

### Gamma-Rays from the Decay of <sup>93m</sup>Mo

S. I. H. Naqvi, I. F. Bubb, and J. L. Wolfson  
 University of Saskatchewan, Regina Campus, Regina, Canada

(Received 28 September 1970)

The  $\gamma$  rays following the decay of 6.9-h <sup>93</sup>Mo have been examined with Ge(Li) and NaI detectors, and improved measurements of energies and intensities have been made.

In the course of recent decay studies, some of the measurements previously made by Alexander and Scharff-Goldhaber<sup>1</sup> on the  $\gamma$  rays following decay of the 6.9-h level in <sup>93</sup>Mo have been performed with improved precision.

Protons from the University of Manitoba cyclotron, extracted at 24–26 MeV and traversing 0.25 cm of Al impinged on Nb metal foil (99.99% pure, Alfa Inorganics Inc., Beverly, Massachusetts). Irradiations were performed for approximately 2–3 h with beam currents of 0.5–1.5  $\mu$ A. The activated Nb foil was allowed to decay for 2–7 h and then examined with a 29-cc Ge(Li) detector operated singly, or in coincidence with a second 42-cc Ge(Li) detector or a NaI detector. In addition, the low-energy radiations were examined with a 0.4-cc Ge(Li) x-ray detector. Since some  $\gamma$  rays due to products of reactions other than (*p*, *n*) were observed, careful measurements of decay rates were made to be certain that only radiations from the 6.9-h <sup>93</sup>Mo were studied.

In Table I the energies and intensities of all  $\gamma$  rays observed are summarized. For the intensity measurements the efficiency equation for Ge(Li)

detectors as given by Paradellis and Hontzeas<sup>2</sup> was used. The results are in agreement with the decay scheme shown in Fig. 1. Searches for a 948-keV  $\gamma$  ray (from the 2425- to 1477-keV level) and for a 2162-keV  $\gamma$  ray (from the 2162 keV to ground level) proved unsuccessful.

The authors acknowledge with thanks the financial support rendered by the National Research Council of Canada.

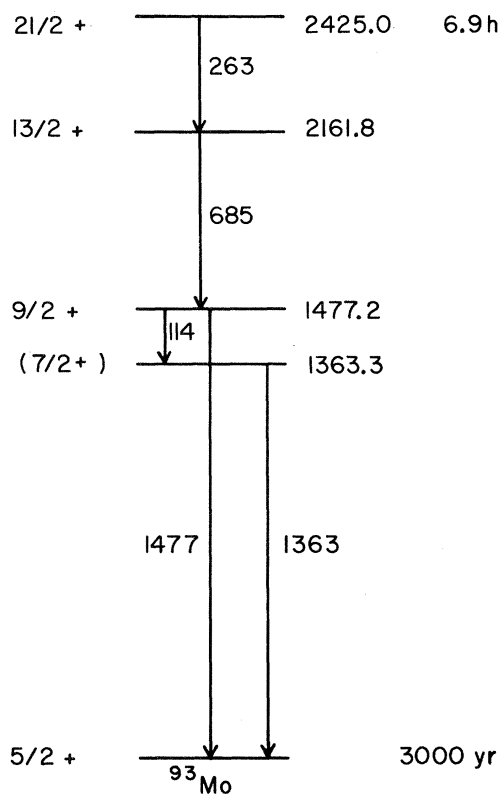


FIG. 1. Decay scheme for 6.9-h <sup>93</sup>Mo. All energies are in keV.

TABLE I. Energies and relative intensities of  $\gamma$  rays from the decay of 6.9-h <sup>93</sup>Mo.

Our results		Results taken from Table I of Ref. 1	
Energy	Intensity	Energy	Intensity
113.92 ± 0.19	0.71 ± 0.05	114.0 ± 0.5	0.6 ± 0.3
263.23 ± 0.19	61.6 ± 2.6	262.5 ± 0.5	52 ± 10
684.64 ± 0.26	92.5 ± 4.0	685.0 ± 0.5	91 ± 31
947.87 ± 0.45	≤ 0.2	...	...
1363.0 ± 1.1	0.62 ± 0.08	1365 ± 0.5	0.8 ± 0.5
1477.2 ± 0.3	100	1477 ± 1	100
2161.8 ± 0.6	≤ 0.08	...	...

<sup>1</sup>P. Alexander and G. Scharff-Goldhaber, Phys. Rev. **151**, 964 (1966).

<sup>2</sup>T. Paradellis and S. Hontzeas, Nucl. Instr. Methods **73**, 210 (1969).