

[54] METHOD OF SEPARATING ISOTOPES FROM GASEOUS MIXTURES

794834 5/1958 United Kingdom 55/17

[75] Inventors: Karl Janner, Erlangen; Klaus Gregorius, Neunkirchen a. Brand; Hans-Joachim Niemann, Erlangen; Arno Kersting, Erlangen; Eberhard Schuster, Erlangen, all of Fed. Rep. of Germany

[73] Assignee: Kraftwerk Union Aktiengesellschaft, Mulheim, Fed. Rep. of Germany

[21] Appl. No.: 55,917

[22] Filed: Jul. 9, 1979

Related U.S. Application Data

[63] Continuation of Ser. No. 862,504, Dec. 20, 1977, abandoned.

[30] Foreign Application Priority Data

Dec. 30, 1976 [DE] Fed. Rep. of Germany 2659590

[51] Int. Cl.³ B01D 59/00; B01D 59/02

[52] U.S. Cl. 423/3; 204/157.1 R

[58] Field of Search 423/3; 204/157.1 R

[56] References Cited

U.S. PATENT DOCUMENTS

3,465,500	9/1969	Fenn	55/17
3,559,373	2/1971	Garrett	55/15 X
3,626,665	12/1971	Fenn et al.	55/17
3,788,038	1/1974	Zahner	55/17 X
4,025,790	5/1977	Jetter et al.	250/423 P X
4,031,397	6/1977	Cardillo	250/423 P
4,032,306	6/1977	Lee	55/17
4,179,272	12/1979	Kivel	204/157.1 R X

FOREIGN PATENT DOCUMENTS

690681	7/1964	Canada	204/157.1 R
1959767	6/1971	Fed. Rep. of Germany	204/11DIG..
1258461	3/1961	France	55/17

OTHER PUBLICATIONS

Gochelashvili, K. S. et al., "Methods for Selective Heterogeneous Separation of Vibrationally Excited Molecules", *Sov. Phys.-JETP*, 43(2): 274-277, Feb. 1976.

Gochelashvili, K. S. et al., "Selective Heterogeneous Separation of Vibrationally Excited Molecules", *JETP Lett.*, 21(11): 302-303, Jun. 1975.

Anderson, J. B. et al., "Isotope Separation in a Seeded Beam", *Science*, 187: 642-644, 1975.

Robinson, C. P. et al., "Some Developments in Laser Isotope Separation Research at Los Alamos", DOE Report #LA-UR-76-191, 2/1976.

Butler, J. F., "Pb-Salt Tunable Diode Lasers", Proc. 1st Euro. Electro-Optics Markets and Tech. Conf., pp. 99-105, 1973.

Jetter, H. et al., "Uranium Isotope Separation Using I.R. Lasers", Proc. Int. Conf. on Uranium Isotope Separation, pp. 1-6, Mar. 5-7, 1975, London.

Primary Examiner—Deborah L. Kyle
Attorney, Agent, or Firm—Herbert L. Lerner

[57] ABSTRACT

Separation of isotopes from a gaseous mixture of substances containing the isotopes by incorporating supplemental gas and adiabatically expanding at an expansion ratio and starting temperature to cool the mixture and effect condensation of at least a portion of the supplemental gas. Laser radiation is applied to effect selective excitation of one isotope component with selective retention of the non-excited isotope component in the condensate. The condensation may be accelerated by generating condensation nuclei. A compression joint may be used to effect a temperature rise of the gaseous mixture and peelers employed to separate the gas stream portion rich in excited isotope component from the portion rich in non-excited isotope component.

17 Claims, 6 Drawing Figures

