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Niemann

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[54] **METHOD AND APPARATUS FOR THE SEPARATION OR ENRICHMENT OF ISOTOPES**

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[51] **Int. Cl.**[2] **B01J 1/10**

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[58] **Field of Search** ..... 204/157.1 R, DIG. 11; 250/527

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,443,087	5/1969	Robieux et al.	204/157.1 R
3,719,454	3/1973	Shang	204/DIG. 11
3,937,956	2/1976	Lyon	250/290

OTHER PUBLICATIONS

IBM Technical Disclosure Bulletin, vol. 17, No. 11 (April 1975) pp. 3501 & 3502.

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[57] **ABSTRACT**

Method for separation or enrichment of isotopes bound to anisotopic materials and forming a mixture of isotope compounds by irradiating the mixture of isotope compounds with a first light source to photochemically convert the mixture to a second mixture of isotope compounds, e.g. converting UF_6 to UF_5 and F, irradiating the second mixture in the presence of a reactant with a second light source to selectively excite only one isotope compound of the second mixture, the reactant chemically reacting with the excited compound, e.g. $UF_5 \rightarrow UF_4 + F$ or $UF_5 + R$ (reactant) $\rightarrow UF_4 + RF$ and separating the reaction products including one of the isotopes of the first mixture.

The separation or enrichment of isotopes may be carried out in apparatus having a highly-reflecting elliptical cylinder with a reaction vessel provided with feed and reactant inlet and reaction products outlet, disposed at one focal line of the elliptical cylinder and a high pressure mercury burner disposed at the second focal line, and with the reaction vessel arranged between resonator mirrors of a dye laser as the second light source.

12 Claims, 4 Drawing Figures