

TABLE I. Evaluation of the partial cross section for the production of Cm^{242} . (Mean value $f\sigma_1 = 568$ barns.)

Sample No.	Integrated flux $f(\rho v)dt$ (10^{20} neutrons/cm 2)	$f\sigma_1 f(\rho v)dt$ from Cm^{242} production	$f\sigma_1$ (barns)	Percent deviation from mean
7	3.24	0.180	555	-2.1
3	2.12	0.123	580	+2.2
6	1.27	0.071	560	-1.3
5	0.365	0.0212	580	+2.1
4	0.162	0.00911	562	-0.9

If no Am^{242} g.s. is formed directly, that is, without intermediate formation of 16-hr Am^{242m} , then f will be identical with b , the β -branching ratio of Am^{242m} . A value of about 0.6 for b has been reported;¹ that is, b and f are approximately equal. This suggests that little, if any, Am^{242} g.s. is formed directly.

It is a pleasure to acknowledge our debt to Mr. Philip B. Aitken

for the design of equipment used in the handling of large α -activities.

¹ O'Kelley, Barton, Crane, and Perlman, Phys. Rev. **80**, 293 (1950).

² Hanna, Harvey, and Moss, Phys. Rev. **78**, 617 (1950).

³ B. W. Sargent, Chalk River Report CRP-403, unpublished.

Odd-Even Effect in Neutron Capture Gamma-Ray Spectra

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ADDITIONAL evidence has been obtained showing the dependence of the shapes of the neutron capture gamma-ray spectra on the odd-even character of the compound nuclei formed

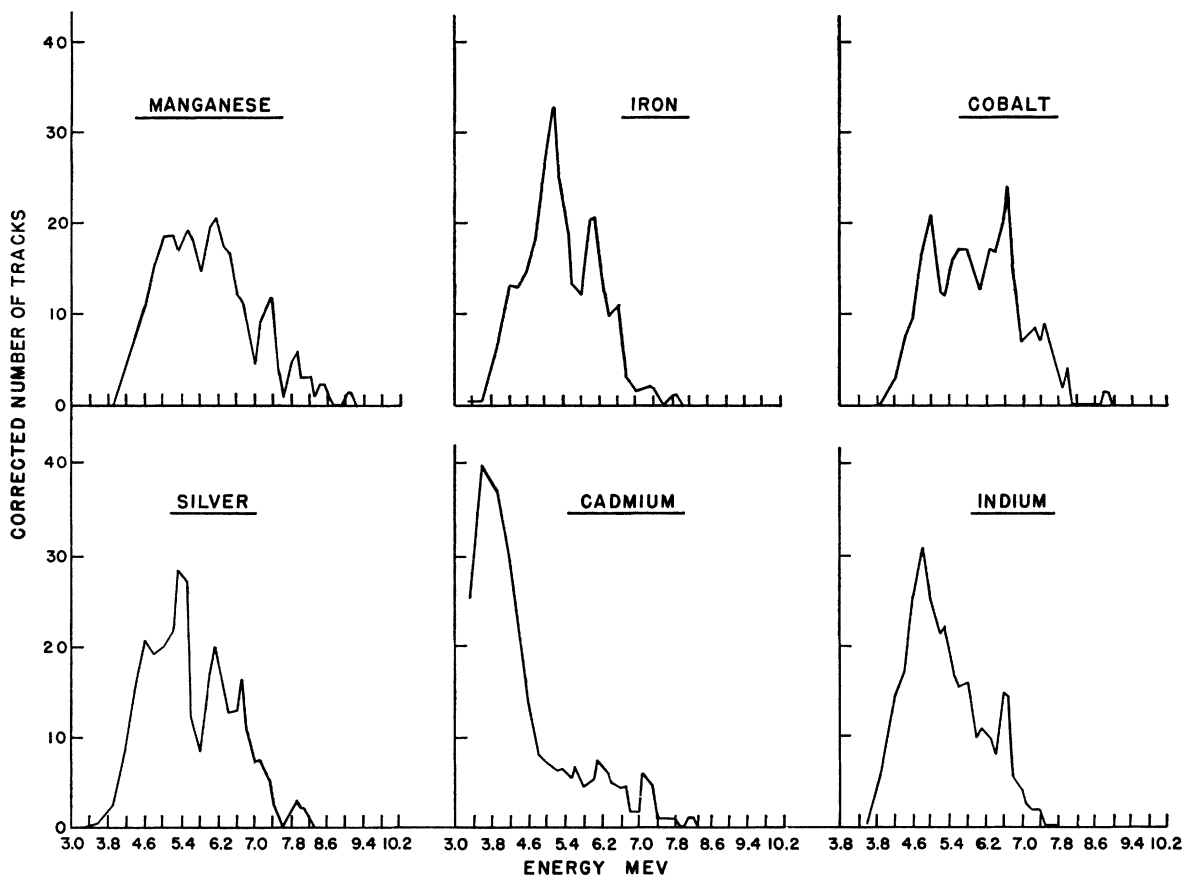


FIG. 1. Neutron capture gamma-ray spectra.

after neutron capture. The D_2O -soaked plate method^{1,2} has been applied to two groups of three adjacent elements, namely, the group manganese, iron, and cobalt and the group silver, cadmium, and indium. The spectra are shown in Fig. 1. The spectra of iron and cadmium have been reported previously.²

The manganese spectrum arises from the compound nucleus Mn^{56} , an odd-odd nucleus. The iron spectrum arises almost entirely from Fe^{56} , an even-even nucleus. The cobalt spectrum arises from Co^{60} , an odd-odd nucleus.

The silver spectrum arises from Ag^{108} and Ag^{110} , both odd-odd

nuclei. The cadmium spectrum is emitted by Cd^{114} , an even-even nucleus. The indium spectrum is emitted mainly by In^{116} , an odd-odd nucleus.

The evidence shown indicates that in elements of nearly the same Z , the mode of decay from the highly excited state formed on thermal neutron capture is different in nuclei of differing odd-even types. This would indicate a possible dependence of level spacings on odd-even characteristics of nuclei.

¹ B. Hamermesh, Phys. Rev. **76**, 182 (1949).

² B. Hamermesh, Phys. Rev. **80**, 415 (1950).