

On the Radioactive Deposits of Thoron

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Numerous reports have been published of the disintegration products of thoron or radon collected on a metal surface¹. However, it seems to the present author that little information is available on the decay curve of such deposits collected on materials other than metals. To study

1) G. B. Cook and J. F. Duncan: "Modern Radiochemical Practice", Oxford, Clarendon Press, p. 14, (1952).

this problem, an experiment was performed in this laboratory. Copper plate, polyethylene film, and also the surface of water were used as collecting surface in this experiment. For not less than fifty hours, a collecting surface was exposed to a gas containing thoron, without application of electric field. The thoron was in equilibrium with thorium-X produced in crystalline thorium nitrate. As soon as the collecting surface was taken out from the gaseous medium, the radioactivity of the deposits was measured with a G-M counter. The geometry was kept as constant as possible for the counting of the activity of deposits on both copper plate and polyethylene film. Corrections were made for the coincidence loss on all the data obtained. It has been found that the amount of the radioactivity per unit area of collecting surface is roughly equal for different kinds of surface material, but the shape of the decay curve of the collected products depends on the kind of material. From the experimental results, the decay curves of the radioactive deposits were partly illustrated in Fig. 1. In Fig. 1, the decay curve A of the radioactive deposits collected on a copper plate constitutes almost a straight-line in semilogarithmic scale, showing the half-life of ThB (10.6 hr.). On the other hand, the decay curve B of the deposits collected on a polyethylene film shows some deviation from the straight-line at the initial stage of decay. Then it turned to

a straight-line showing the half-life of ThB. For the measurement of the deposits collected on the surface of water, the water was evaporated up in a stainless steel dish and the radioactivity of the invisible residue was measured. The decay curve C obtained for the deposit on water has an intermediate shape between the cases of copper plate and polyethylene film. The total amount of the deposits collected on the surface of water is, however, smaller than that on the copper plate or polyethylene film because of the different surface area as well as the different geometry for the deposition. These results were always reproducible. The shapes of the decay curves indicate that there is some difference between the deposition velocity of ThB and ThC, and that the ratio of deposition velocity of ThC to ThB is greater for the collection on a copper plate than on a polyethylene film or the surface of water. To date, the phenomenon and the mechanism of the preferential deposition of some daughter disintegration products from thoron on different surface materials have not been described. Detailed results and probable explanation of the phenomenon will be reported elsewhere.

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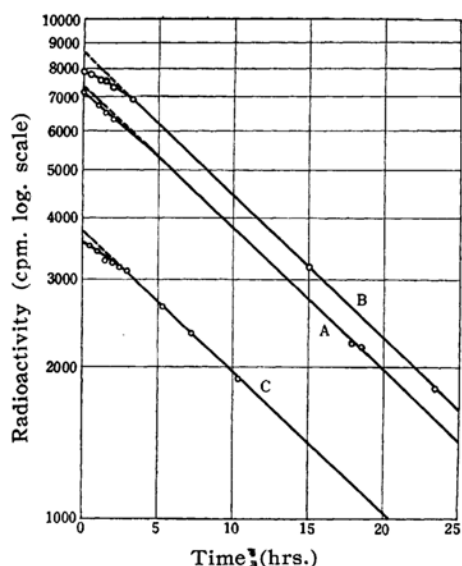


Fig. 1. Curve A: Copper plate.
Curve B: Polyethylene film.
Curve C: Surface of water.