

red heat removed the citric acid. In some cases where extremely thin samples of the radioactivity were desirable for alpha-pulse analysis, berkelium was volatilized in a vacuum from a hot filament and collected on a platinum disc.

In those experiments directed toward the determination of the mass number of the berkelium isotope, a radiochemically pure element 97 fraction was obtained and after its decay the residual daughter activities were separated in another high temperature column employing Dowex-50 resin and ammonium citrate as the eluting agent as described above. Traces of Am^{241} and Cm^{242} were present and served to mark the positions of these elements in the fractions from the column. The thin plates made of these fractions were examined in the differential pulse analyzer and in the windowless proportional counter mentioned below.

Experimental Methods Used in Radioactivity Measurements

The thin deposits of the radiochemically pure element 97 fractions on platinum plates were examined in the differential alpha-particle pulse analyzer.¹¹ In this instrument individual pulses from an ionization chamber are sorted electronically and recorded on 48 fast mechanical registers in such a way as to separate the individual alpha-particle energies from a mixture of alpha-emitters. (A typical alpha-particle pulse analysis curve of the element 97 fraction is shown in Fig. 5.) In establishing values for the alpha-particle energies of the new isotope, direct comparison was made with pulse analyses of thin samples of isotopes, whose alpha-energies are well known, using the same instrumental conditions.

The thin deposits containing the element 97 fraction were also examined for any electron, x-ray, or gamma-ray radiations which might accompany decay

¹¹Ghiorso, Jaffey, Robinson, and Weissbourd, National Nuclear Energy Series, Plutonium Project Record, Vol. 14B, "The Transuranium Elements: Research Papers," Paper No. 16.7 (McGraw-Hill Book Co., Inc., New York, 1949).