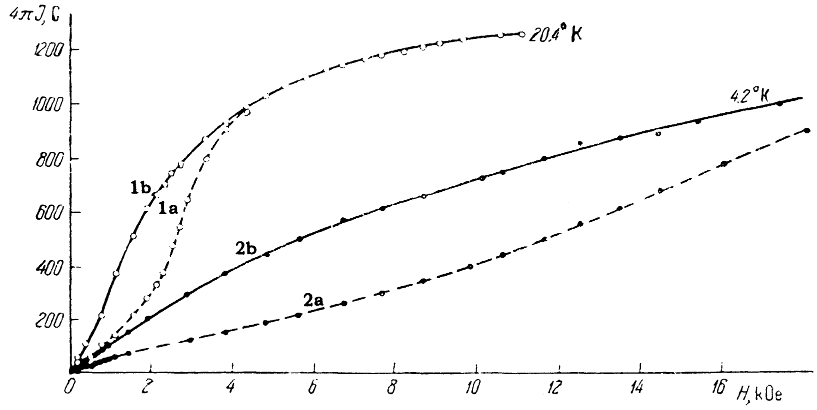

FIG. 2

and 4.2°K respectively. Such an unusual character of the curves can be explained by a large energy of magnetic anisotropy.

Repeated demagnetization and magnetization at the measurement temperature again leads to curves 1b and 2b. Secondly, the strong difference of the magnetization curves at 20.4°K from the magnetization curves at 4.2°K is remarkable. The latter run considerably below the former up to a field of 18,000 Oe and do not reach saturation there. Kouvel, Graham, and Becker[3] attribute the specific magnetic properties of these alloys to the occurrence of a ferrimagnetic structure. It seems to us that the data which they present is insufficient for such a judgement.

Measurements of the coercive force at 77.8 and 20.4°K have shown it to increase by one order of magnitude, from 140 Oe at 77.8°K to 1000 Oe at 20.4°K. Such a strong increase attests to the sharp temperature dependence of the magnetic anisotropy constant.

A final conclusion about the nature of the magnetic properties of the alloy Ni_3Mn in the disordered state can be made only after a precise determination of the magnetic anisotropy constant and after a neutron diffraction analysis to determine the character of the sublattices and to establish the antiferromagnetic interaction, if such exists.

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ALPHA DECAY OF ISOMERIC Bi^{210}

S. V. GOLENETSKII, L. I. RUSINOV, and Iu. I. FILIMONOV

Leningrad Physico-Technical Institute, Academy of Sciences, U.S.S.R.

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INVESTIGATIONS of the radioactivity of Bi^{210} have established that in addition to RaE ($T_{1/2}$ = 5 days, $E_{\beta max}$ = 1170 kev) there is a long-lived isomer of Bi^{210} which emits α particles with an energy of 4935 ± 20 kev and $T_{1/2} = 2.6 \times 10^6$ years.[1,2] In the present work we have investigated the decay of long-lived Bi^{210}.

The α-particle spectrum was studied using a pulse ionization chamber filled with a mixture of argon (90%) and CH_4 (10%) at atmospheric pressure.[3] The half-width of the line from the α particles of Pu^{239}, with energy 5150 kev, was 30 kev. We investigated an enriched and purified sample of Bi^{210} with a specific activity of 14000 α decays per min. per mg. The source area was 25 cm^2 and the thickness of the active layer was 10 microgram/cm^2.

The measured α spectrum of Bi^{210} is shown in Fig. 1. In addition to the previously observed α particles with energy 4935 ± 10 kev, we found new α-particle groups with energies of 4900 ± 10 and 4640 ± 30 kev. The relative intensities of these

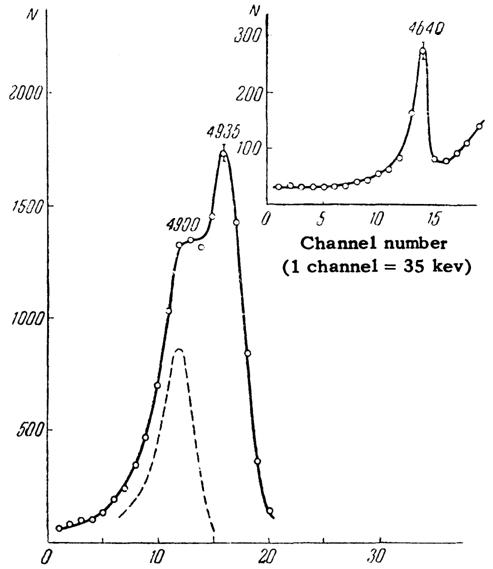

FIG. 1

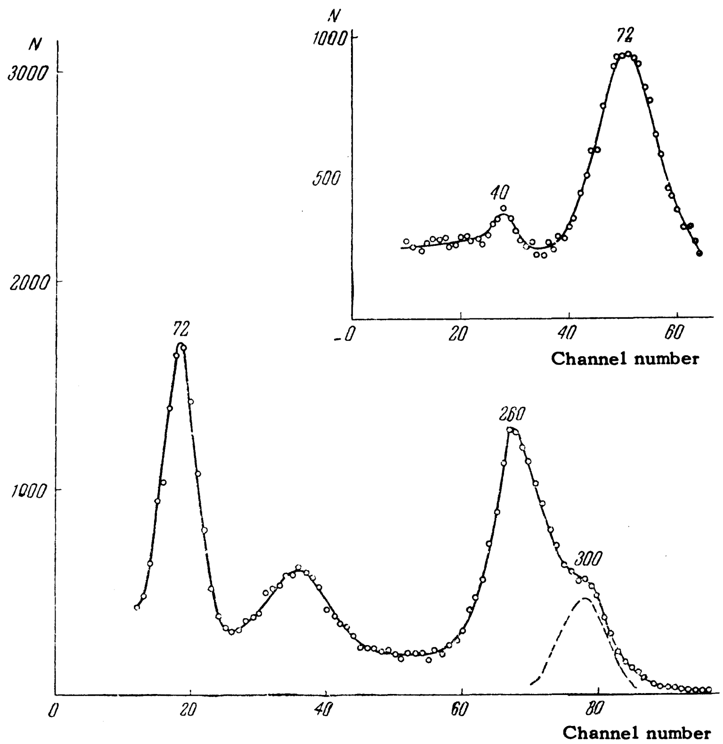

FIG. 2

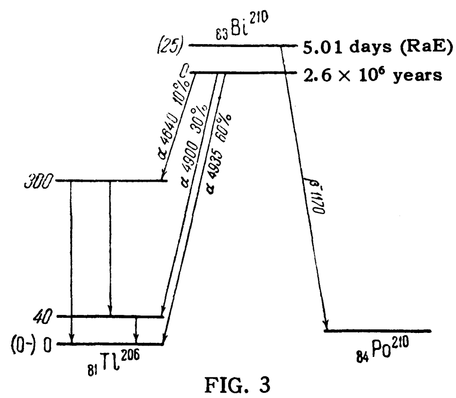

FIG. 3

three α transitions are 60, 30 and 10%, respectively.

We also found that about 10% of the α decays are accompanied by γ radiation. The γ rays were studied using a spectrometer consisting of a NaI (Tl) crystal, a FEU-13 photomultiplier and a single-channel pulse-height analyzer. The resolution of the spectrometer for the 660-kev line of Cs^{137} was 8.5%. The measured γ spectrum of Bi^{210} is shown in Fig. 2. Analysis of the curve shows the presence of γ transitions with energies of 260 ± 10 and 300 ± 10 kev, and relative intensities 1 and 0.4. The line at 72 ± 3 kev is due to the characteristic radiation of thallium. The identification of the small peak near 40 kev requires further investigation. It is possible that this maximum is due to a γ transition in Tl^{206}, which should be highly converted.

To confirm the assignment of the observed γ rays at 260 and 300 kev to transitions of the excited Tl^{206} nucleus, we studied α-γ coincidences. The α particles were detected in zinc sulphide and the γ rays in a NaI (Tl) crystal. The resolving time of the coincidence circuit was 5×10^{-8} sec. We established that the γ rays with E_γ = 300 kev and E_γ = 260 kev are in coincidence with the Bi^{210} α particles.

The results give grounds for assuming that there are excited states at 40 and 300 kev in Tl^{206}. The observed α and γ transitions can be explained on the basis of the decay scheme shown in Fig. 3.

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