efficiency in the counter used resulting from differences in energies of the x-rays of curium and protactinium. The use of this method tacitly assumes that the number of L x-rays emitted per disintegration is the same for the two isotopes U^{231} and Bk^{243}. There was some experimental justification for this as evidenced by the ratios of counting rates in the xenon-filled counter and in the windowless proportional counter. (These measurements made under as nearly identical conditions as possible gave ratios for the two isotopes which agreed within 5 percent.) Further justification was found in the observation that there are no significant numbers of soft gamma-rays of energies close to those of the L x-rays emitted in the decay of either isotope. This observation was made by pulse analysis of the pulses produced in a xenon gas-filled proportional counter using the same 48 channel instrument as was used in measuring alpha-particle energies. This method of x-ray energy determination is similar to one reported previously.[13] The energies of the L x-rays were established to be approximately those of curium and no extraneous soft gamma-rays were observed.

EXPERIMENTAL RESULTS

Results of Radioactivity Measurements

Applying the procedures described above to helium ion bombarded targets of Am^{241} and examining the radioactivity in the separated fractions expected to contain element 97 (if present), distinctive high energy alpha-radioactivity and radiations typical of the electron-capture process were revealed. All of the radioactivity decayed with a 4.6-hour half-life.

The results of a typical experiment in which alpha-particle energies and group abundances were measured by differential pulse analysis are shown in Fig. 5. The rate of decay of each energy group was measured by plotting the area under each peak versus the time of decay of the radioactivity. All three peaks were

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[13] Kirkwood, Pontecorvo, and Hanna, Phys. Rev. 74, 497 (1948).