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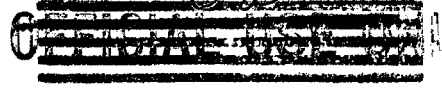
Cushman, Bonnie E.

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SUMMARY OF THE RESEARCH PROGRESS MEETING OF APRIL 5, 1951

Bonnie E. Cushman

September 11, 1951

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Carbide and Carbon Chemicals Company (C-31 Plant)	26 - 27
Carbide and Carbon Chemicals Company (K-25 Plant)	28 - 29
Carbide and Carbon Chemicals Company (Y-12 Area)	30 - 33
Chicago Patent Group	34
Chief of Naval Research	35
Columbia University (Havens)	36
duPont Company	37 - 39
H. K. Ferguson Company	40
General Electric Company, Richland	41 - 44
Hanford Operations Office	45
Idaho Operations Office	46 49
Iowa State College	50
Kellex Corporation	51
Knolls Atomic Power Laboratory	52 - 55
Los Alamos	56 - 58
Mallinckrodt Chemical Works	59
Mound Laboratory	60 - 62
National Advisory Committee for Aeronautics	63
National Bureau of Standards	64
Naval Medical Research Institute	65
Naval Research Laboratory	66
New Brunswick Laboratory	67
New York Operations Office	68 - 69
North American Aviation, Inc.	70 - 72
Oak Ridge National Laboratory (X-10)	73 - 80
Patent Branch, Washington	81
Sandia Corporation	82
Savannah River Operations Office	83
UCLA Medical Research Laboratory	84
USAF - Headquarters	85
U. S. Naval Radiological Defense Laboratory	86
University of California Radiation Laboratory	87 - 91
University of Rochester	92 - 93
Westinghouse Electric Corporation	94 - 97
Wright-Patterson Air Force Base	98 - 100
Technical Information Service, Oak Ridge	101 - 115
Aircraft Nuclear Propulsion Project, Oak Ridge	116 - 118

Total 118

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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 100 μ g 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) $\text{Cm}^{242}(\alpha, n) \text{Cf}^{245} \rightarrow \text{Bk}^{245}$ by K capture, (2) $\text{Cm}^{242}(\alpha, p) \text{Bk}^{245}$, and (3) $\text{Cm}^{243}(\alpha, n) \text{Cf}^{246}$. 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 $\text{Cf}^{246} \xrightarrow{\alpha} \text{Cm}^{242}$.

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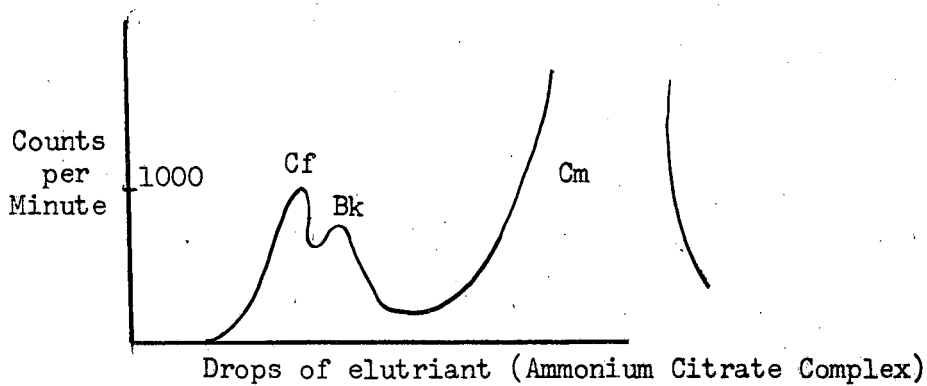


Fig. 1

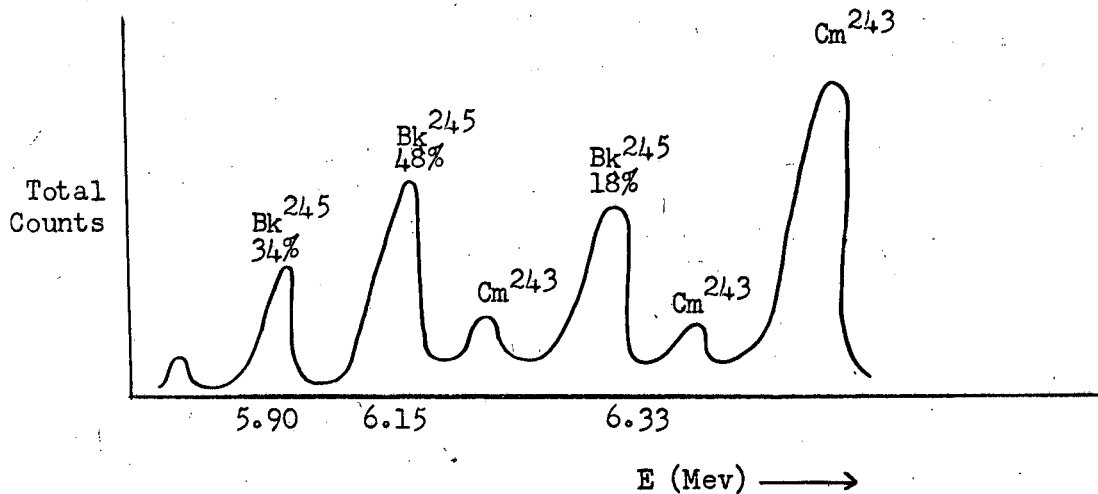


Fig. 2

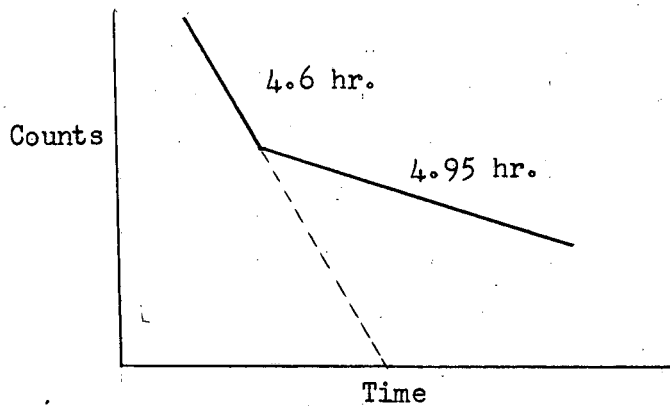


Fig. 3