FINAL REPORT

DOE Proposal: "12th International Workshop on Inelastic Ion Surface Collisions to be Held January 1999 at South Padre Island, Texas

Principal Investigator: J. W. Rabalais, Department of Chemistry, University of Houston, Houston, TX 77204-5641; P (713)743-3282; F 713) 743-2709; rabalais@uh.edu

DOE Contact: J. V. Martinez, Fundamental Interactions Branch, Division of Chemical Sciences, Office of Basic Energy Sciences

Period of Award: 9/15/98 – 9/14/99
Amount of Award: $5,000

The Twelfth International Workshop on Inelastic Ion Surface Collisions was held at the Bahia Mar Resort and Conference Center on South Padre Island, Texas (USA) from January 24 to 29, 1999. South Padre Island is a semi-tropical barrier island just off the southern most tip of the Texas coast. With the Gulf of Mexico seaside on one side of the island and the placid Laguna Madre Bay on the other side, it provided a comfortable, relaxed, and focused setting for the Workshop. The Workshop brought together most of the leading researchers from around the world to focus on both the theoretical and experimental aspects of particle – surface interactions and related topics. An effort was made to invite young researchers and to introduce new techniques and applications that had not previously been a part of this Workshop. The presentations and discussions included the following topics: *ion- and electronically-induced desorption and chemical reactions, *mechanisms of physical-, chemical-, kinetic-, and potential-sputtering, *charge states of scattered, recoiled, and sputtered particles from surfaces, *inelastic collisions of atoms, molecules, and clusters with surfaces, *scattering, fragmentation, and reactions of molecules and clusters with surfaces, *particle energetics in reactions, film growth, defect formation, and surface modification at low energies. The attendees were highly satisfied with the meeting location, schedule, and the scientific interaction.

The IISC Workshops have been held every two years to provide an international forum for the exchange of information and ideas on fundamental phenomena in the above-mentioned areas. The Twelfth IISC Workshop was attended by 120 scientists from 22 countries. There were 17 invited and 18 contributed oral presentations and 67 poster presentations. There were no parallel sessions and ample time for discussions. Most of the presenters contributed manuscripts to the proceedings. Each of these manuscripts was refereed anonymously by two referees. The referees were selected both from the conferees as well as externally. These research papers were grouped herein into seven sections, each section starting with invited papers followed by contributed papers to be published as a Proceedings Volume in Nuclear Instruments and Methods in Physics.
DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, make any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.
DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.
Research. These proceedings provide a survey of the state of the art and the activities in the field and should be published by Fall 1999.

The DOE funds were used to assist the travel and accommodation expenses for students and postdoctorals and for various ancillary costs. This support made it possible for 19 students and postdoctorals to attend and participate in the Workshop. These items are detailed below.

Eight students that received travel assistance:

Five postdoctoral associates that received travel assistance:

Personnel from the University of Houston and Rice University:
A van was rented to transport people from Houston to the meeting. The students and postdoctorals transported in the van were E. Ada, I. Bolotin, V. Bykov, P. A. W. van der Heide, S. M. Lee, I. Vaquilla, J. Wolfgang, and the Conference Secretary – Debra Kipple. Dr. Rabalais’ airfare to the meeting.

Ancillary Expenses
Miscellaneous expenses: Printing the Book of Abstracts, postage for mailouts, audio-visual equipment rental, machine shop expenses for construction of high stand for projection screen, and computer peripherals. These ancillary expenses were essential for a well-organized and successful meeting.

The following items are attached to this report:
1. The “Book of Abstracts” from the Workshop.
2. A list of participants in the Workshop.
3. The Preface, Front Pages, and Table of Contents of the Proceedings to be published in Nuclear Instruments and Methods in Physics Research.
Proceedings of the Twelfth International Workshop on
Inelastic Ion-Surface Collisions (IISC-12)
South Padre Island, Texas, USA, January 24-29, 1999

Editors

J. W. Rabalais
University of Houston, Houston, Texas

P. Nordlander
Rice University, Houston, Texas
Preface

The Twelfth International Workshop on Inelastic Ion Surface Collisions was held at the Bahia Mar Resort and Conference Center on South Padre Island, Texas (USA) from January 24 to 29, 1999. South Padre Island is a semi-tropical barrier island just off the southernmost tip of the Texas coast. With the Gulf of Mexico seaside on one side of the island and the placid Laguna Madre Bay on the other side, it provided a comfortable, relaxed, and focused setting for the Workshop. The Workshop brought together most of the leading researchers from around the world to focus on both the theoretical and experimental aspects of particle – surface interactions and related topics. An effort was made to invite young researchers and to introduce new techniques and applications that had not previously been a part of the this Workshop. The presentations and discussions included the following topics: *ion- and electronically-induced desorption and chemical reactions, *mechanisms of physical-, chemical-, kinetic-, and potential-sputtering, *charge states of scattered, recoiled, and sputtered particles from surfaces, *inelastic collisions of atoms, molecules, and clusters with surfaces, *scattering, fragmentation, and reactions of molecules and clusters with surfaces, *particle energetics in reactions, film growth, defect formation, and surface modification at low energies.

The IISC Workshops have been held every two years to provide an international forum for the exchange of information and ideas on fundamental phenomena in the above-mentioned areas. The Twelfth IISC Workshop was attended by 120 scientists from 22 countries. There were 17 invited and 18 contributed oral presentations and 67 poster presentations. There were no parallel sessions and ample time for discussions. Most of the presenters contributed manuscripts to the proceedings. Each of these manuscripts was refereed anonymously by two referees. The referees were selected both from the conferees as well as externally. These research papers are grouped herein into seven sections, each section starting with invited papers followed by contributed papers. These proceedings provide a survey of the state of the art and the activities in the field.

We look forward to the next IISC Workshop to be held in Bariloche, Argentina.

J. W. Rabalais
P. Nordlander

Guest Editors
International Scientific Committee

A. Arnnu, Depto. Universidad del Pais Vasco, San Sebastian, Spain
M. Bernheim, University of Paris, France
V. Kh. Ferleger, Arifof Institute of Electronics, Tashkent, Uzbekistan
J. P. Gauyacq, Universite Paris Sud, Orsay Cedex, France
W. Heiland, Universitat Osnabruck, Osnabruck, Germany
R. J. MacDonald, University of Newcastle, Newcastle, New South Wales, Australia
M. L. Martiarena, Centro Atomic Bariloche, Bariloche, Argentina
K. Morita, Nagoya University, Nagoya, Japan
P. Nordlander, Rice University, Houston, Texas, USA
J. W. Rabalais, University of Houston, Houston, Texas, USA
Z. Sroubek, Acad. of Sci. of the Czech Rep., Praha, Czech Republic
M. Szymonsky, Jagelonin University, Krakow, Poland
E. Taglauer, Max Plank Inst. fur Plasmaphysik, Garching bei Muchen, German
N. Tolk, Vanderbilt University, Nashville, TN, USA
I. F. Urazgil'din, Moscow State University, Moscow, Russia
P. Varga, Technical University, Vienna, Austria

Local and Program Committee

Raul A. Baragiola University of Virginia
Dennis C. Jacobs Notre Dame University
Barbara H. Cooper Cornell University
F. Barry Dunning Rice University

Local Organizing Committee

J. W. Rabalais University of Houston
P. Nordlander Rice University

Sponsors
Department of Energy
National Science Foundation
Elsevier Science
Leybold Vacuum Products
Physical Electronics
Quantar Technology
Varian Associates
## Contents

**Preface**

**Committees**

**Section I: Charge Transfer**

N. Lorente, D. Teillet-Billy, J.-P. Gauyacq, *Theoretical Studies of Charge Transfer in Molecular Ion-Metal Surface Collisions*


H. Winter, C. Auth, T. Hecht and A. Mertens, *Charge Exchange and Excitation Phenomena at Insulator Surfaces*

A. Lavery, C. E. Sosolik, B. H. Cooper, *Charge Transfer Dynamics of Low Energy Oxygen Ion Beams Scattered from Cu(001)*

M. A. Gleeson and A. W. Kleyn, *Effects of Cs-Adsorption on the Scattering of Low-Energy Hydrogen Ions From HOPG*

J. A. M. C. Silva, J. Wolfgang, A. G. Borisov, J. P. Gauyacq, P. Nordlander, D. Teillet-Billy, *Resonant Charge Transfer Processes in Ion-Metal Surface Collisions: Effect of the Presence of Vacancies or Adatoms on the Surface*

S. Deutscher, A. G. Borisov, V. Sidis, *Theory of Charge Transfer on MgO(100) Surfaces*

D. L. Bixler, J. C. Lancaster, F. J. Kontur, P. Nordlander, G. K. Walters and F. B. Dunning, *Use of Spin-Labeling Techniques to Probe the Dynamics of He⁺ Ion Neutralization at Clean Metal Surfaces*

A. Sindona and G. Falcone, *Surface Influences on Resonant Ionization During Sputtering*

Hecht, R. Pfandzelter, A. G. Borisov and H. Winter, *Charge Exchange of Fast Metastable He Atoms in Front of an Al(111)-Surface*

**Section II: Energy Loss**

J. I. Juariisti, A. Arnau, P. M. Echenique, C. Auth and H. Winter, *Charge State Dependence of the Energy Loss of Slow Nitrogen Ions Reflected from an Aluminum Surface Under Grazing Incidence*


M. Kato and R. Smith, *Theoretical Study of Electronic Energy Loss Recently Observed in Impact Collision Ion Scattering of a Low Energy Li⁺ from a TaB₂(0001) Surface*
M. A. Cazalilla and J. I. Juaristi, Energy Loss of Fast Protons Specularly Reflected from Metal Surfaces

R. A. Baragiola, S. M. Ritzau, R. C. Monral, C. A. Dukes and P. Riccardi, Mechanisms for Ion-Induced Plasmon Excitation in Metals

Section III: Sputtering and Ion Emission

D. E. Grosjean, R. A. Baragiola, W. L. Brown, Electrostatic Charging Effects in Fast H⁺ Interactions with Thin Ar Films

R. Pedrys, B. Warczak, P. Leskiewicz, J. Schou, O. Ellegaard, Sputtering by Excitonic and Elastic Processes from Solid Neon by He Ion Bombardment

P. A. W. van der Heide, Velocity Distributions of the Negatively Charged Monatomic Secondary Ions of Copper, Silver and Gold

D. Ishikawa, R. Ishigami and K. Morita, Positive to Neutral Ratio of Cu Species Ejected from the Si(111)-"5x5"-Cu Surface Measured by Multi-photon Resonance Ionization Spectroscopy

A. Delcorte, X. Vanden Eynde, F. Reich and P. Bertrand, Kinetic Energy Distribution of Molecular Fragments Sputtered from Poly(ethylene terephthalate) Under Indium Ion Bombardment: Effects of the Primary Beam Energy and Angle

Section IV: Clusters


B. Kaiser, T. M. Bernhardt, B. Stegemann, J. Opitz, K. Rademann, Interaction of Mass Selected Antimony Clusters with HOPG

L. Kantorovich, A. Shluger, J. Günster, J. Stultz, S. Krischok, D. W. Goodman, P. Stracke, V. Kempter, Mg Clusters on MgO Surfaces: Characterization by MIES and Electronic Structure ab initio Calculations

I. Baranov, S. Jarmiychuk, S. Kirillov, A. Novikov, V. Obnorskii, C. Reimann and K. Wien, Macrocluster Desorption Effect Caused by Single MCI: Charges of Gold Clusters (3-22nm) Desorbed Due to Electronic Processes Induced by Fission Fragment Bombardment in Nanodispersed Gold Targets

Section V: Reactive Scattering


T.-H. Shin, S.-J. Han, H. Kang, Interactions of Low Energy Cs⁺ with Frozen Water Overlayers: Observation of an Unusually High Yield for Reactive Scattering
S. Krischok, H. Müller and V. Kempter, Surface-Induced Dissociation in Slow Collisions of H₂⁺ and O₂⁺: Information From Ion Impact Electron Spectra

J. Scheer, K. Brüning, T. Fröhlich, P. Wurz and W. Heiland, Scattering of Small Molecules from a Diamond Surface


S. M. Lee, E. T. Ada, H. Lee, D. Marton and J. W. Rabalais, Kinetic Energy Dependence of TiSi₂ Film Growth from Low Energy Ti⁺ Ion Beams


R. A. Baragiol, C. L. Atteberry, D. A. Bahr and M. M. Jakas, Solid-State Ozone Synthesis by Energetic Ions

Z. Vidovic, A. Billebaud, M. Fallavier, R. Kirsch, J.-C. Poizat, J. Remillieux, O. F. Smidts, M. Rösler, Theoretical and Experimental Study of the Correlation Between Forward and Backward Electron Emissions Induced by H⁺ or H⁺ Incident on Carbon Foils


J. I. Juaristi and M. Rösler, Atomic Number Dependence of the Forward/Backward Kinetic Electron Emission by Slow Ions in Carbon Foils

Section VI: Applications

K. Wu, M. J. Iedema, A. A. Tsekouras and J. P. Cowin, Probing Aqueous-Organic Interfaces with Soft-Landed Ions

E. Taglauer, A. Steltenpohl and R. Beikler, Scattered Ion Yields from Bimetallic Crystal Surfaces


L. Houssiau and J. W. Rabalais, Scattering and Recoiling Imaging Spectrometry (SARIS) Study of Chlorine Chemisorption on Ni(110)

D. Nakamura, J. Yuhara and K. Morita, Self-Organization of Monolayer (Pb,Sn) Adsorbates at Si(111) Surface Recoil-Implanted by KeV Ion Impact

T. Igel, R. Pfandzelter, and H. Winter, Surface Magnetism of Ultrathin Cr, Mn, and Fe Films on Fe(100) Studied via Electron Capture Spectroscopy

R. Pfandzelter, Submonolayer Homoeptaxy on Fe(100) Studied by Grazing Ion-Surface Scattering: Experiments and Computer Simulations
Section VII: Multiply Charged Ions

F. W. Meyer and V. A. Morozov, Multicharged Ion - Surface Measurements at ORNL MIRF using Decelerated Beams

M. Rösler, D. Niemann, N. Stolterfoht and A. Dubus, Electron Emission From Below the Surface Induced by Highly Charged Ions: Effect of Depth Distribution of Electron Excitation

C. Laulhé, R. Hoekstra, S. Hoekstra, H. Khemliche, R. Morgenstern, A Närman, and T. Schlathölter, Hollow Atom Dynamics on Thin Film Covered Surfaces

R. Schuch, W. Huang, H. Lebius, Z. Pešic, N. Stolterfoht and G. Vikor, Angular Dependence of Energy Loss in Scattering of Slow Highly Charged Ar Ions from a Au Surface
LIST OF ATTENDEES AT THE IISC – 12 WORKSHOP

Earl Ada
Department of Chemistry
University of Houston
Houston, TX 77204-5641
Phone: (713) 743-3280
FAX: (713) 743-2709
eada@bayou.uh.edu,

Jean Paul Allain
Dept. of Nuclear Engineering
University of Illinois-Urbana
214 NEL, MC 234
103 S. Goodwin Ave.
Urbana, IL 61801-2984
Phone: (217) 333-2295
FAX: (217) 333-2906
jpallain@starfire.ne.uiuc.edu,

Abdalaziz Almulhem
Physics Department KFU
King Faisal University
P. O. Box 1759
Hofuf 31982 Saudi Arabia
Phone: 96635866645
FAX: aalmulhem@kfupm.edu.sa,

Scott Anderson
Department of Chemistry
University of Utah
315 S. 1400 E
Salt Lake City, UT 84112
Phone: (801) 585-7289
FAX: (801) 581-8433
anderson@chemistry.utah.edu,

Robert A. Armstrong
Dept. of Physics
University of Ottawa
150 Lois Pasteur
Ottawa, ONTARIO KIN 6N5 Canada
Phone: (613) 562-5800, X. 6735
FAX: (613) 562-5192
ram@physics.uottawa.ca,

Andres Amau
Departamento de Fisica de Materiales
Universidad del Pais Vasco
Facultad de Quimica, Apartado 1072
San Sebastian 20080 Spain
Phone: 34-943-44-82-04
FAX: 34-943-21-22-36
waparpia@sq.ehu.es,

Raul A. Baragiola
Lab. for Atomic and Surface Physics
University of Virginia
Thornton Hall
Charlottesville, VA 22901
Phone: (804) 982-2907
FAX: (804) 924-1353
raul@virginia.edu,

Igor A. Baranov
V. G. Khloplin Radium Institute
2-Murinskij Ave. 28,
194021 St. Petersburg Russia
Phone: (7812)2475749
FAX: (7812)2478095
baranov@atom.nw.ru,

Andrei Borisov
Lab. des Coll. Atomiques et
Moleculaires
Universite de Paris Sud
Batiment 351
F-91405 Orsay, Cedex France
Phone: (33) 1 69157697
FAX: (33) 1 69157671
gauyacq@lcam.u-psud.fr,

Alan V. Barnes
Mail Stop: L-414
Lawrence Livermore National Laboratory
7000 East Ave.
Livermore, CA 94550
Phone: (925) 422-9645
FAX: (925) 422-5940
barnes25@llnl.gov,

Patrick Bertrand
Physique des Matériaux (PCPM)
Université Catholique de Louvain
1, Place Croix Sud 1
B-1348 Louvain-la-Neuve Belgium
Phone: +(32-10) 47 35 81
FAX: +(32-10)473452
bertrand@pcpm.ucl.ac.be,

Jochen Braun
Dept. of Physics
Rice University
6310 Main St.
Houston, TX 77005-1892
Phone: FAX:
jbraun@rice.edu,

Jean-Pierre Briand
LPAN case 93 tour 12
Université P. et M. Curie
4 place Jussieu
F-75005 Paris France
Phone: +33 1 44 27 38 78
FAX: +33 1 44 27 38 69
JPBRIAND@EXT.JUSSIEU.FR,

Vladimir Bykov
Department of Chemistry
University of Houston
Houston, TX 77204-5641
Phone: (713) 743-3283
FAX: (713) 743-2709
vbykov@uh.edu,

M. A. Cazalilla
Materiaaleen Fisika Saila
Universidad del Pais Vasco
Kimika Fakultatea, Manuel Lardizabal
Ibilbidea, 3
Posta Kutxa 1072, 20080 Donostia
Spain
Phone: 34-43-44-80-00, ext. 5392
FAX: 34-43-21-22-36
wacagum@sq.ehu.es,
Keun Hwa Chae  
Atomic-Scale Surface Science Research Ctr.  
Yonsei University  
134 Shinchon-dong  
Seoul 120-749 Korea  
Phone: +82-2-361-3843  
FAX: +82-2-312-7090  
khchae@phya.yonsei.ac.kr,  

Basudev Chaudhuri  
Department of Physics  
Cornell University  
117 Clark Hall C-2  
Ithaca, NY 14853-2501  
Phone: 607-255-6068  
FAX: 607-255-6428  
bc26@msc.cornell.edu,  

Barbara Cooper  
Dept. of Physics  
Cornell University  
Clark Hall  
Ithaca, NY 14853-2501  
Phone: (607) 255-3664  
FAX: (607) 255-6428  
cooper@msc.cornell.edu,  

James Cowin  
Pacific Northwest National Laboratory  
Box 999, M/S K8-88  
Richland, WA 99352  
Phone: 509-376-6330  
FAX: 509-376-6066  
jp.cowin@pnl.gov,  

Jim H. Craig, Jr.  
Department of Physics  
UT - El Paso  
500 West University Avenue  
El Paso, TX 79968-0515  
Phone: (915) 747-7528  
FAX: (915) 747-5447  
jcraig@utep.edu,  

Stefan Deutscher  
Lab. des Coll. Atomiques et Moléculaires  
Université de Paris Sud  
Bâtiment 351  
F 91405- Orsay Cedex France  
Phone: 33-1-6915-7699  
FAX: 33-16515-7671  
sad@utk.edu,  

Alain Dubus  
Service de Metrologie Nucleaire (CP 165/84)  
Université Libre de Bruxelles  
50, Avenue F. D. Roosevelt  
B-1050 Bruxelles Belgium  
Phone: +32-2-6502059  
FAX: +32-2-6504534  
adubus@ulb.ac.be,  

F. Barry Dunning  
Dept. of Physics MS-61  
Rice University  
P.O. Box 1892  
Houston, TX 77251-1892  
Phone: (713) 527-8101  
FAX: (713) 285-5143  
fbd@rice.edu,  

James Engstrom  
3100 Central expressway  
Symyx Technologies  
Santa Clara, CA 95051  
Phone: (408) 330-2181  
FAX: (408) 748-1221  
jre@cheme.cornell.edu,  

Dan Fry  
Department of Physics  
Kansas State University  
116 Cardell Hall  
Manhattan, KS 66502  
Phone: 785-532-2650  
FAX: 785-532-6806  
dfry@phys.ksu.edu,  

Jean-Pierre Gauyacq  
Lab. des Coll. Atomiques et Moléculaires  
Universite de Paris Sud  
Bâtiment 351  
F-91405 Orsay Cedex France  
Phone: 33-1 69156565  
FAX: 33-1 69157671  
gauyacq@lcam.u-psud.fr,  

M. A. Gleeson  
FOM-Instituut voor Atoom- en Molecuulysica  
Kruislaan 407 – Watergraafsmeer  
NL-1098 SJ Amsterdam  
The Netherlands  
Phone: +31 (20) 6081234  
FAX: +31 (20) 6684106  
gleeson@amolf.nl,  

Jennifer Hampton  
Department of Physics  
Cornell University  
Clark Hall C-2  
Ithaca, NY 14853-2501  
Phone: 607-255-3326  
FAX: 607-255-6428  
Hampton@msc.cornell.edu,  

Seung-Jin Han  
Chemistry Department  
Pohang Institute of Science & Technology  
Hyoja-dong, Nam-ku  
Pohang, Gyeong-buk 790-784 Korea  
Phone: 82-562-279-2779  
FAX: 82-562-279-3399  
han@chem.postech.ac.kr,  

Luke Hanley  
Dept. of Chemistry, M/C III  
University of Illinois at Chicago  
845 W. Taylor St., 4500 SES, m/c 111  
Chicago, IL 60607-7061 USA  
Phone: 312-996-0945  
FAX: 312-996-0431  
ihanley@uic.edu,
<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
<th>Address</th>
<th>Phone</th>
<th>Fax</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wolfgang Harbich</td>
<td>Institute de Physique Experimentale</td>
<td>Lausanne CH-1015 Switzerland</td>
<td>+41 21 693 4415</td>
<td>+41 21 693 3604</td>
<td><a href="mailto:harbich@epfl.ch">harbich@epfl.ch</a></td>
</tr>
<tr>
<td>Dr. Ronnie Hoekstra</td>
<td>Rijksuniversiteit Groningen</td>
<td>KNIV</td>
<td></td>
<td></td>
<td><a href="mailto:hoekstra@kvi.nl">hoekstra@kvi.nl</a></td>
</tr>
<tr>
<td>Laurent Houssiau</td>
<td>Department of Chemistry</td>
<td>University of Houston</td>
<td>(713) 743-3283</td>
<td>(713) 743-2709</td>
<td><a href="mailto:laurent@bayou.uh.edu">laurent@bayou.uh.edu</a></td>
</tr>
<tr>
<td>J. L. Juaristi</td>
<td>Departamento de Fisica de Materiales</td>
<td>Universidad del Pais Vasco</td>
<td></td>
<td></td>
<td><a href="mailto:wabjuoli@sq.ehu.es">wabjuoli@sq.ehu.es</a></td>
</tr>
<tr>
<td>Bernhard Kaiser</td>
<td>Walter-Nernst-Inst. f. Phys. u. Theor. Chemie</td>
<td>Humboldt-Universität zu Berlin</td>
<td>+49-30-20935561</td>
<td>+49-30-20935559</td>
<td><a href="mailto:bernd@rad01.chemie.hu-berlin.de">bernd@rad01.chemie.hu-berlin.de</a>,</td>
</tr>
<tr>
<td>Takeshi Kan</td>
<td>Fundamental Electronics Research Institute</td>
<td>Osaka Electro-Communication University</td>
<td>+81-720-24-1131</td>
<td></td>
<td><a href="mailto:m97107@isc.osakac.ac.jp">m97107@isc.osakac.ac.jp</a></td>
</tr>
<tr>
<td>Heon Kang</td>
<td>Chemistry Department</td>
<td>Pohang University of Science &amp; Technology</td>
<td></td>
<td></td>
<td><a href="mailto:surfion@postech.ac.kr">surfion@postech.ac.kr</a></td>
</tr>
<tr>
<td>Andrey K. Kazansky</td>
<td>Institute of Physics</td>
<td>The University of St. Petersburg</td>
<td></td>
<td></td>
<td><a href="mailto:andrey.kazansky@pobox.spbu.ru">andrey.kazansky@pobox.spbu.ru</a>,</td>
</tr>
<tr>
<td>Volker Kempter</td>
<td>Physikalisches Institut</td>
<td>Techn. Universität Clausthal</td>
<td>05323/72-2363</td>
<td>05323/72-3600</td>
<td><a href="mailto:volker.kempter@tu-clausthal.de">volker.kempter@tu-clausthal.de</a>,</td>
</tr>
<tr>
<td>Young Sun Kim</td>
<td>Department of Chemistry</td>
<td>University of Houston</td>
<td>(713) 743-3283</td>
<td>(713) 743-2709</td>
<td><a href="mailto:ykim@bayou.uh.edu">ykim@bayou.uh.edu</a></td>
</tr>
<tr>
<td>Bruce E. Koel</td>
<td>Dept. of Chemistry</td>
<td>University of Southern California</td>
<td>520-505-4126</td>
<td></td>
<td><a href="mailto:koel@chem1.usc.edu">koel@chem1.usc.edu</a></td>
</tr>
<tr>
<td>Werner Heiland</td>
<td>Fachbereich Physik</td>
<td>Universität Osnabrück</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D. C. Jacobs</td>
<td>Dept. of Chemistry and Biochemistry</td>
<td>University of Notre Dame</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dai Ishikawa</td>
<td>Dept. of Crystalline Matls. Science,</td>
<td>Nagoya University</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bernhard Kaiser</td>
<td>Walter-Nernst-Inst. f. Phys. u. Theor. Chemie</td>
<td>Humboldt-Universität zu Berlin</td>
<td></td>
<td></td>
<td><a href="mailto:bernd@rad01.chemie.hu-berlin.de">bernd@rad01.chemie.hu-berlin.de</a>,</td>
</tr>
<tr>
<td>Takeshi Kan</td>
<td>Fundamental Electronics Research Institute</td>
<td>Osaka Electro-Communication University</td>
<td>+81-720-24-1131</td>
<td></td>
<td><a href="mailto:m97107@isc.osakac.ac.jp">m97107@isc.osakac.ac.jp</a></td>
</tr>
<tr>
<td>Masaaki Kato</td>
<td>Dep. of Crystalline Materials Science</td>
<td>Nagoya University</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Andrey K. Kazansky</td>
<td>Institute of Physics</td>
<td>The University of St. Petersburg</td>
<td></td>
<td></td>
<td><a href="mailto:andrey.kazansky@pobox.spbu.ru">andrey.kazansky@pobox.spbu.ru</a>,</td>
</tr>
<tr>
<td>Bruce E. Koel</td>
<td>Dept. of Chemistry</td>
<td>University of Southern California</td>
<td>520-505-4126</td>
<td></td>
<td><a href="mailto:koel@chem1.usc.edu">koel@chem1.usc.edu</a></td>
</tr>
<tr>
<td>Volker Kempter</td>
<td>Physikalisches Institut</td>
<td>Techn. Universität Clausthal</td>
<td>05323/72-2363</td>
<td>05323/72-3600</td>
<td><a href="mailto:volker.kempter@tu-clausthal.de">volker.kempter@tu-clausthal.de</a>,</td>
</tr>
<tr>
<td>Young Sun Kim</td>
<td>Department of Chemistry</td>
<td>University of Houston</td>
<td>(713) 743-3283</td>
<td>(713) 743-2709</td>
<td><a href="mailto:ykim@bayou.uh.edu">ykim@bayou.uh.edu</a></td>
</tr>
<tr>
<td>Bruce E. Koel</td>
<td>Dept. of Chemistry</td>
<td>University of Southern California</td>
<td>520-505-4126</td>
<td></td>
<td><a href="mailto:koel@chem1.usc.edu">koel@chem1.usc.edu</a></td>
</tr>
</tbody>
</table>
Fred W. Meyer  
Physics Div., MS-6372  
Oak Ridge National Laboratory  
Bldg. 6003, P.O. Box 2008  
Oak Ridge, TN 37831-6372  
Phone: (423) 574-4705  
FAX: (423) 574-4745  
Meyerfw@ornl.gov,

Kenji Morita  
Dept. of Crystalline Mats. Science, School of Engineering  
Nagoya University  
Furo-Cho, Chikusa-Ku  
464-8603 Nagoya Japan  
Phone: 81-52-789-4686  
FAX: 81-52-789-5155  
k-morita@mail.nucl.nagoya-u.ac.jp,

V. A. Morozov  
Physics Division  
Oak Ridge National Laboratory  
P. O. Box 2008  
Oak Ridge, TN 37831-6377  
Phone: (423) 574-4783  
FAX: (423) 574-4745  
morozov@phy.ornl.gov,

Peter Nordlander  
Dept. of Physics, Rice Quantum Inst.  
Rice University  
6100 S. Main St., P.O. Box 1892  
Houston, TX 77251  
Phone: (713) 285-5171  
FAX: (713) 527-9033  
Nordlander@surf.rice.edu,

Toniis N. T. Nuver  
Debye Institute (AGF)  
Utrecht University  
Prin&etoonplein 5  
NL-3584 CC Utrecht  
The Netherlands  
Phone: 31-30-2533196  
FAX: 31-30-2537468  
t.t.nuver@phys.uu.nl,

Thomas M. Orlando  
W. R. Riley, Environmental Molecular Sciences Lab.  
Pacific NW National Laboratory  
P. O. Box 999, MSIN K8-88  
Richland, WA 99352  
Phone: (509) 376-9420  
FAX: (509) 376-6066  
tm_orlando@pnl.gov,

J. A. Perez  
Department of Physics  
University of Missouri - Rolla  
102 Physics Bldg.  
Rolla, MO 65409-0640  
Phone: 573-341-4707  
FAX: 573-341-4715  
jperez@umr.edu,

Rupert Pfandzelter  
Humboldt-Universität Berlin  
Institut für Physik  
Invalidenstraße 110  
D-10115 Berlin  
Germany  
Phone: 49(0)30 2093 7693  
FAX: 49(0)30 2093 7899  
pfandz@physik.hu-berlin.de,

Elmar Platzgummer  
Inst. für Allgemeine Physik  
Technische Universität Wien  
Wiedner Hauptstr. 8-10/134  
A-1040 Vienna  
Austria  
Phone: (+43 1) 588 01-13485  
FAX: (+43 1) 588 01-13499  
platzgummer@iap.tuwien.ac.at,

Martin Plihal  
Dept. of Physics & Astronomy  
Rutgers University  
136 Frelinghuysen Road, P.O. Box 849  
Piscataway, NJ 08855  
Phone: (732) 445-4603  
FAX: (732) 445-4433  
mpiilhal@physics.rutgers.edu,

J. Wayne Rabalais  
Department of Chemistry  
University of Houston  
Houston, TX 77204-5641  
Phone: (713) 743-2382  
FAX: (713) 743-2709  
rabalais@uh.edu,

Max Roesler  
Department: FD  
Hahn-Meitner-Institut Berlin  
Glienicker Str. 100  
D-14109 Berlin  
Germany  
Phone: 030-6457154  
FAX: 030-64091190  
max.roesler@gmx.de,

Philippe Roncin  
Lab. des Coll. Atomiques et Moleculaires  
Université de Paris Sud  
Bâtiment 351  
F-91405 Orsay, Cedex  
France  
Phone:  
FAX:  
gauyacq@lcam.u-psud.fr,

Marika Schleberger  
FB Physik  
Universität Osnabrück  
Barbarastrasse 7  
D-49069 Osnabrück  
Germany  
Phone: 541-969 2664  
FAX: 541-969 2670  
tiger@uos.de,

Dieter H. Schneider  
Mail Stop: L-414  
Lawrence Livermore Natl. Laboratory  
7000 East Ave.  
Livermore, CA 94550  
Phone: (925) 423-5940  
FAX: (925) 422-5940  
schneider2@llnl.gov,