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SUMMARY OF THE RESEARCH PROGRESS MEETING OF APRIL 5, 1951

Bonnie E. Cushman

September 11, 1951

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SUMMARY OF THE RESEARCH PROGRESS MEETING OF APRIL 5, 1951

Bonnie E. Cushman

September 11, 1951

I. Dr. Darcy Walker discussed work done recently at Cornell on the production of photomesons. Various elements have been bombarded with 300 Mev gamma rays from the synchrotron and mesons of approximately 50 Mev have resulted. Both π^+ and π^- mesons were studied. The cloud chamber scattering experiments were mentioned briefly.

II. New Isotopes of Bk and Cf - E. K. Hulet.

Although only one determination has as yet been made, the production of new Bk and Cf isotopes, as found by Thompson, Street, Ghiorso and Hulet, is fairly certain. The starting material was a 100μg mixture obtained from the Chalk River pile containing 93 percent Cm^{242}, 5 percent Cm^{243} and 2 percent Cm^{244}. This was bombarded with 35 Mev α particles and 17 Mev deuterons. Attention was focused on the reactions (1) $Cm^{242}(\alpha,n)\ Cf^{245} \rightarrow Bk^{245}$ by K capture, (2) $Cm^{242}(\alpha,p)\ Bk^{245}$, and (3) $Cm^{243}(\alpha,n)\ Cf^{246}$. The chemistry was the usual process of ion exchange and precipitation chemistry; the results from the last ion exchange are given in Fig. 1. Samples from each peak were counted in a differential α pulse analyzer and windowless counter (Fig. 2). The decay of each peak was followed and three peaks were tentatively assigned to a 4.6 hour Bk^{245}. To verify the assignment a Cm^{245} daughter was sought, since Bk^{245} is a K-capturing isotope (indicated by $\gamma/e^- = 4$). The branching ratio α/K is equal to 0.1 percent and shows that the α decay is very small. Fig. 3 illustrates the decay curve. Assuming that the isotope is Bk^{245}, one can set a limit to the half-life of Cm^{245} of 200 years.

Cf^{246} has been previously reported by Ghiorso, Thompson and Seaborg (See Phys. Rev. 80, 791 (1950)). It was shown in these later experiments to be a pure α emitter -- only one peak (6.5 Mev) was obtained. No γ rays were observed when using a xenon counter. The mass assignment was proved by the reaction $Cf^{246} \xrightarrow{\alpha} Cm^{242}$.

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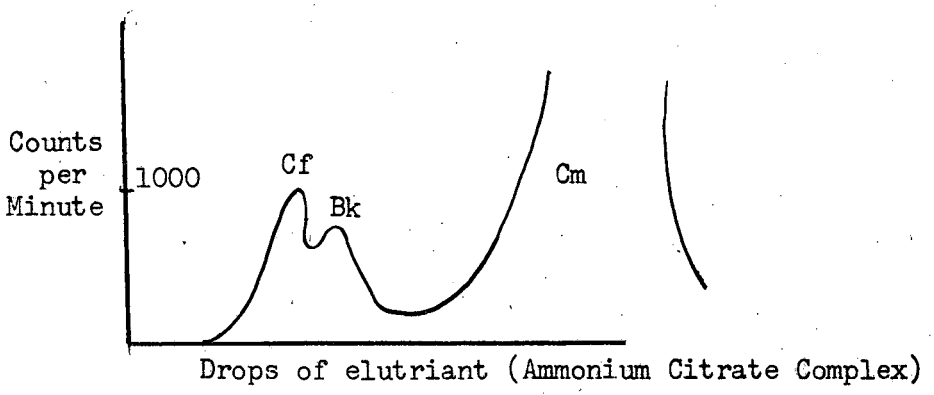

Fig. 1

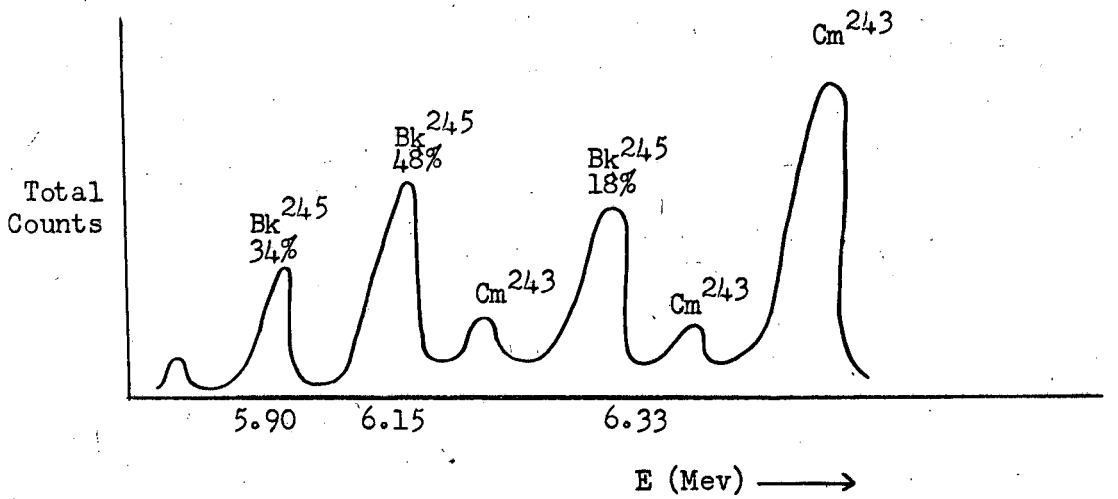

Fig. 2

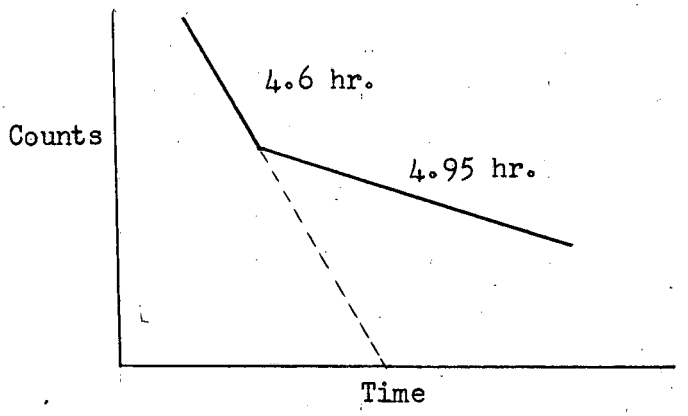

Fig. 3