These can be compared directly with the V^{50} doublet to get the energy level diagram shown in Fig. 1. Because the largest error occurs in the V^{50} doublet, it mattered little whether we used the new Ti^{50} and Cr^{50} doublets alone or the combined results in making the energy comparisons.

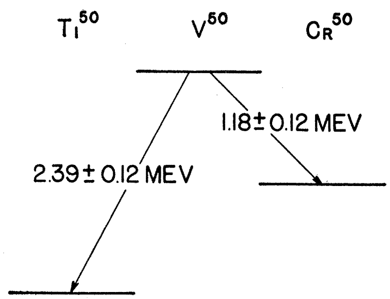

FIG. 1. Energy differences for isobars at mass 50.

It is apparent that ample energy is available for decay of V^{50} to Cr^{50} or Ti^{50}, and failure to detect this activity must be attributed to long half-life.

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Thermal Neutron Flux Measurements in Graphite Using Gold and Indium Foils

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THE observed activations of measuring foils in thermal neutron flux determinations in diffusing media must be corrected for the attenuation of the neutron flux in the foil and for the flux depression caused by the presence of the foil. In considering these corrections, previous workers[1] have counted the β^- particles from the foils and compared their results with a correction obtained from diffusion theory as worked out by Bothe.[2]

In the present experiments the γ-rays with indium and gold foils were counted. The advantage of counting the γ-rays rather than the β^- particles is that the absorption of the γ's by the measuring foil is a small effect, and the observed activities give information directly about the perturbation of the flux by the foil.

A series of indium and one of gold foils, $1\frac{1}{2}$ inches in diameter and ranging from 1 to 5 mils in thickness, was exposed in a slot of the Oak Ridge Standard Graphite Pile in which the cadmium ratio as measured with indium foils is greater than 300. The foils were counted with a sodium iodide crystal and a 5819 photomultiplier through a layer of aluminium of sufficient thickness to absorb all the β^- particles.

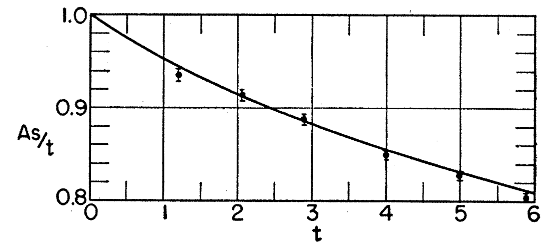

FIG. 1. The circled points represent the relative saturated activities per unit thickness of indium foils in graphite plotted as a function of their thickness in mils. The errors shown are the standard errors of counting. The solid curve is obtained from the theory of Bothe.

Figure 1 shows the saturated activity per unit thickness of the indium foils plotted against the thickness in mils. Figure 2 shows the same quantity for the set of gold foils. The data have been normalized arbitrarily since the point at zero thickness is not available. The solid lines have been computed from the theory of Bothe. The transport mean free path of thermal neutrons in graphite has been taken as 2.5 cm.[3]

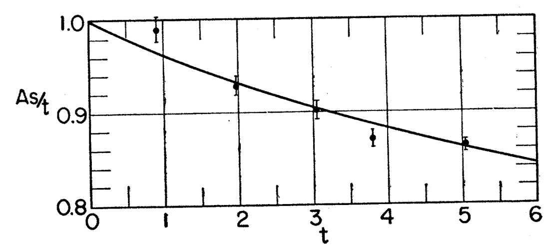

FIG. 2. The circled points represent the relative saturated activities per unit thickness of gold foils in graphite plotted as a function of their thickness in mils. The errors shown are the standard errors of counting. The solid curve is obtained from the theory of Bothe.

A transport theory correction for this effect has been given by Skyrme.[4] For the thicknesses of foils used in these experiments, Bothe's theory and Skyrme's theory lead to essentially the same correction factors.

We wish to thank Mr. D. G. Ott, who carried out the initial experiments.

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