 498, 505, 623, 631, 632, 643
Holcomb, M. C.	94	Janssen, J. E.	252
Holcombe, C. E.	644	Jenkins, M. G.	346, 356, 358, 398, 425, 514, 515
Holloway, D. L.	365	Jenkins, V. T.	398
Holmes, J.	339	Johnson, C. A.	360, 449, 519
Holmes, J. M.	1071, 1076	Johnson, D. D.	646, 651
Holtzberg, F.	825, 841, 844-48	Johnson, D. R.	389, 400, 406, 411, 438, 439, 458, 466, 487, 492, 498, 499, 503
Hook, D. D.	1033	Johnson, D. W.	927, 1011, 1012, 1021, 1042, 1044
Hopper, A. T.	374	Johnson, J.	805
Hornbeck, J. W.	1012, 1021	Johnson, J. S., Jr.	589, 590, 594, 596
Horowitz, S. H.	767, 815	Johnson, K. D.	939, 1003
Horton, J. A.	642, 648, 657, 665, 669, 670, 671, 678, 682		
Horton, L. L.	396		
Host, G. E.	950, 952		

Johnson, K. H.	916
Johnson, M. A.	938
Johnson, W. D.	990
Johnson, W. S.	180
Johnson-Mohler, E.	98, 284
Johnston, C. A.	991
Johnston, J. W.	933, 971, 999
Johnston, J. W., Jr.	940, 1024
Jones, D. W.	1043
Jones, E. C.	660, 661, 827
Jordan, A. C.	631, 692
Joslin, D. L.	432, 461
Jou, W. H.	139
Joyce, T. W.	592
Joyner, P. A.	110
Judkoff, R.	304

K

Kafka, R. J.	744
Kahl, W. K.	412, 456, 467, 532, 550, 587
Kalish, Y.	386
Kang, S.	395, 414, 452
Kannberg, L. D.	866
Kao, M. Y.	642
Karas, P. L.	828
Karasek, K.	379, 441, 476, 482
Kardas, A.	865
Karnitz, M. A.	154, 286, 317, 324, 328, 329, 342, 345
Kauffield, M.	135
Kean, J. N.	914
Keating, K.	15
Kedl, R. J.	863, 868, 880
Kee, D. D.	941, 980
Keiser, J. R.	613, 707
Kelkar, A. D.	359, 451
Kelley, E. F.	766
Kelley, F. A.	363, 417, 447
Kelly, J. M.	1012
Kempton, W.	91
Kennedy, W. N.	749
Kenney, W. A.	962
Kerchner, H. R.	838, 841, 844
Kertesz, M. P.	631
Keshock, E. G.	130, 166
Ketcham, T. D.	661
Keyes, B. L. P.	349-51, 407, 415
Khandelwal, P. K.	355, 440
Kidd, G. H.	1035

Kiggans, J. O.	643
Kim, C.	585
Kim, H. E.	616
Kim, H. J.	381, 414
Kim, K.	414
Kim, K. S.	452
Kim, N.	263
Kimrey, H. D.	643
Kin, Y. C.	852
Kirk, J. A.	884
Kirk, M. A.	825, 846-48
Kirkpatrick, J. R.	257
Kirmse, R. D.	977
Kirol, L.	860
Klabunde, C. E.	827
Kladivko, E. J.	939
Klareich, F. H.	233
Klass, S.	1032
Klatt, L. N.	603, 604
Klein, K. W.	746, 787
Klemens, P. G.	263
Klopfenstein, N. B.	920
Knapp, C. E.	470
Knoke, G. S.	139
Knutsen, C.	75
Kobayashi, A. S.	514, 515
Koch, C. C.	664
Kodas, T. T.	829
Koehler, W. C., Jr.	295
Koester, D. A.	403, 404, 436
Kolb, J. O.	292, 300, 304, 318, 334
Kollie, T. G.	193, 208, 220, 228
Kondolf, G. M.	1089
Kopp, R. F.	1010
Kornhauser, A. A.	182
Korus, R. A.	981
Krahn, L.	262
Krarti, M.	230
Krause, F.	59, 60
Krause, R.	357
Kroeger, D. M.	821, 823, 829, 830, 834, 835, 843, 850-58
Krummel, J. R.	1029, 1043, 1048
Kruse, V. J.	750, 760, 762
Krusin-Elbaum, L.	825, 841, 846, 847
Kuman, K.	230
Kurka, K.	776, 804, 818
Kweller, E.	123
Kyle, D. M.	192, 1092
Kyriacou, C. I.	388

L

Labs, K.	211, 267
Lago, R.	993
Lai, J. S.	778
Laing, P. M.	538
Lander, M. L.	501
Landrum, H. L., Jr.	220
Landsberg, J. J.	985
Larsen, R. P.	560
Larson, S. C.	281
Lasseter, R. H.	812
Lathwell, D. J.	936
Lau, S. K.	370
Lauf, R. J.	640, 644, 858
Laughlin, K.	930
Lavan, Z.	101
Lawler, J. S. ...	752, 761, 771, 777, 778, 783
Lay, K. W.	660, 661, 828
Layton, P. A.	953, 962, 967, 992, 1023, 1046, 1050
Lebow, M. A.	812
Ledin, S.	945
Lee, E. H.	634, 635, 649, 665, 681
Lee, R.	92
Lee, Y.	635
Lefebvre, A. H.	577, 584
Legro, J. R.	782
Leitnaker, J. M.	728
Lesney, M. S.	996
Levins, W. P.	154, 296, 305, 314, 317, 324, 328, 342, 345
Lewis, M. B.	649
Li, C.-W.	353, 367
Li, T. K.	366
Liang, J.-C.	71
Lilley, E.	372, 382, 455
Lin, C.-K. J.	346
Lin, H. T.	435
Lindemer, T. B.	851
Linders, J. R.	768
Ling, J.	365
Linkous, R. L.	212, 215, 602–604
List, F. A.	834
Litvin, A.	259
Litzinger, T. A.	530, 544, 547, 549, 575
Liu, C. T.	638, 645, 647, 654, 656, 664, 665, 671, 679, 681, 682, 688
Liu, H. T.	139
Liu, K. C.	412, 424, 451, 456, 462, 464, 467, 480, 522
Liu, T. K.	769
Liu, W.	426
Liu, Z.	896
Lizzio, A.	590
Loewen, K. H.	902
Long, C. E.	1038
Long, E. L., Jr.	587
Long, W. F.	812
Longmire, C. L.	813
Lothner, D. C.	963
Love, P. M.	229, 246
Lovett, W. R.	1010
Low, J. J.	666
Lowden, R. A.	637
Lowenberg-DeBoer, J.	935
Lowndes, D. H.	660, 661, 827, 836
Loxton, C. M.	657
Lstiburek, J.	204
Lucas, B. N.	849
Lux, A. E.	763
Luxmoore, R. J.	972
Lyle, F. F., Jr.	555
Lynd, L. R.	917, 951, 1056

M

MacDonald, J. M.	106, 234, 287, 289, 304, 307, 316, 320, 323, 326, 329, 335, 338, 339, 340, 765
Macey, S. M.	40
Macriss, R. A.	144, 160, 179
Maguire, M. C.	674
Mahler, K. A.	904, 905, 965, 1018
Major, C. H.	46
Major, J. E.	913
Major, R. W.	757, 770
Majumdar, B. S.	374, 454
Malcolm, E. W.	938
Malozemoff, A. P.	841, 844, 846, 848
Mamantov, G.	1080–82
Mangels, J.	371
Mann, L. K.	1021
Mansur, L. K.	635, 649
Manwiller, K. E.	470
Marans, R. W.	81
Manand, G.	944
Marsh, G. C.	851
Martin, C. W.	1021
Martin, J. F.	886
Martin, M.	516
Martin, R. L.	398, 425
Marwick, A. D.	825, 838, 841, 844, 847, 848

- Mashikian, M. S. 796
 Mason, T. W. 86
 Masterson, D. 554
 Mathiprakasam, B. 155, 184
 Matijasevic, V. C. 836
 Mattson, J. A. 946
 Maybee, C. 936
 Maziasz, P. J. 638
 Mazzucchi, R. P. 304
 McBrayer, J. F. 982
 McBride, M. F. 216
 McCamy, J. W. 661
 McCarthy, J. F. 918
 McCauley, J. W. 439
 McClung, R. W. 478, 492, 498, 663, 691
 McClure, P. K. 339
 McCluskey, P. H. 433
 McCold, L. N. 330, 332, 333, 343
 McConnell, B. W. 747, 751, 806, 808
 McCool, J. I. 706, 718
 McCorkle, J. 278
 McCown, B. H. 976, 997
 McCoy, H. E., Jr. 756
 McCullum, D. E. 361, 409, 413, 423, 520
 McElfresh, M. W. 848
 McElroy, D. L. 207-209, 212,
 213, 215, 219-21, 224, 225,
 228, 244, 254, 279, 491, 650
 McEntee, J. 140
 McEvers, J. A. 619
 McFarland, M. 104
 McGill, R. N. 527, 529, 533,
 534, 536, 546, 551, 552, 556,
 560, 563, 570, 573, 580, 582
 McGranaghan, M. F. 807, 822
 McGraw, B. A. 180
 McHargue, C. J. 396, 397, 461, 494, 495
 McIver, J. C. 812
 McKamey, C. G. 670, 821
 McKenna, J. R. 973
 McLain, H. A. 106, 276, 306, 335
 McLaughlin, R. A. 1014, 1045
 McLaughlin, S. B. 887
 McLinden, M. 135
 McMahan, B. G. 891
 McMahan, J. E. 43
 McMurtry, C. H. 347
 McNabb, H. E., Jr. 959
 McNabb, H. S., Jr. 891, 919, 920, 998
 McNabb, W. A. 887, 992, 1023
 McNatt, J. D. 262
 McRoberts, R. E. 1034
 Mdafri, A. 935
 Meckler, G. 101
 Medelius, P. 788, 793, 805
 Mei, V. C. 101, 113, 121, 123,
 134, 142, 153, 155, 164,
 169, 174, 184, 186, 1092
 Melichar, L. 1038
 Melton, B. S. 272
 Mertol, A. 282, 283
 Meskimen, G. F. 1031
 Miami, University of 586
 Michael, D. A. 952, 958, 1009
 Michaelis, H. 15
 Michels, E. 294
 Michler, C. H. 1001
 Mihlmester, P. E. 295, 322
 Mikijelj, B. 371
 Milberg, M. E. 525
 Miller, C. W., Jr. 368, 393
 Miller, D. B. 741, 763
 Miller, J. H. 637
 Miller, R. G. 209
 Miller, W. A. 146, 148, 154, 168, 172, 187
 Minton, N. A. 943
 Misuriello, H. 321
 Mitchell, C. P. 924
 Mitchell, W. 530
 Mixon, W. R. 304, 321, 329
 Miyasaka, S. C. 1026
 Mize, C. 907, 908
 Mizuhara, H. 452
 Modahl, R. J. 103
 Modine, F. A. 757, 759, 770,
 774, 785, 790, 817
 Monteen, L. D. 778
 Moodera, J. S. 828
 Moore, N. L. 44
 Moorhead, A. J. 616, 686, 693, 694, 695
 More, K. L. 403-405, 436
 Morel, T. 375, 496
 Morgan, S. J. 73
 Morrell, J. A. 738
 Morris, L. E. 692
 Morris, M. D. 4
 Morris, M. D. 816
 Motakef, S. 235, 243
 Moy, C. A. 867, 878
 Mukherjee, A. K. 658
 Mulrone, P. 272
 Mulroy, W. 135
 Murphy, R. W. 130, 139, 142, 166, 183
 Murray, M. D. 1033

Mutsuddy, B. C.	454
Myers, W. E.	740

N

Nadel, S.	15
Natansohn, S.	348, 421
National Planning Committee for District Heating, Cooling and Cogeneration ...	285
Naus, D. J.	286
Naylor, M. G. S.	352, 362, 416, 457
Neff, H. P., Jr.	775
Nehmadi, M.	766
Neil, J. T.	378, 442, 469, 484
Nelson, G. D.	308
Nelson, J. K.	814
Nelson, N. D.	958, 1009, 1035
Nelson, W. R.	783, 784
Nemethy, E. K.	993
Newson, D.	353, 367
Nguyen, P. V.	896
Nichol, J.	768
Nichols, R. J.	917, 951
Nicholson, D. M.	636, 646, 651, 659, 673
Nicholson, J. M.	410, 420, 463
Nickel, D. L.	750
Nieh, T. G.	688
Nixon, R.	506
Noble, M. T.	308
Nolan, M. G.	800
Norby, R. J.	927, 928
Nordh, N. E.	945
Norton, D. P.	660, 661, 827, 836
Noun, R. J.	44

O

O'Hern, M. E.	849
O'Leary, L.	333
O'Neal, G. G.	565, 571
O'Neill, R. V.	1048
O'Niel, D.	414
Oblas, D. W.	381, 445
Occhionero, A. J.	112
Ohr, S. Y.	276
Ohriner, E. K.	670
Oliver, B. F.	652
Oliver, W. C. ..	432, 461, 635, 652, 672, 849
Olszewski, M.	859, 871, 884
Omatete, O. O.	401, 615, 618, 641

Ong, E. T.	865
Oommen, T. V.	749
Ossandon, J. G.	839, 844
Ostry, M. E.	945, 959, 998
Otto, R. G.	1090
Otvos, J. W.	993
Oye, H. A.	854

P

Pace, M. O.	766
Padgett, R. A.	855-57
Paille, N. I.	354
Palumbo, J. H.	547
Park, E.	374
Park, J. E.	257
Parker, D.	267
Parrish, D. J.	921, 942, 973, 974
Pasto, A. E.	348, 421
Patten, D. O.	453
Patterson, M. R.	137, 167, 610
Patton, J. B.	752, 761, 777, 778, 783
Paulson, T. E.	368, 393
Pawel, J. E.	396, 397, 475, 494, 495
Peach, H. G.	87
Pearman, N.	275
Pedersen, C. R.	195
Pelletier, P. J.	354, 372
Pennsylvania State University	583
Perez-Blanco, H. ...	126, 137, 167, 170, 610
Perlack, R. D.	888, 901, 1030, 1047
Peters, J. S.	15
Petersen, S. R.	242
Peterson, C. L.	981
Petri, R.	865
Petrich, C. H.	1086
Petrie, T. W.	195, 251
Pettifor, D. G.	671
Petty, D. G.	914
Pfeifer, R. A.	936
Pflanz, H. M.	811
Phadke, A. G.	767, 815
Phillips, B. A.	124, 129
Phillips, D. R.	1039
Pierce, R. S.	1012
Pih, H.	464
Pimentel, D.	1029
Pinski, F. J.	646, 651
Plastics Institute of America	697, 698
Poche, J. M.	339
Poirier, C.	876

Pollinger, J. P. 353, 365, 367, 448
 Pompe, R. 439
 Pope, P. E. 1014, 1045
 Porter, W. D. 834
 Post, W. M. 972
 Povirk, G. L. 670
 Powell, R. H., Jr. 191
 Power, M. 294
 Pratt, D. C. 990, 1002
 Preckel, P. 935
 Predmesky, R. L. 410, 420, 463
 Preece, J. E. 897, 903, 922
 Pregitzer, K. S. 896
 Prindle, B. 30
 Privon, G. T. 185
 Prouse, D. W. 473
 Prowler, D. 98, 284
 Pruchnic, S. J., Jr. 497
 Pujari, V. K. 354, 373, 392, 422, 443, 444
 Purucker, S. L. 83, 89

Q

Quinn, G. D. 394, 408
 Quinn, T. F. J. 727

R

Raab, J. 7, 13
 Rackliffe, G. B. 760
 Radwan, M. A. 1008
 Ragins, B. R. 86
 Railsback, S. F. 1083–87
 Ranney, J. W. 887, 888, 895, 901, 923, 924,
 953, 967, 992, 1005, 1023, 1046, 1047
 Rao, G. R. 634
 Rasmussen, R. W. 252
 Rauscher, H. M. 950, 952
 Raymer, P. L. 904, 905, 926, 943
 Rayner, S. 86
 Reardon, B. J. 832, 833, 840
 Rebenne, H. E. 381, 445, 479
 Reddy, C. S. 543
 Reddy, K. V. 1031
 Reed, D. A. 775
 Reed, J. H. 15, 773, 784, 786
 Reid, E. A. 112
 Reiner, R. H. 602
 Resetar, T. M. 439
 Rettberg, W. A. 339

Reyes, I. 1036, 1037
 Rice, C. K. 109, 131, 159, 173, 190
 Riecke, G. T. 125
 Riekerk, H. 1021
 Rietveld, W. J. 1028
 Rinehart, B. N. 1084
 Rink, K. K. 577
 Ritchie, R. H. 799, 820
 Ritschard, R. L. 329
 Rizy, C. G. 906
 Rizy, D. T. 740, 747, 752, 761,
 777, 778, 783, 794, 807, 822
 Robbins, B. 749
 Robinson, D. A. 308
 Rockefeller, G. D. 768
 Rockenfeller, U. 861, 870
 Rockwood, D. L. 996, 1031, 1049
 Rogers, E. T. 157
 Roke, L. 114
 Romana, L. J. 396, 397
 Ronnberg-Wastljung, A. 945
 Rose, P. A. 980
 Rose, P. H. 339
 Rosenfield, A. R. 374, 488, 513
 Ross, D. E. 339
 Rossi, G. A. 372, 373, 380,
 382, 422, 443, 453, 455, 470
 Roth, P. I. 903
 Roth, P. L. 897, 922
 Roux, J. A. 271
 Rubinstein, M. 745, 764, 793, 805
 Ruggles, M. B. 620
 Rule, L. 907, 908
 Russell, M. 901
 Rust, W. W. 200
 Ryan, T. W., III 559, 569, 576

S

Sabo, C. 12, 18
 Sakai, M. 514
 Salama, K. 830
 Salas, T. M. 743
 Sale, M. J. 1084–87, 1089, 1090
 Sales, B. C. 838
 Sales, L. C. 354, 392
 Salk, M. S. 1025
 Salomone, L. R. 256
 Salyer, I. 875
 Sand, J. R. 105, 110, 118,
 131, 132, 147, 148, 158

Sanders, J. P.	270	Shen, L.	267, 308
Sands, S. H.	769	Sheppard, K.	260
Sankar, J.	359, 451, 481	Sherman, M. H.	329
Santana, E. A.	872	Shetty, D. K.	473, 518
Santavicca, D. A.	530	Shim, Y.	785
Santella, M. L.	391, 468, 490, 633, 674, 678, 687	Shipp, P. H.	251, 268, 270
Santini, D. J.	43	Shirley, S. T.	277
Sarin, V. K.	381, 445, 479	Shonder, J. A.	116
Sauers, I.	776, 800–804, 818, 819	Shonka, D. B.	54
Saunders, H. E.	749	Siebein, K. N.	373, 422, 443
Saxonis, W.	15	Sikka, V. K.	658, 665, 683, 696
Scarascia-Mugnozza, G.	978	Silver, M. N.	757, 770
Scarbrough, J. O.	821, 851, 855	Simpson, W. A.	456, 467, 478
Schaefer, G. E.	439	Simpson, W. A., Jr.	663, 691
Scheid, H. W.	1022	Sinha, A.	451
Scheithauer, R.	995	Sircar, A.	874
Scherr, M. I.	30	Sisson, W. G.	1073–75, 1077
Schienle, J.	379, 441, 476, 482, 502, 516	Sivers, E. A.	365
Schlegel, J. A.	332, 333	Skadberg, A.	907, 908
Schneider, T. R.	653	Skrurud, C. L.	993
Schoch, K. F., Jr.	749	Sladden, S. E.	941, 968, 980
Schon, A.	15	Sluiter, M.	646
Schubert, T. H.	964, 979	Smidt, F.	720
Schulte, P. J.	978, 1027	Smith, B.	978
Schultz, D.	907, 908	Smith, C. T.	1021
Schweitzer, M.	6, 7, 13, 23, 25, 35, 42, 47, 66, 86, 290	Smith, D.	1016
Scofield, M. P.	221	Smith, I. D.	814
Scott, C. D.	1053, 1054, 1056, 1058, 1060, 1062–68, 1077	Smith, J. D. B.	749
Scott, T.	272	Smith, J. L., Jr.	182
Scott, T. C.	1053	Smith, S. A.	44
Scull, N.	585	Smith, T. L.	202
Sederoff, R. R.	966	Smyth, J.	502
Sefer, N. R.	548, 558, 569, 574	Snell, S. A.	68, 72, 736, 737, 738
Sekula, S. T.	852	Snoha, D. J.	408
Sellmer, J. C.	976	Soderstrom, E. J.	738
Selvamanickam, V.	830	Solidum, E.	353, 367, 379
Selverian, J. H.	395, 414	Solomon, A. D.	871, 874
Sennerby-Forsse, L.	962	Sols, F.	799, 820
Sepulveda, J. L.	388	Sommers, G. L.	1084
Sernyk, J. L.	905	Sparks, C. J.	642, 854
Seybold, K. G.	356	Specht, E. D.	852, 854
Shaakir-Ali, J. A.	1086	Spooner, S.	591
Shaffer, P. T. B.	632	Srinivasan, G. V.	370
Shapiro, A.	716	St. Julien, D.	661
Sharp, T. R.	234, 302, 304, 307, 316, 320, 326, 340	Stansbury, E. E.	205, 206, 232
Shaw, J. H.	751, 781	Stanton, B. J.	1007
Shelton, W. A.	646	Starr, E. C.	812
Shelton, W. A., Jr.	651	Starr, T. L.	637
		Statt, T. G.	147
		Staunton, J. B.	646
		Sterling, R.	267
		Stern, P. C.	91

- Stettler, R. F. 890, 898, 949, 978, 1007
 Stevens, R. A. 798
 Stewart, J. R. 787, 792
 Stewart, W. E., Jr. 869, 873
 Stickler, L. A. 873
 Stiel, L. I. 872, 885
 Stiles, E. D. 463
 Stimely, G. L. 1019
 Stinton, D. P. 676
 Stocks, G. M. 646, 651, 659
 Stoecker, W. F. 175
 Stoloff, N. S. 664
 Stone, J. W. 793, 805
 Stone, T. A. 100
 Storm, R. S. 370, 437
 Stovall, J. P. 744, 746, 753, 807, 812
 Stovall, T. K. 82, 336, 862, 880
 Stover, L. R. 1019
 Strand, R. F. 964
 Stranford, G. 379
 Strauss, C. H. 925, 954, 960,
 961, 1000, 1019, 1020
 Strehlow, R. A. 401
 Stucky, D. 935
 Suelzle, L. R. 791
 Sugihara, G. 1048
 Sullivan, R. 113
 Sullivan, R. 282, 283
 Sullivan, R. L. 812
 Sullivan, T. M. 369
 Sumner, D. R. 943
 Sun, Y. R. 838, 839, 841, 844, 845, 847
 Sundberg, G. J. 373, 380, 422, 453
 Surles, S. E. 975
 Swab, J. J. 408, 429, 430, 459, 507
 Swain, M. N. 545, 572
 Swain, M. R. 545, 572
 Swain, M. V. 510
 Swank, W. T. 1012, 1021
 Swanson, R. E. 450
 Swartz, S. L. 374, 454
 Swedish Motor Fuel Technology Co. 562
 Swihart, J. C. 636
- T**
- Takeyama, M. 645
 Tang, Z. 900
 Taub, A. I. 664
 Taylor, E. R., Jr. 747, 750
 Taylor, M. J. 871, 882
 Taylor, S. E. 993
 Ten Eyck, M. O. 347
 Teng, K. 482
 Tennery, V. J. 398, 425, 427
 TenWolde, A. 262
 Ternes, M. P. 296, 302-305,
 313, 314, 319, 325, 327, 330, 341
 Tesche, F. M. 742, 747, 758,
 762, 769, 772, 779, 789, 797, 808
 Tew, T. 1039
 Tewari, P. H. 444
 Thacker, L. S. 193
 Thoma, P. 642
 Thomas, D. E. 743
 Thomas, D. L. 926, 943
 Thomas, J. R., Jr. 269
 Thompson, J. C. 773
 Thompson, J. E. 1059, 1062
 Thompson, J. R. 825, 827, 838,
 839, 841, 844-48, 852
 Thomson, E. M. 788, 793, 805
 Thomson, J. O. 838
 Thornbur, R. W. 920
 Thorp, J. S. 767, 815
 Thrill, D. C. 904, 905
 Tiegs, T. N. 419, 431, 433, 434, 465, 489,
 493, 500, 504, 505, 512, 523, 618, 670
 Ting, B.-Y. 712, 713, 726
 Tinus, R. W. 1028
 Tkaczyk, J. E. 660, 661, 828
 Todd, D. E. 927, 1011, 1042
 Tomlinson, J. J. 859, 864, 866,
 868, 871, 879, 882
 Tonn, B. E. 85, 89
 Torpey, M. R. 258
 Torreano, S. J. 1006
 Tortorelli, P. F. 622, 662
 Tracey, D. M. 354
 Triolo, R. 590, 591, 594, 596, 597
 Tritton, L. M. 1021
 Trumble, D. A. 67, 93
 Tschaplinski, T. J. 913, 918, 927,
 928, 983, 984, 986, 987, 989
 Tucker, W. T. 360, 449, 519
 Tuluca, A. N. 230, 261
 Turchi, P. E. A. 646
 Turhollow, A. F. 887, 909, 929, 933,
 944, 953, 971, 994, 999, 1024
 Turner, R. H. 189
 Tuskan, G. A. 887, 930
 Tye, R. P. 222, 230, 274

U

Uman, M. A.	745, 755, 764, 788, 793, 795, 805
Urban, C. M.	565

V

Vaccari, D. L.	355, 440
Vahlas, C.	837
Vaidyanathan, R.	359, 481
Valore, R., Jr.	261
Van Geem, M. G.	253, 259, 277, 281
Van Lear, D. H.	1012, 1021
Van Miegroet, H.	1012
Van Volkenburg, E.	978
Vance, E. F.	742, 795
Vance, M. C.	623, 631
Vaughan, D. H.	921, 942, 974
Venezia, A. M.	657
Venkateswaran, V.	437
Veverka, E. F.	751, 806, 814
Vincent, R. J.	138
Vineyard, E. A.	107, 114, 117, 119, 120, 127, 147, 148, 171
Vineyard, T. A.	344
Vinyard, S.	569
Violette, D. M.	15
Virkar, A. V.	473, 518
Voldrich, W.	384
Volenec, J. J.	939, 1003
Vonier, T.	230
Vories, R.	288
Voshall, R. E.	749
Voss, M. K.	196
Votaw, P. C.	803, 804

W

Waddle, D. B.	765
Wade, J. A.	380
Wade, J. C.	356
Wadsworth, J.	688
Wagner, C. L.	739, 768
Wahiduzzaman, S.	375, 496
Wakenell, J. F.	565, 571
Waldman, D. J.	535, 539
Waldron, W. D.	125, 138
Walkdorf, S. P.	810
Walling, R. A.	812

Wang, J. S.	392
Wang, J. T.	1081
Wang, Z. L.	634
Wang, Z. L.	823, 835
Wantland, J. L.	570, 580
Ward, C. Y.	980
Ward, T. L.	829
Warner-Selph, M. A.	569
Warren, J. W.	639
Warwick, W. H.	431
Wasserman, D. M.	323
Watson, M. A.	388
Watts, J. A.	1086
Watts, R. L.	44
Weaver, F. J.	207, 208, 215, 220, 224, 228, 491, 650
Weaver, R. S.	229
Webb, J. W.	1086
Weil, R.	260
Weiss, C. D.	417, 447
Weiss, P.	53
Wenzel, C. R.	1023
Wereszczak, A. A.	1093
Werst, S. H.	220
Wert, J. J.	396, 397
West, B. H.	412, 527, 529, 531, 533, 534, 551, 552
West, D. C.	1021
Westmoreland, C. G.	615, 641
Wetherington, G. R.	784
Whalen, P.	353, 367
Wheeler, R.	825
Wheeler, R. B.	759, 785, 817
Whitaker, R. A.	625
White, D. L.	14, 30, 55, 80, 83, 85, 95, 288, 299, 301, 344
White, K. W.	514, 515
Whitenton, E. P.	715, 716
Whitesell, C. D.	964, 979, 1026
Wiard, B. M.	978, 1013
Wiederhorn, S. M.	357, 402, 426, 526
Wiesman, C.	1016
Wiggins, C. M.	743
Wilbanks, T. J.	91
Wilcox, B. A.	216
Wilkes, K. E.	195, 197, 201, 236, 270, 304, 310-12, 315, 318, 331, 337
Williams, F.	1081
Williams, L. S.	21, 38, 57, 61, 70
Williams, L. S.	313
Williams, R. K.	433, 477, 491, 505, 843, 849, 850, 851, 855, 857, 858

Williams, V.	339
Willkens, C. A.	354, 373, 443, 471, 483
Willman, A. J.	339
Wilson, B. C.	1033
Wilson, C. R.	729, 730, 732
Wilson, D. F.	598, 707
Wilson, L. F.	998
Winer, W. O.	712, 726, 727
Winsor, R. E.	538
Wintenberg, A. L.	766
Witherspoon, M. J.	294
Wittmer, D. E.	368, 393
Wolf, D. D.	921, 942, 973
Wolf, J. D.	409, 413
Wolf, J. S.	605
Wolf, S. M.	653
Wolfe, A. K. 5,	86
Wong, P. S.	448
Wong, V. W.	541
Woodfin, S. L.	1004
Wortward, J. A.	1062
Worthington, T. K.	825, 841, 846-48
Wray, P.	907, 908
Wright, J.	1032
Wright, L. L.	887-89, 911, 924, 925, 931, 932, 937, 953, 955, 961, 967, 969, 985, 988, 992, 1004, 1005, 1023, 1046, 1050
Wright, N.	934
Wright, T.	299
Wu, F. J.	380, 453
Wyman, C. E.	917, 951

Y

Yajnik, S.	271
Yamanis, J.	353, 367
Yaney, P.	409, 413
Yang, H.	636
Yang, Y. P.	366
Yarbrough, D. W.	194, 199, 207, 209, 213-15, 224, 225, 227, 241, 244, 245, 264, 279, 331, 477, 505, 650
Yeckley, R. L.	354
Yeh, H.	353, 365, 367, 379, 441, 448, 476, 482, 516
Yost, R. S.	1026
Young, A. C.	618
Young, J. P.	1080-82
Younkins, T. D.	809
Yourstone, E.	5, 22, 35, 42
Yuhas, D.	379
Yust, C. S.	700, 704, 705, 717, 728

Z

Zaltash, A.	600-604
Zarr, R. R.	209
Zawacki, T. S.	144, 160, 179
Zerega, A. M.	72
Zhu, S.	827
Zilberstein, G.	442, 469, 484, 508
Zimmerman, K. H.	178, 191
Zinkle, S. J.	649

Internal Distribution

1.	D. Adams	44.	C. Forsberg
2.	L. J. Allison	45.	W. Fulkerson
3.	S. W. Allison	46.	R. L. Graves
4.	R. J. Andermann, Jr.	47.	T. Grizzard
5.	P. Angelini	48.	C. A. Gunderson
6.	L. D. Armstrong	49.	R. M. Harrington
7.	D. C. Bauer	50.	M. R. Harris
8.	O. A. Basaran	51.	R. A. Hawsey
9.	V. D. Baxter	52.	S. G. Hildebrand
10.	J. J. Blass	53.	L. J. Hill
11.	P. J. Blau	54.	E. Hillsman
12.	A. Bleier	55.	D. R. Hines
13.	M. D. Boring	56.	P. J. Hughes
14.	C. R. Boston	57.	P. J. Hughes
15.	R. A. Bradley	58.	M. G. Jenkins
16.	C. H. Brown	59.	R. L. Jolley
17.	M. A. Brown	60.	L. Jung
18.	R. A. Buhl	61.	M. A. Karnitz
19.	R. S. Carlsmith	62.	M. J. Kass
20.	C. P. Chihasz	63.	E. N. Kaufman
21.	A. Choudhury	64.	S. B. Kennedy
22.	J. E. Christian	65.	H. T. Kerr
23.	S. M. Cohn	66.	T. Klasson
24.	J. L. Cook	67.	J. O. Kolb
25.	J. W. Cooke	68.	R. P. Krishnan
26.	D. Copinger	69.	M. A. Kuliasha
27.	J. M. Corum	70.	E. H. Lee
28.	J. M. Cosgrove	71.	N. E. Lee
29.	G. E. Courville	72.	W. Y. Lee
30.	J. Coyner	73.	K. C. Liu
31.	B. L. Cox	74.	R. A. Lorenz
32.	D. F. Craig	75.	P. M. Love
33.	F. A. Creswick	76.	G. M. Ludtka
34.	J. H. Cushman	77.	G. Mackiewicz-Ludtka
35.	B. H. Davison	78.	J. C. Mailen
36.	A. O. Desjarlais	79.	G. Marland
37.	J. Dickerman	80.	W. R. Martin
38.	N. Domingo	81.	J. R. Mayotte
39.	R. E. Eversole	82.	E. W. McDaniel
40.	P. D. Fairchild	83.	R. N. McGill
41.	T. D. Ferguson	84.	H. A. McLain
42.	J. J. Ferrada	85.	R. McMahon
43.	S. K. Fischer	86.	W. R. Martin

87.	V. C. Mei	122.	W. D. Siemens
88.	G. E. Michaels	123.	P. S. Sklad
89.	S. Michaud	124.	E. J. Soderstrom
90.	W. R. Mixon	125.	B. M. Sorensen
91.	J. J. Morello	126.	A. Sozer
92.	M. T. Naney	127.	G. W. Strandberg
93.	R. J. Norby	128.	V. J. Tennery
94.	R. E. Norris	129.	P. T. Thornton
95.	S. D. Nunn	130.	V. R. Tolbert
96.	D. G. O'Connor	131.	J. J. Tomlinson
97.	C. E. Oliver	132.	C. Trettin
98.	L. J. Ott	133-82.	K. H. Vaughan
99.	J. T. Parks	183.	C. D. Warren
100.	A. Pasto	184.	D. A. Waters
101.	R. D. Perlack	185.	J. A. Watts
102.	M. J. Peterson	186.	J. R. Weir
103.	L. P. Phillips	187.	A. Wereszczak
104.	D. D. Rhew	188.	D. L. White
105-109.	C. K. Rice	189.	J. Whitefield
110.	D. T. Rzy	190.	T. J. Wilbanks
111.	G. L. Riner	191.	K. A. Williams
112.	P. A. Rubin	192.	G. M. Wood
113.	M. J. Sale	193.	H. D. Wooten
114.	R. Sams	194.	S. B. Wright
115.	R. Sanders	195.	R. E. Ziegler
116.	A. C. Schaffhauser	196-97.	Laboratory Records
117.	E. Schorn	198.	Laboratory Records—RC
118.	W. E. Schramm	199.	ORNL Patent Office
119.	R. E. Schreiber	200.	Central Research Library
120.	R. N. Scogin	201.	Document Reference Sect.
121.	T. C. Scott		

External Distribution

202. Henry Amistadi, RR 2, Box 2191C, Brunswick ME 04011
203. John Andre, NRECA, Norris Memorial Library, 1800 Massachusetts Avenue, NW, Washington DC 20036
204. Stuart Baird, ICLEI, 8th Floor, East Tower, City Hall, 100 Queen Street West, Toronto, Ontario M5H 2N2
205. David Barraco, LightStat, 15 Canton Spring Road, Canton CT 06019
206. Jerry Bellucci, Applied Economics Research, 299 Broadway, Suite 803, New York NY 10007

- 207. Belinda Chan, Gas Marketing Department, Consolidated Edison,
Four Irving Place, Room 305, New York NY 10003
- 208. Howard Geller, Executive Director, American Council for an Energy-
Efficient Economy, Suite 801, 1001 Connecticut Avenue, NW,
Washington, D. C. 20036
- 209. Thomas J. Gross, Deputy Assistant Secretary for Transportation
Technologies, EE-30, FORS, U.S. Department of Energy, 1000
Independence Avenue, SW, Washington DC 20585
- 210. Donna Hawkins, Office of Building Technologies, EE-40, FORS, U.S.
Department of Energy, 1000 Independence Avenue, SW,
Washington DC 20585
- 211. Ann Hegnauer, Office of Transportation Technologies, EE-30, FORS,
U.S. Department of Energy, 1000 Independence Avenue, SW,
Washington DC 20585
- 212. Richard Hirsh, Department of History, VPISU, Blacksburg VA 24061-
0117
- 213–214. B. Kavanaugh, Center for Energy Studies, Louisiana State University,
Baton Rouge LA 70803-0301
- 215. Peter O'Farrell, Oakhurst Associates, 26 Rockmont Road, Arlington
MA 02174
- 216. Mark Levine, Applied Science Division, Lawrence Berkeley
Laboratory, Building 90-4000, One Cyclotron Road, Berkeley CA
94720
- 217. John P. Millhone, Deputy Assistant Secretary for Building
Technologies, EE-40, FORS, U.S. Department of Energy, 1000
Independence Avenue, SW, Washington DC 20585
- 218. Ms. Marsha L. Quinn, Office of Industrial Technologies, Energy
Efficiency and Renewable Energy, U.S. Department of Energy, 1000
Independence Avenue, SW, Washington DC 20585
- 219. Arthur H. Rosenfeld, Center for Building Science, Building 90-3085,
Lawrence Berkeley Laboratory, Berkeley CA 94720
- 220. T. V. Ramachandra, Centre for Ecological Sciences, Indian Institute
of Science, Bangalore, 560 012 India
- 221. Mary Rouleau, AARP State Legislative Department, Utility Issues,
601 E Street, NW, Washington DC 20049

- 222. Tish Russell, 2222 222nd Street SE, Bothell WA 98021
- 223–26. Don Sample, USDOE, OSTI, P. O. Box 62, Oak Ridge TN 37831-9939
- 227. Dr. R. L. San Martin, Deputy Assistant Secretary for Utility Technologies, EE-10, FORS, U.S. Department of Energy, 1000 Independence Avenue, SW, Washington DC 20585
- 228. Ms. Cathy Short, Office of Utility Technologies, EE-10, FORS, U.S. Department of Energy, 1000 Independence Avenue, SW, Washington DC 20585
- 229. Judy Spinner, Kansas City Power & Light Company, Department of Regulatory Affairs, 1201 Walnut, 20th Floor, Kansas City MO 64106
- 230. Frank M. Stewart, Jr., Deputy Assistant Secretary for Technical and Financial Assistance, EE-50, FORS, 1000 Independence Avenue, SW, Washington DC 20585
- 231. Andrew Stirling, Energy Group, Science Policy Research Unit, Mantell Building, University of Sussex, Falmer, East Sussex
- 232. Alan J. Streb, Deputy Assistant Secretary for Industrial Technologies, EE-20, FORS, U.S. Department of Energy, 1000 Independence Avenue, SW, Washington DC 20585
- 233. Linda Testa, SRC, 111 Presidential Boulevard, Suite 127, Bala Cynwyd PA 19004
- 234. Pamela Torres, Electric Power Research Institute, Room 6-113, 3412 Hillview Avenue, Palo Alto CA 94303
- 235. Phillip Wemhoff, T-7, Jacksonville Electric Authority, 21 West Church Street, 7th Floor, Jacksonville FL 32202
- 236. Andrew Wynn, EC Division, SHS 130, Augusta ME 04333
- 237. Office of the Assistant Secretary for Energy Efficiency and Renewable Energy, EE-1, FORS, U.S. Department of Energy, 1000 Independence Avenue, SW, Washington DC 20585
- 238. Office of the Assistant Manager for Energy Research and Development, DOE/ORO, P. O. Box 2008, Oak Ridge TN 37831-6269
- 239–77. Office of Scientific and Technical Information, USDOE, P. O. Box 62, Oak Ridge TN 37831

END

DATE
FILMED
9 / 28 / 93