

On the Number of δ Particles Expelled Concurrently with each α Particle Emitted by Polonium.

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A problem which has been presented for solution for some time in connection with radio-active transmutations is the manner in which the active deposit particles in radium, thorium and actinium acquire their positive charge and in virtue of which they are attracted in an electric field to the electrode which is negatively charged.

One inference which may be drawn from some observations on the active deposits from actinium which are recorded in a paper published recently by the writer¹ is that the active deposit particles at the instant of their production are uncharged and that their positive charge is acquired by contact with the surrounding ionized gas.

This deduction may be made from the fact that when exposures are made to the emanation in a small chamber at the lowest pressures attainable the amount of active deposit obtained on a charged electrode is practically the same, whether it be charged positively or negatively or whether it be uncharged.

The active deposit particle, it is generally conceded, is produced by the expulsion of an α particle from the parent atom.

As the α particle has been shewn to carry a positive charge of two elementary units it follows that if the active deposit particle is uncharged when it is created, the expulsion of the α particle, from the parent atom, must be accompanied by the emission of two delta particles each bearing one elementary negative unit of electricity.

As the expulsion of α particles from polonium is known to be accompanied by the emission of delta particles it was thought that if the number of delta particles accompanying on the average the expulsion of one α particle from polonium could be determined the result might possibly throw some light on the problem raised here in connection with the formation of active deposit particles from radioactive emanations.

In the following paper an account is given of some experiments made in connection with such a determination.

The manner in which the experiments were carried out is illustrated by the diagram shewn in Fig. I. A small copper plate N, coated with a thin deposit of polonium on its anterior face, was connected with a

¹ Kennedy. Phil. Mag. 1909, p. 744.