

CNLM-1802-2

PURIFICATION OF ARGON, HELIUM
AND XENON

SEPTEMBER 16, 1959

A BIBLIOGRAPHY

COMPILED BY E. A. CERNAK

LEGAL NOTICE

This report was prepared as an account of Government sponsored work. Neither the United States, nor the Commission, nor any person acting on behalf of the Commission

A. Makes any warranty or representation, expressed or implied, with respect to the accuracy, completeness, or usefulness of the information contained in this report, or that the use of any information, apparatus, method, or process disclosed in this report may not infringe privately owned rights; or

B. Assumes any liability with respect to the use of, or for damages resulting from the use of any information, apparatus, method, or process disclosed in this report.

As used in the above, "person acting on behalf of the Commission" includes any employee or contractor of the Commission, or employee of such contractor, in the extent that such employee or contractor of the Commission, or employee of such contractor prepares, disseminates, or provides information in, any information pursuant to his employment or contract with the Commission, or his employment with such contractor.

THE LIBRARY
PRATT & WHITNEY AIRCRAFT DIVISION
CONNECTICUT OPERATIONS - CANEL
MIDDLETOWN, CONN.

741 01

Unclassified
Classification

R. P. Knapke
Authorized Classifier

9/21/57
Date

INTRODUCTION

This bibliography contains 145 references on the technology and apparatus used in the purification of argon, helium and xenon, and on the analysis for water, carbon monoxide, hydrogen, nitrogen, and oxygen, in the purification process. The references are arranged in four classifications: general, argon, helium, and xenon. Within each classification, the references are arranged in chronological order. The sources used in compiling this bibliography were:

1. Applied Science and Technology Index 1958 - July, 1959
2. Card Catalogue
3. Chemical Abstracts 1937 - August, 1959
4. Engineering Index 1950 - 1958
5. Industrial Arts Index 1945 - 1957
6. Nuclear Science Abstracts 1948 - August, 1959

CNLM-1802-2

TABLE OF CONTENTS

	Page
GENERAL REFERENCES	3
ARGON	11
HELIUM	15
XENON	17

GENERAL REFERENCES

1. Grosskopf, Karl
DETECTING IMPURITIES IN GASES. U.S. 862,859. Dec. 2, 1958.
C.A. 53:7856g.
2. Healy, P. W. ed.
QUARTERLY PROGRESS REPORT FOR MTR-ETR TECHNICAL BRANCHES, SECOND QUARTER,
1958. Sept. 8, 1958. p82. IDO-16481.
3. Korsh, M. P., and Martynova, V. M.
CATALYTIC PURIFICATION OF A MIXTURE OF INERT GASES WITH OXYGEN. U.S.S.R.
112,945. Aug. 15, 1958. C.A. 53:2558b.
4. Popelyshko, I. F.
FILTER FOR PURIFICATION OF LIQUIDS AND GASES. U.S.S.R. 110,134. June 25,
1958. C.A. 52:12470h.
5. Becker, Erwin, W. A.
SEPARATION OF GASES. Brit. 794,834. May 14, 1958. C.A. 52:16813e.
6. Schedling, J. and Maas, F. J.
ELECTROSTATIC PURIFICATION OF GAS. (To Societe Financiere D'Expansion
Commerciale et Industriale Sa. "Sfindex.") Israeli. 10,201. Mar. 13,
1958. C.A. 52:8645h.
7. Moore, A. S. and Katell, S.
NEW AGITATOR ABSORBER FOR CO₂. Pet Refiner 37, no. 3, 163-8. Mar. 1958.
8. Beaver, C. E.
AUTOMATION PROVIDES KEY TO MORE EFFICIENT GAS CLEANING. Blast F. And Steel
Fl. 46, no. 3, 318-20. Mar. 1958.
9. Gnauck, G.
THE PREPARATION OF PURE INERT GASES BY USING LOW TEMPERATURES. Kaltetech.
Suppl. to Technik (Berlin.) 13: 57-60. (1958) C.A. 52:9534c.

10. Bochkova, O. P., Razumovskaya, L. P., and Frish, S. E.
A SIMPLIFIED METHOD OF SPECTRAL ANALYSIS OF INERT GASES FOR PURITY
Translated by L. Bovey from Optika i Spektroskopiya 5, no. 93, 5 (1958.)
AERE-Trans-11/3/5/1165. N.S.A. 13:10870.
11. Mallowney, J. F.
WHICH CO₂ REMOVAL SCHEME IS BEST? Diags. Pat. Refiner 36: 149-52. Dec. 57.
12. Kleinschmidt, R. V.
PRINCIPLES OF GAS CLEANING. ASME-Paper no. 57 - A-270 for meeting Dec. 1-6
1957. 6p.
13. Updegraff, N. C.
GAS PURIFICATION FOR LOW TEMPERATURE PROCESSING. Chem. Eng. Progress 53,
no. 6, 268-71. June 1957.
14. Bairstow, R.
OPERATION OF TOWER BOX PURIFIERS. Gas J 290, no. 4894, 243, 246-9, Disc.
249-51. May 1, 1957.
15. CHEMICAL ENGINEERING DIVISION SUMMARY REPORT JANUARY, FEBRUARY, AND MARCH 1956.
May 2, 1956. Decl. Feb. 12, 1957. 139p. ANL-5560. N.S.A. 11:7408.
16. Cernak, Vladimir
ANALYSIS OF RARE GASES BY MASS SPECTROMETER. Chem. Průmysl 7: 8-11. (1957)
C.A. 51:13651i.
17. Toroches-Nikov, N. S., et al.
ADVANCES IN THE PURIFICATION OF INERT GASES. Brit. Chem. Eng. 2: 424-5.
(1957) Trans from Khim. Průmysl. 4: 32-8. (1956) C.A. 52:3420a.
18. Florenskii, R. P.
APPARATUS FOR MICROANALYSIS OF INERT GASES. (V. I. Vernodskii Inst. Geo-
chem. and Anal. Chem., Acad. Sci. U.S.S.R., Moscow.) Zhur. Anal. Chem. 12:
332-7. (1957) C.A. 52:1692d.
19. Vonnegut, Bernard
HALOGEN VAPOR DETECTOR. (To G. E. Co.) U.S. 774,652. Dec. 18, 1956.
C.A. 51:3376a.

20. Babakov, V. M.
FOAMER FOR PURIFICATION OF GASES. U.S.S.R. 102,778. May 25, 1956
C.A. 52:4258h.
21. Moore, D. B.
RECENT DEVELOPMENTS IN GAS PURIFICATION. Gas World 143, no. 3726, 153-5.
Jan. 14, 1956. Disc. 55-6p. see also Gas J. 285, no. 4834, 4835. Jan. 25,
1956. 218-20, p225. Feb. 1, 1956. p285.
22. Stairmand, C. J.
DESIGN AND PERFORMANCE OF MODERN GAS CLEANING EQUIPMENT. Inst. Fuel - J 29,
no. 181. Feb. 1956. p58-76. Disc. p76-81.
23. D'Amiens, J.
L'EPURATION CHIMIQUE DU GAZ A LA STATION DE COMPRESSION DE NEUVES - MAISON.
J. Usines a Gaz 50, no. 1, 7-10. Jan. 1956.
24. Silverman, Louis., and Bradshaw, Wanda
DETERMINATION OF SMALL QUANTITIES OF HYDROGEN IN THE INERT GASES. (Atomica
Intern., Canoga Park, Calif.) Anal. Chim. Acta. 15: 31-42. (1956)
(In English) C.A. 51:135f.
25. Reynolds, J. H.
HIGH-SENSITIVITY MASS SPECTROMETER FOR NOBLE GAS ANALYSIS. (Univ. of Calif.)
Berkeley. Rev. Sci. Instr. 27: 928-34. (1956) C.A. 51:17262e.
26. Gibbs, D. S., Svec, H. J., and Harrington, R. E.
PURIFICATION OF THE RARE GASES. (Iowa State Coll., Ames.) Ind. Eng. Chem.
48: 289-96. (1956) C.A. 50:89781.
27. Turkel'Taub, N. M. et al.
CHROMATOGRAPHIC METHOD FOR SEPARATION OF HYDROGEN OF CARBON MONOXIDE, METHANE,
AND A MIXTURE OF RARE GASES. Zhur. Anal. Khim. 11: 159-66. (1956)
C.A. 50:144461.
28. Servigne, Marcel., De Montgareuil, Pierre, Guerin, and Domine, Daniel
ANALYSIS OF TRACE IMPURITIES IN RARE GASES BY OPTICAL EXCITATION OF ULTRA -
HIGH FREQUENCY. Compt. Rend. 242: 2827-30. (1956) C.A. 50:153431.
29. Kohl, A. L. and Riesenfeld, F. C.
GAS CONDITIONING TODAY. Refiner 34, no. 11, Nov. 1955. p209-13. 35,
no. 2. Feb. 1956. pl33-4.

30. Heinrich, D. O.
DI¹¹ ELEKTRISCHE GASREINIGUNG. Brennstoff Waerme Kraft 7, no. 9. Sept. 1955.
p389-94.
31. Colichman, Eugene L., ed.
GENERAL CHEMISTRY QUARTERLY PROGRESS REPORT FOR JULY-SEPTEMBER 1954. June 1,
1955. Decl. Dec. 5, 1955. p51. NAA-SR-1205. N.S.A. 10:2258.
32. Colichman, Eugene L., and Motta, E. E., eds.
GENERAL CHEMISTRY QUARTERLY PROGRESS REPORT FOR APRIL-JUNE 1955. March 15,
1956. Decl. Feb. 27, 1957. p22. NAA-SR-1476. N.S.A. 11:7429.
33. Martin, A. B. ed., Section A. and Cochran, J. C. ed., Section B.
SODIUM GRAPHITE REACTOR QUARTERLY PROGRESS REPORT FOR JULY-SEPTEMBER 1955.
Mar. 15, 1956. Decl. Apr. 8, 1957. p141. NAA-SR-1513. N.S.A. 11:13969.
34. Pekowitz, Leonard, P.
CONTINUOUS DETECTION AND MEASUREMENT OF LOW CONCENTRATIONS OF OXYGEN IN GASES.
Anal. Chem. 27: 245-8. (1955) Feb. N.S.A. 9:2636.
35. Kristensen, H.
EPURATION ET PURIFICATION DES GAZ PAR LES ÉTHANOLAM ES. Chimie et Industrie
73, no. 1. Jan. 1955. p69-77.
36. Adwentowski, K., and Zielinski, E.
SOURCES OF INERT GASES IN POLAND. 1. (Katedrze Chem. Ogo'lnej Akad. Gorniczo-
Hutniczej, Krakow, Poland.) Przemysl Chem. 11: 502-7. (1955) C.A. 52:11369a.
37. Sharvin, Yu. V., Andrianov, V. P., and Sharova, E. A.
APPARATUS FOR DETERMINATION OF SMALL CONCENTRATIONS OF OXYGEN IN GASES.
Zavodskaya Lab. 21: 853-5. (1955) C.A. 50:3805g.
38. Silverman, Louis., and Bradshaw, Wanda
DETERMINATION OF OXYGEN IN CERTAIN GASES: IMPROVED WINKLER METHOD. (N. Am.
Aviation, Inc., Downey, Calif.) Anal. Chim. Acta 12: 526-41. (1955)
(In English) C.A. 50:9226d.
39. Embshoff, A. C.
GAS PURIFICATION AND WATER TREATMENT IN THE GAS INDUSTRY. Infilco, Inc. illus.
American Gas Association Proceedings: 1955, p777-80.

40. Gibbs, D. S., Svec, H. J., and Harrington, R. E.
PURIFICATION OF THE RARE GASES. 1. A COMPARISON OF ACTIVE METALS IN THE
PURIFICATION OF RARE GASES. Dec. 30, 1954. p47. I.S.C.-560.
N.S.A. 9:3282.
41. Jones, H. N.
ARC MELTING OF REFRACTORY METALS. A REVIEW OF PROGRESS FROM OCTOBER 10,
1954 TO APRIL 4, 1955. July 27, 1955. p16. RDB(C) /TN-133.
42. Martin, A. B. ed., Section A., Inman, Guy, M. ed., Section B.
SODIUM GRAPHITE REACTOR. QUARTERLY PROGRESS REPORT OCTOBER-DECEMBER
1954. May 15, 1955. Decl. Feb. 28, 1957. p133. NAA-SR-1292.
N.S.A. 11:7847.
43. Varga, G.
ELEKTROSZTATIKUS SZUERIEK GAZTISIZTITAL CELJARA. Magyar Technika 9,
no. 8. Aug. 1954. p433-9.
44. Ireland, J. L.
DIVIDED FLOW PURIFICATION. Gas J. 278, no. 4740. Apr. 7, 1954. p56-7.
45. REMOVING OXYGEN FROM GASEOUS MIXTURES
Indian Oxygen and Acetylene Co. Ltd., Indian 49: 552. Feb. 24, 1954.
C.A. 48:7285c.
46. PURIFICATION OF GASES OR GAS MIXTURES
Indian Oxygen and Acetylene Co. Ltd., Indian 49: 138. Jan. 2, 1954.
C.A. 48:7285d.
47. Riesz, R. and Dieke, G. H.
THE ANALYSIS AND PURIFICATION OF RARE GASES BY MEANS OF ELECTRIC DISCHARGES.
(John Hopkins Univ., Baltimore, Mi.) J. Appl. Phys. 25: 196-201. (1954)
C.A. 48:57271.
48. Dombrowski, H. S.
DETERMINATION OF THE NITROGEN CONTENT OF NOBLE GASES. ABSORPTION IN
TITANIUM METAL. (E. I. du Pont de Nemours and Co., Newport, Del.) Anal.
Chem. 26, no. 3, 526-8. (1954) C.A. 48:6318d.
49. Takao, Zenichiro, et al.
PURIFICATION OF INERT GASES. (To Kobe Steel Manufacturing Co.) Japan
6169. ('53) Nov. 30. C.A. 48:11124c.

50. Whiting, R.
CASE FOR DEEP PURIFIER. Gas World 137, no. 3594. June 23, 1953. p1784-7;
see also Gas J. 275, no. 4702. July 15, 1953. p153-6; Disc. p156-8.
51. Seitz, O. Rudolph
APPARATUS FOR CONTINUOUS DETERMINATION OF IMPURITIES IN A GAS STREAM. (To
Air Reduction Co., Inc.) U.S. 2,640,870. June 2, 1953. C.A. 47:78381.
52. Schnitzler, H.
ANWENDUNG VON SCHALL UND ULTRASCHALL BEI DER GASREINIGUNG. Archiv fuer
Eisenhuettenwesen 24, no. 5-6. May-June, 1953. p199-202.
53. Bowman, Robert, E., and Hartley, Charles, B.
DETERMINATION OF HYDROGEN AND OXYGEN IN INERT GASES. May 1, 1953. p22.
WADC-TR-53-67. N.S.A. 7:5305.
54. Mooney, Ronald, B.
PURIFICATION OF INERT GASES. (To Imperial Chemical Industries Ltd.) Brit.
690,198. April 15, 1953. C.A. 47:127751.
55. Manning, D. L. and White, J. C.
THE DETERMINATION OF TRACES OF HYDROGEN FLUORIDE IN INERT GASES. Oak Ridge,
Tenn. ORNL-1538. April 10, 1953.
56. Dokoupil, Z., et al.
A METHOD FOR REMOVING HYDROGEN FROM INERT GASES. (Kamerlingh Onnes Lab.,
Leiden, Neth.) Appl. Sci. Research A4: 57-60. (1953) C.A. 48:4364h.
57. Werner, R.
DIE ELEKTROSTATISCHE GASREINIGUNG. Zeit des Oesterreichischen Ingenieur-
u Architekten-Vereines 97, no. 19-20. Oct. 3, 1952. p169-72.
58. British Oxygen Co., Ltd. and Powell, Herbert, M.
PURIFICATION OF THE RARE GASES. Brit 678,312. Sept. 3, 1952 and Brit
678,313. C.A. 47:3532b.
59. PURIFICATION OF THE RARE GASES.
British Oxygen Co. Ltd. (Herbert M. Powell, Inventor.) Ger 843,252.
July 7, 1952. C.A. 49:26881.

60. Garsid, J. E. and Roberts, A. L.
THEORY OF FLUIDIZATION AND ITS APPLICATION TO GAS PURIFICATION. Diags.
J. Applied Chemistry 2, (sup. no. 1) p39-47. 1952.
61. Riesz, R. P., and Dieke, G. H.
THE ANALYSIS AND PURIFICATION OF RARE GASES BY MEANS OF ELECTRIC DISCHARGES.
(1952) p20. (NP-4976) N.S.A. 8:747.
62. Harrison, E. R.
A SIMPLE METHOD OF PURIFYING HYDROGEN, NITROGEN, AND THE INERT GASES.
(At. Energy Research Establishment, Harwell, Berks, Engl.) J. Sci. Inst. 29:
295. (1952) C.A. 47:3529g.
63. Williams, D. D., Blachly, C. H. and Meller, R. R.
DETERMINATION OF TRACES OF OXYGEN IN GASES. (Naval Research Lab., Washington,
D. C.) Anal. Chem. 24: 1819-21. (1952) C.A. 47:2085f.
64. TRAY PURIFIERS.
Gas. J. 268, no. 4615. Nov. 14, 1951. p420.
65. CATALYTIC GAS PURIFICATION; DEAXO PROCESS.
Diags. Metallurgia 44: 196-7. Oct. 1951; Engineering 172: 428. Oct. 5,
1951. Engineer 192: 632. Nov. 16, 1951.
66. Kubo, Yukimasa
APPARATUS FOR PURIFICATION OF INERT GASES. (To Mitsubishi Electro-Engineering
Co.) Japan 4918. ('51) Aug. 31. C.A. 47:3532a.
67. Haurin, W.
ZUR FRAGE DER HOCHDRUCK-GAS-TROCK-ENREINIGUNG. Gas-u Wasserfach 92.
no. 9. May 15, 1951. p102-10.
68. Blohm, C. L. and Chapin, W. F.
PURIFICATION AND DEHYDRATION OF GASES. Bibliog. Flow Diags. World Oil
130: 253-64. June 1950.
69. DRY PURIFICATION RESEARCH.
Gas Age 105: 102. Apr. 27, 1950. Bibliog.
70. Roberts, L. E. J., and Davidge, P. C.
A SIMPLE TECHNIQUE FOR SEMI-MICRO GAS ANALYSIS. Jan. 1950. p12. AERE-
C/R-470. N.S.A. 4:2638.

71. Bowman, R. E., and Hartley, C. B.
DETERMINATION OF IMPURITIES IN INERT GASES. (Air Material Command, U.S.A.F., Dayton, Ohio) Welding J. (N.Y.) 29: 258-62s. (1950) C.A. 44:9297c.
72. REACTOR PHYSICS, SECTION II., PROGRESS REPORT NO. 39.
October 1-31, 1949. Nov. 30, 1949. Decl. Jan. 10, 1956. p36.
AECD-4025. N.S.A. 10:5358.
73. Newton, Amos, S.
THE USE OF URANIUM AND URANIUM COMPOUNDS IN PURIFYING GASES. p10. AECD-2135: n. d., Decl. July 20, 1948. N.S.A. 1:620.
74. Hibbs, R. F.
MASS SPECTROMETRIC EXAMINATION OF RARE GAS SPECTRA. July 6, 1948. p9.
AECU-37 (Y-193) N.S.A. 2:503.
75. Brady, L. J.
DETERMINATION OF SMALL AMOUNTS OF OXYGEN IN GASES. Anal. Chem. 20: 1033-7. (1948) C.A. 43:1286b.
76. Hall, T. A., and Haselden, G. G.
PURIFICATION OF GASES IN LOW TEMPERATURE PROCESSES, ABSTRACT. Chemical Age (London) 57: 755. Dec. 13, 1947.
77. GAS PURIFIER, DEOXO PURI-DRYER.
II. Chemical Industries 61: 282. Aug. 1947.
78. Van Nuys, Claude, C.
SEPARATION OF THE CONSTITUENTS OF GASEOUS MIXTURES. (To Air Reduction Co., Inc.) U. S. 2, 471,279. Mar. 11, 1947. C.A. 41:3591h.
79. Berghaus, Bernhard, and Burkhardt, Wilhelm.
PURIFYING "NOBLE GASES" SUCH AS Ar. U.S. 2, 342,784. Feb. 29, 1944.
C.A. 38:4762.
80. Peters, Kurt
ADSORPTION AND DESORPTION. Reichsamt Wirtschaftsausbau. Prof-Nr. 43:
(PB 52003) 113-20. (1940) C.A. 41:6105g.
81. Krauss, Alwin
PURIFYING RARE OR NOBLE GASES SUCH AS THOSE OF THE ARGON GROUP. (To I. G. Farbenind. A.-G.) U.S. 2, 204,501. June 11, 1939. C.A. 34:7076.

82. RARE GASES.
Farben Industrie, A.-G. Brit 503,533. Apr. 11, 1939. C.A. 33:7505.
83. Kable, H.
ANALYSIS OF INERT GASES. p301-5 (in) "QUALITATIVE ANALYSIS-GENERAL REVIEW"
H. Grubitsch. FIAT Rev. German Sci. 1939-1946. C.A. 46:4416f.
84. RARE GASES
I. G. Farbenind. A.-G. (Alwin Krauss, Inventor.) Ger 658,540. Apr. 5,
1938. C.A. 32:6408.

ARGON

85. PURIFICATION OF ARGON.
British Oxygen Co. Ltd. (John W. Armond, Inventor.) Brit. 809,168.
Feb. 18, 1959. C.A. 53:11781c.
86. Wolcott, Dennis
ARGON PURIFICATION (To Air Reduction Co., Inc.) U.S. 874,030.
Feb. 17, 1959. C.A. 53:12610c.
87. Fedorko, Geo.
ARGON FROM AIR. (To Air Products, Inc.) Brit. 793,336. Apr. 16, 1958.
C.A. 52:20951a.
88. Pascard, R. and Fabre, R.
REGULATION DE PRESSION DANS LES BOITES AGANTS, PURIFICATION D'ARGON.
Mar. 1958. pl2. CEA-810. N.S.A. 13:8824.
89. Jones, Robert, A., and Milton, Robert, M.
PURIFICATION OF ARGON. (To Union Carbide Corp.) U.S. 810,454. Oct. 22,
1957. C.A. 52:2474f.

90. Sardarov, S. S.
NOVYI REAKTOR DLYA VYDELENIYA I ECHISTKI RADIOGENNOGO ARGONA. Akademiya Nauk S.S.S.R. Izvestiya. Seriya Geofizicheskaya 22, no. 4, 108-12. Apr. 1957.
91. Zielinski, E.
SEPARATION OF HELIUM-NEON-NITROGEN MIXTURES BY A COMBINATION ADSORPTION AND DESORPTION METHOD. (Acad. Górniczo-Hutnicza, Krakow.) Przemysl Chem. 13: 642-6. (1957) (English Summary) C.A. 52:6860a.
92. Kazarnovskaya, L. I., Dykhno, N. M., and Narinski^u, G. B.
APPARATUS FOR ANALYSIS OF MIXTURES OF OXYGEN, NITROGEN, AND ARGON. Zavodskaya Lab. 23: 1387-8. (1957) C.A. 53:5765e.
93. Gittsevich, G. A.
EXPERIENCE IN THE PRODUCTION AND PURIFICATION OF ARGON. Kislород 10, no. 4, 29-38. (1957) C.A. 53:5605f.
94. Dykhno, N. M., Chernyshev, B. A., and Slin'ko, M. G.
PURIFICATION OF ARGON FROM OXYGEN BY CATALYTIC HYDROGENATION. Kislород 10, no. 4, 14-24. (1957) C.A. 53:5605h.
95. Masuda, Nobuo, Nakamura, Seinin, and Isoya, Nobeharu
APPARATUS FOR PURIFICATION OF ARGON. (To Tokai Ammonium Sulfate Industries, Ltd.,) Japan 7262 ('56) Aug. 24, 1956. C.A. 52:19045i.
96. Matsuda, Nobuo
ARGON CONTAINING KRYPTON AND XENON. (To Tokai Ammonium Sulfate Industries, Ltd.,) Japan 7262 ('56) Aug. 24, 1956. C.A. 52:19045i.
97. PURIFYING ARGON.
Adolf Messer, G. m. b. H. (Friedrich Taubenberger, Inventor) Ger. 945,751. July 19, 1956. C.A. 52:20951b.
98. ARGON PURIFICATION.
Adolf Messer, G. m. b. H. (Rolf Grotewold, Inventor) Ger. 930,033. Mar. 8, 1956. C.A. 52:13208b.
99. Ishida, Ryohai
GAS ANALYSIS BY MEANS OF LOW PRESSURE ELECTRODELESS DISCHARGE-ANALYSIS OF IMPURITIES IN ARGON GAS. (Govt. Chem. Ind. Research Inst., Tokyo) Repts. Govt. Chem. Ind. Research Inst. Tokyo 51: 343-4. (1956) C.A. 51:2481.

100. Dianov-Klokov, V. I.
SPECTROSCOPIC DETERMINATIONS OF SMALL AMOUNT OF NITROGEN IN GASEOUS ARGON.
Zavodskaya Lab. 22: 444-7. (1956) C.A. 51:3199c.
101. Houston, Reagan., Latimer, Robert E.
CONTINUOUS ANALYSIS OF ARGON FOR TRACES OF NITROGEN. (Linde Air Products
Co., Tonawanda, N.Y.) I.S.A. Journal 3: 490-1. (1956) C.A. 51:3583i.
102. Biddle, W. F., and Sheldon, J.
A PORTABLE ARGON PURITY INDICATOR. Aug. 6, 1954. p10. AERE - W/1-78.
N.S.A. 9:3776.
103. Makita, Masayuki
AN APPARATUS FOR MANUFACTURING PURE ARGON ATTACHED TO AN APPARATUS FOR
PREPARATION OF OXYGEN AND NITROGEN. Japan. 3317 ('54) June 9.
C.A. 49:5898f.
104. Suwa, Tasuke
REFINING ARGON (To Showa Electro-Industries Co.) Japan 2829. ('54)
May 24, 1954. C.A. 49:5792e.
105. Masuda, Nobuo
REFINING ARGON. (To Tokai Ammonium Sulfate Industries Co.) Japan 2830
('54) May 24, 1954. C.A. 49:5792f.
106. Ita, Tadao
PURIFICATION OF ARGON. (To Nippon Electrical Metallurgy Co.) Japan 2071.
(1954) April 19, 1954. C.A. 49:2689a.
107. PURIFICATION OF HELIUM - GROUP GASES.
Telefunken Gesellschaft Fur Drahtlose Telegraphie m. b. h. (Alfred
Widmann and Heinz Breuer, Inventors.) Ger. 752,433. Nov. 4, 1952.
C.A. 52:2474e.
108. PREPARATION OF ARGON SUITABLE FOR LIGHT BULBS.
Gesellschaft Fur Linde's Esmaschinen A.-G. (Johannes Wuclerer, Inventor.)
Ger. 844, 017. July 14, 1952. C.A. 52:77901.
109. Rodgers, John W., Stephens, Edgar, J. and Imperial Chemical Industries Ltd.
PURIFICATION OF ARGON. Brit. 644,120. Jan. 2, 1952. C.A. 46:5278f.

110. Haynes, Pierre, E.
SEPARATION OF ARGON FROM AIR. (To Koppers Co., Inc.) U.S. 2,545,462.
Mar. 20, 1951. C.A. 45:6812a.
111. Axon, J. B., Pearce, M. and Ruhrmann, M.
PRODUCTION OF TECHNICAL ARGON. Indus. Chemist 26, no. 304. May 1950.
p205-8.
112. Gerling, E. K. and Baranovskaya, N. V.
QUANTITATIVE SEPARATION OF ARGON FROM SMALL QUANTITIES OF KRYPTON AND XENON
BY MULTIPLE ADSORPTION AND DESORPTION. I. Zhur. Anal. Khim. 5: 131-8.
1950.
113. Mallett, M. W.
PURIFICATION OF ARGON. (Battelle Memorial Inst., Columbus, Ohio.)
Ind. Eng. Chem. 42: 2095-6. (1950) C.A. 45:1309h.
114. Manfils, A. and Rosen, B.
SPECTROSCOPIC DETERMINATION OF TRACES OF NITROGEN IN ARGON. (Univ. Liege,
Belg.) Rev. Universelle Unives 6: 79-81. (1950) C.A. 44:5264i.
115. Klema, Ernest, D.
CONTINUOUS PURIFICATION OF HYDROGEN AND ARGON-HYDROGEN GAS MIXTURES.
Jan. 5, 1954. Decl. July 19, 1948. 13p/ AECD-2157 (LADC-234) N.S.A.
1:757.
116. Strishevskii, I. I.
METHODS OF ARGON ANALYSIS. Kislorod 4, no. 6, 33-43. (1947) C.A. 46:7469i.
117. Maveri, Dino
NATIONAL (ITALIAN) PRODUCTION OF ARGON. Chimica e industria (Italy) 22:
457-63. (1940) C.A. 35:1585.
118. Krause, Alvin
PURIFYING RARE OR NOBLE GASES SUCH AS THOSE OF THE ARGON GROUP. (To I. G.
Farbenind. A.-G.) U.S. 2,204,501. June 11, 1939. C.A. 37:7076.²
119. Hoffmann, E.
DETERMINATION OF SMALL QUANTITIES OF OXYGEN IN ARGON DOWN TO 0.002% BY
VOLUME. Mikrochemie 25: 82-4. (1938) C.A. 33:1625.⁹

120. Kroll, W.
 ARGON. Metallwirtschaft 17: 463-5. (1938) C.A. 32:6013.⁴

HELIUM

121. Marsh, W. R.
 THE DETERMINATION OF OXYGEN AND HYDROGEN IN HELIUM. Mar. 1959. p16.
 AERE-C/M-377. N.S.A. 13:12425.
122. Wilkins, M. and Wilson, J. D.
 THE MEASUREMENT OF IMPURITIES IN HELIUM. PART I: THE KATHAROMETER AS A
 CONTINUOUS ANALYZER FOR TOTAL IMPURITIES. Feb. 1959. p24. AERE-C/R-
 2808. N.S.A. 13:13211.
123. Gorfinkel, B. I., and Arkhipov, Yu. A.
 DETERMINATION OF IMPURITIES IN HELIUM. U.S.S.R. 799. Nov. 29, 1958.
 C.A. 53:7856g.
124. West, David, L.
 DETERMINATION OF DEUTERIUM, OXYGEN AND NITROGEN IN HELIUM BY GAS CHROMATO-
 GRAPHY. p101-4 (in) "ANALYTICAL CHEMISTRY IN NUCLEAR REACTOR TECHNOLOGY.
 PART I. SPECIFIC APPLICATIONS OF DIVERSE METHODS OF CHEMICAL ANALYSIS."
 Second Conference, Gatlinburg, Tenn. Sept. 29, -Oct. 1, 1958. TID-75,
 68. (Pt. 1) (p101-4) N.S.A. 13:12455.
125. HELIUM SEPARATION AND PURIFICATION.
J. Franklin Inst. 266: 80-1. Jul. 1958.
126. HELIUM SEPARATION AND PURIFICATION BY DIFFUSION.
Bell Lab. Rec. 36: 262-3. Jul. 1958.
127. HELIUM SEPARATION AND PURIFICATION NEW DIFFUSION TECHNIQUE.
Chem. and Ind. p733. June 21, 1958.

128. Vasil'ev, D. I.
A LABORATORY APPARATUS FOR PURITY TESTING OF A HELIUM FLOW. Translated by J. B. Sykes from Prihory i Tekh. Ekspt. no. 4, p107. (1958) p3.
AERE-Trans 11/3/5/1181. N.S.A. 13:11106.
129. Zielinski, E.
SEPARATION OF HELIUM-NEON-NITROGEN MIXTURES BY A COMBINATION ADSORPTION AND DESORPTION METHOD. (Acad. Górniczo-Hutnicza, Krakow.) Przemysl Chem. 13: 642-6. (1957) (English Summary) C.A. 52:6860a.
130. Bradshaw, W. and Tarpinian, M.
EFFICIENCY OF NAK BUBBLERS IN REDUCING THE OXYGEN CONTAMINATION OF HELIUM. June 3, 1955. p28. NAA-SR-MEMO-1389. N.S.A. 12:11340.
131. Vasil'eva, M. Ya., and Tsyg, Ankova, I. I.
THE INFLUENCE OF SMALL ADDITIONS OF NITROGEN AND OXYGEN ON CURRENT STRENGTH IN CONTINUOUS ELECTRICAL DISCHARGE AND THE DETERMINATION OF THE PER CENT COMPOSITION OF NITROGEN IN ARGON. Vestnik Moskov. Univ. 10, no. 12. Ser. Fiz - Mat. i Estest Ven. Nauk No. 8, 81-6. (1955) C.A. 50:9940e.
132. Moyer, James, W. and Ruggles, William, A.
OPTICAL METHOD FOR MEASUREMENT OF SMALL AMOUNTS OF OXYGEN IN A HELIUM ATMOSPHERE. (K.A.P.L. Schenectady, N. Y.) J. Opt. Soc. Amer. 44: 86-7. (1954) C.A. 48:3847f.
133. PURIFICATION OF HELIUM-GROUP GASES.
Telefunken Gesellschaft Fur Drahtlose Telegraphic m. b. h. (Alfred Widmann and Heinz Breuer, Inventors.) Ger. 752,433. Nov. 4, 1952. C.A. 52:2474e.
134. Reddan, M. J. and Rouse, G. F.
CLEAN-UP HELIUM GAS IN AN ARC DISCHARGE. Bibliog. Il. Diags. Electrical Engineering 71: 159-64. Feb. 1952.
135. Mays, W. A.
IMPROVEMENT OF INERT-GAS WELDING BY USING HIGH-PURITY HELIUM. Il. Welding Journal 30: sup. 602-6. Dec. 1951.
136. Mattraw, H. C.
THE DETERMINATION OF TRACE AMOUNTS OF HYDROGEN IN HELIUM. Jan. 31, 1951. Decl. Dec. 6, 1955. p22. KAPL-472. N.S.A. 10:6128.

137. Moyer, James W. and Ruggles, Wm. A.
AN OPTICAL METHOD FOR MEASUREMENT OF SMALL AMOUNTS OF OXYGEN IN A HELIUM
ATMOSPHERE. (nd) p15. KAPL-519. N.S.A. 5:4883.
138. Mays, W. A.
HIGH-PURITY HELIUM FOR WELDING. Metal Progress 54: 848. Dec. 1948.
139. Mays, W. A.
HIGH-PURITY HELIUM SAVES MONEY ON ALUMINUM WELDS. Welding Journal 27:
609. Aug. 1948.
140. Hausen, H.
"HELIUM PURIFICATION OF THE ZEPPELIN SHIPPING INTERESTS IN FRANKFORT A. M."
Chem. Fabrik: (1938) p239-40. C.A. 32:6107.2

XENON

141. Steiner, M. and Manowitz, B.
RECOVERY OF FISSION PRODUCT NOBLE GASES; KEROSENE-BASE SOLVENTS ARE SUITABLE
FOR USE IN A CONTINUOUS ABSORPTION-STRIPPING PROCESS FOR THE SEPARATION
RECOVERY OF XENON AND KRYPTON. Bibliog. Diags. Ind. and Eng. Chem. 51:
47-50. Jan. 1959.
142. Petukuhov, S. S., Vagen, E. V., and Zhurhovitskii, A. A.
KRYPTON AND XENON. U.S.S.R. 110,873. June 25, 1958. C.A. 52:12472d.
143. Pastovskii, V. G., Rovinskii, A. I., Petrovskii, Yov.
PREPARATION OF PURE XENON. Zhur. Priklad. Khim. 31: 5-13. 1958. C.A.
52:9534d.
144. Zielinski, E.
SEPARATION OF HELIUM-NEON-NITROGEN MIXTURES BY A COMBINATION ADSORPTION
AND DESORPTION METHOD. (Acad. Górniczo-Hutnicza, Krakow.) Przemysl Chem.
13: 642-6. (1957) (English Summary) C.A. 52:6860a.

145. Matsuda, Nobuo
ARGON CONTAINING KRYPTON AND XENON. (To Tokai Ammonium Sulfate Industries, Ltd.,) Japan 7262 ('56) Aug. 24, 1956. C.A. 52:190451.
146. Hnilicka, Miloslav, P.
KRYPTON AND XENON. (To Carthage Hydrocol, Inc.) U.S. 2,698,523. Jan. 4, 1955. C.A. 49:5898f.
147. PURIFICATION OF HELIUM-GROUP CASES.
Telefunken Gesellschaft Fur Drahtlose Telegraphic m. b. h. (Alfred Widmann and Heinz Breuer, Inventors.) Ger. 752,433. Nov. 4, 1952. C.A. 52:2474e.
148. RECOVERING KRYPTON OR KRYPTON AND XENON, FROM RESIDUAL GASES.
Directie van de Staatsmijnen in Limbur. Brit. 664,838. Jan. 16, 1952. C.A. 46:4754a.
149. Zeides, H., and Brosi, A. R.
DECONTAMINATION OF XENON FROM RADON. Oak Ridge, Tenn. ORNL-793. Aug. 14, 1950.
150. Gerling, E. K. and Baranovskaya, N. V.
QUANTITATIVE SEPARATION OF ARGON FROM SMALL QUANTITIES OF KRYPTON AND XENON BY MULTIPLE ADSORPTION AND DESORPTION. I. Zhur. Anal. Khim. 5: 131-8. (1950) C.A. 44:6230b.
151. Eps⁺ein, S.
KRYPTON AND XENON ARISING FROM FISSION. Proceedings Of The Conference On Nuclear Chemistry: Chemical Institute of Canada. p108-116. 1947. N.S.A. 1:115.
152. Pastovskii, V. G.
INDUSTRIAL METHODS FOR PRODUCTION OF KRYPTON AND XENON AND THEIR APPLICATION. Trans. from Kislorod 4: 5-14. (1947) p34. AEC-TR-2991. N.S.A. 11:11263.

END