Letters to the Editor

NEW SHORT-LIVED ISOMERS OF RUTHENIUM AND TELLURIUM

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THE experiments were carried out with the extracted beam of a 1-meter cyclotron [1]. "Thick" targets of chemically pure elements were pulse-irradiated with 22 MeV α particles and 11 MeV deuterons. The gamma radiation of the target was detected with a scintillation counter with NaI(Tl) crystal and an FÉU-13 photomultiplier. The decay and the energy spectrum of the induced activity were measured in the intervals between the irradiation pulses with the aid of high-speed analyzers (ten-channel time and five-channel pulse-height). The irradiation and the measurements were programmed in time by means of a special circuit, which controlled the operation of the cyclotron and of the measuring apparatus.

Bombardment of molybdenum with alpha particles disclosed a new activity with $T_{1/2} = 1.84 \pm 0.06$ msec and $E_\gamma = 227 \pm 5$ keV, while bombardment of tin yielded an activity with $T_{1/2} = 104 \pm 5$ msec and $E_\gamma = 284 \pm 5$ keV. The gamma spectrum of the activity produced with a tin target also showed the presence of a weak line with 85 ± 5 keV energy. No other lines were observed in the gamma spectra of these activities in the interval from 50 to 1500 keV.

In order to identify the observed activities, Mo, Ru, and Sn targets were bombarded with deuterons. Bombardment of Ru yielded an activity with $T_{1/2}$= 1.84 msec. On the basis of these data it must be assumed that the activity with $T_{1/2} = 1.84$ msec is due to the decay of an Ru isomer, while that with the activity of $T_{1/2} = 104$ msec is due to a Te isomer.

Some assumptions concerning the mass numbers of the new Ru and Te isomers can be drawn from the following considerations. First, we exclude even-even nuclei from consideration. Second, no activity with $T_{1/2} = 1.84$ msec and $E = 227$ keV was observed following bombardment with 22 MeV gamma quanta [2] and 20 MeV protons [3]; this can be attributed to the relatively low content of the stable isotope from which this activity could be obtained via the (γ, n) or (p, pn) reaction. Consequently, the isomer is probably Ru^{97}. Third, the characteristics of the odd isomers of Te with A = 119—127 are well known [4,5]. It is natural to assume that the mass number of the new Te isomer is either 117 or 115. The yield of the activity with $T_{1/2} = 104$ msec was $\sim 1 \times 10^{-7}$, which agrees with the yield of Te^{117} in the Sn^{114} (α, n) and Sn^{115} $(\alpha, 2n)$ reactions from a natural mixture of Sn isotopes, calculated by the procedure proposed by Maksimov [6] and equal to $\sim 6 \times 10^{-7}$.

[1] Demin, Kushakevich, Makoveev, Rozman, and Chachakov, JETP **45**, 1344 (1963), Soviet Phys. JETP 18, 925 (1964).

[2] H. Krehbiel and U. Meyer-Berkhout. Z. Physik **165**, 99 (1961).

[3] A. M. Morozov, Abstract, Candidate's Dissertation, Moscow, 1961.

[4] Gupta, Pramila, and Raghavan. Nucl. Phys. 32, 669 (1962).

[5] B. S. Dzhelepov and L. K. Peker, Skhemy raspada radioaktivnykh yader (Decay Schemes of Radioactive Nuclei), AN SSSR (1958).

[6] M. A. Maksimov, JETP **33**, 1411 (1957), Soviet Phys. JETP **6**, 1085 (1958).

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LAYERED AND FILAMENTLIKE STRUCTURE OF SUPERCONDUCTING Nb-Zr *AND* Nb-Ti *ALLOYS*

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THE existing theoretical concepts [1] explain well the large critical magnetic fields of superconducting alloys of the equilibrium solid solution type. However, in the case of non-equilibrium alloys, which become stratified under certain conditions, there exists apparently also a different