to less than about 10^4 disintegrations per minute. Thus the enormous amount of curium radioactivity in the target material used for producing element 98 had to be separated from the isotopes of the new element by a factor of some 10^6 to 10^7, as mentioned previously, before the alpha-energy pulse analyzer could be used.

The observation of alpha-particles of energy 7.0 to 7.3 Mev is of particular significance in itself. Radiations of such energy have been observed previously only in the decay of the isotopes of elements just above lead as members of distinctive chains of alpha-emitters.[14] These isotopes are of so much lower mass that they cannot be produced in bombardments with helium ions of less than 40-Mev energy.

For these reasons the observation of distinctive alpha-particle radiations should be expected to provide good evidence for the existence of element 98. Furthermore, evidence based on the alpha-particle radiations, together with the observation of the chemical properties expected for the element by means of which all of the other elements above and including lead are separated, should constitute proof of the existence of the new element.

The first successful experiment[2] in which an isotope of element 98 was observed was completed February 9, 1950. This experiment was designed to allow the detection of the long range alpha-particles of an isotope decaying with a half-life as short as 20 minutes.

EXPERIMENTAL WORK

Extraction of Curium

The Cm^{242} used as target material for the production of element 98 was separated from strongly neutron-irradiated americium in which it was produced as a daughter of the beta-particle decay of the 16-hour Am^{242m}. The curium was separated from americium and purified by combinations of precipitation and ion exchange methods.

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[14] G. T. Seaborg and I. Perlman, Revs. Mod. Phys. 20, 585 (1948).