Letters to the Editor

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The Gamma-Rays of Po^{210} *

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IN connection with Chang's studies[1] on the fine structure of the α-particles of Po and with Feather's discussion[2] on this subject it might be useful to report some recent absorption experiments on the γ-rays of this element. Since the sources at our disposal were larger than those used by previous investigators we could easily obtain more accurate results. A thin-walled glass G-M counter was used to detect the radiation.

Figure 1 shows the absorption in lead of the γ-rays of Po and a similar curve for Ra in equilibrium with its products. The ordinates are expressed in counts per minute and per Curie for Po, and in counts per minute and per 10^{-5} Curie for Ra. Within the accuracy of the absorption method it appears that the γ-radiation of Po consists of a single component of half-thickness equal to 8.5 g/cm³ Po. The energy of the radiation can be evaluated to be 0.8 Mev. The intensity per Curie of Po is equivalent to that of the γ-rays from 7.10^{-6} Curie of Ra, when both curves are extrapolated to zero absorption.

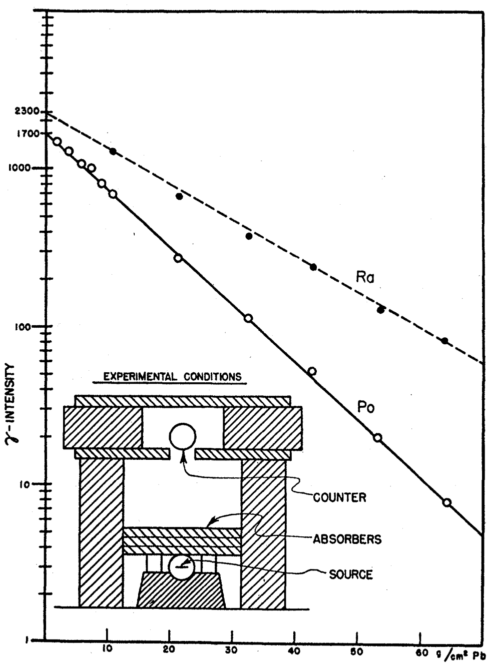

FIG. 1. Absorption in lead of the gamma-rays of polonium and of radium in equilibrium with its products. The ordinates are in counts per minute per Curie for polonium and in counts per minute per 10^{-5} Curie for radium.

The absorption experiments were repeated with many samples, always giving consistent results. The data are in general agreement with those in the literature, both for the absorption curve and for the intensity. However, no evidence of a softer γ-component, as reported by Webster[3] and by Bothe and Becker,[4] was observed.

A search for softer radiations showed no other components until, with absorbers thinner than 0.5 g/cm² Al, one finds a radiation whose mass absorption coefficient in Al is 18 cm²/g and which is probably the same component observed by Curie and Joliot[5] and attributed by them to the L line of polonium.

If one assumed, as these results seem to indicate, that only one γ-component of 0.8 Mev is present, a theoretical difficulty mentioned by Feather[2] would be removed. However, Chang's results on the fine structure of α-particles would be still more difficult to explain.

* This document is based on work performed under Contract No. W-35-058-eng-71 for the Manhattan Project at Clinton Laboratories.
[1] W. Y. Chang, Phys. Rev. **69**, 60 (1946).
[2] N. Feather, Phys. Rev. **70**, 88 (1946).
[3] H. C. Webster, Proc. Roy. Soc. **A136**, 428 (1932).
[4] W. Bothe, Zeits. f. Physik **96**, 607 (1935).
[5] I. Curie and F. Joliot, J. de phys. et rad. [7] **2**, 20 (1931).

Gamma-Rays from Tungsten and Molybdenum

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THE harder gamma-rays of tungsten have been investigated to date only by means of absorption techniques.[1–4] We have studied the gamma-rays from the 24-hour tungsten isotope, using a spectrometer of the usual 180-degree deflection type, measuring photoelectrons emitted from a thorium or a uranium radiator. The spectrometer had a 5-cm radius of curvature, which is small enough to provide a rather large solid angle, but at the same time provides relatively little shielding between the source and the detector. Background counts were high, and the observed peaks amounted to small differences in the counting rates recorded. The instrument was calibrated with photoelectrons produced from the annihilation radiation of copper positrons.

The peaks which were observed have been confirmed on successive runs on different samples. Observation of the decay of the peaks indicates that each of the peaks noted has the 24-hour half-life. It is not likely that any of these peaks are L peaks since the intensity was believed to be too low to show an L peak. The gamma-ray energies corresponding to the observed peaks are 480, 570, 690,