

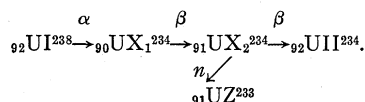
Concentration of Plutonium in Pitchblende

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IN a recent paper¹ Marieta da Silveira succeeded in explaining anomalies in the penetrating power of γ -rays belonging to U-products by a spontaneous neutron emission attributed to $_{91}\text{UX}_2^{234}$, and stated important experimental evidence for the neutron radiation. According to her results the disintegration scheme of U becomes



We have investigated the question whether the neutron emission of UX_2 can explain the existence of plutonium in a uranium deposit found by Seaborg.²

Neutrons from UX_2 should indeed slow down in small steps by colliding with heavy atoms passing through the 38-eV resonance region of $_{92}\text{U}^{238}$ and producing successively $_{92}\text{U}^{239}$, $_{93}\text{Np}^{239}$ and $_{94}\text{Pu}^{239}$ (10^6 years).

Taking into account the lifetime of Pu and assuming that all neutrons emitted by UX_2 lead to the formation of Pu-atoms we obtain an equilibrium concentration of Pu of $4 \cdot 10^{-12}$ percent. Less favorable absorption capture by other nuclei present would reduce the mentioned equilibrium concentration.

It is therefore not impossible that the plutonium found by Seaborg in the pitchblende is caused by the spontaneous neutron emission of UX_2 .

¹ Marieta da Silveira, *Contribuição para o estudo da radiações do UX complexo* Publicação No 2, Faculdade de Ciências de Lisboa, Portugal, 1945.

² Glenn Seaborg, Chem. and Eng. News, p. 2190 (December 10, 1945).