

PROCEEDINGS
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ON THE RELATIVE PROPORTION OF THE TOTAL α -RAY ACTIVITY OF
RADIOACTIVE MINERALS DUE TO THE SEPARATE
RADIOACTIVE CONSTITUENTS.¹

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THE maximum α -ray activity of a considerable number of radioactive minerals was measured and compared with the activity of known quantities of pure uranium, thorium and radium. The relative decrease in activity due to the removal of known quantities of radium emanation and products of rapid change from the minerals and radium salts was also determined. The activity of the polonium and actinium separated from known quantities of minerals was compared with the activity of the uranium contained in the same minerals. From the data thus secured it is possible to calculate the relative proportion of the α -ray activity of minerals due to the separate radioactive constituents. It was found that the quantity of actinium present in minerals is proportional to the uranium contained in them, which is likewise the case with polonium when the mineral does not spontaneously evolve radium emanation. The activity due to thorium was found to be proportional to the quantity of this element contained in the mineral as indicated by chemical analysis. It was observed, however, that the specific activity of the thorium obtained from certain commercial salts of thorium was only one half that of the thorium contained in, and by certain methods separated from, the natural thorium minerals.

The general conclusions reached in the paper are: (1) That actinium is a disintegration product of uranium; (2) polonium is a disintegration product of radium through the emanation; (3) that radiothorium is a disintegration product of ordinary chemical thorium, which is elementary in character, and (4) that the α -ray activity of minerals in radioactivity equilibrium is equal to the sum of two factors, one of which depends only on the amount of uranium present and the other only on the amount of thorium contained in the mineral.

¹ Abstract of a paper presented at the meeting of the Physical Society held February 24, 1906.