

STUDIES OF  $49 < Z < 51$  AND  $N > 50$  NUCLEI AT INTERMEDIATE ENERGIES

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As groundwork for the eventual spectroscopic study of the light indium isotopes by  $(^6\text{Li}, xn)$  reactions, we have bombarded several light Pd targets with  $^6\text{Li}$  beams of energies from 55 to 100 MeV and have obtained extensive excitation function data. The portion of this data which shows the production of the light In isotopes is shown in Figures 1a and 1b, for bombardment of  $^{104}\text{Pd}$  and  $^{106}\text{Pd}$ , respectively. Our basic measurements have been 1) in-beam prompt and inter-beam-burst  $\gamma$ -ray spectra and 2) off-line residual activity measurements on the bombarded targets. Isotopes produced in the bombardments were identified by their known in-beam  $\gamma$  rays or their known decay properties, and production cross sections were determined mainly from decay data for which there is less uncertainty concerning  $\gamma$ -ray branching intensities.

The  $^6\text{Li}$ -induced reactions measured in this work were dominated by the charged-particle emission channels, at the expense of substantial yield of light In nuclei. Production of In isotopes lighter than  $^{106}\text{In}$  by  $(^6\text{Li}, xn)$  reactions therefore seems impractical. As is evident from Figure 1, the  $^{106}\text{In}$  production cross section is reasonably large (approximately 0.1 barn) for 55-MeV bombardment of  $^{104}\text{Pd}$ , and so further study of the in-beam production of this nucleus is in progress. Identification of

possible in-beam  $^{106}\text{In}$   $\gamma$  rays is proceeding, based on the in-beam excitation function data already acquired. Furthermore, we have acquired approximately  $20 \times 10^6$  events of four-parameter  $\gamma$ - $\gamma$  coincidence data from the 55-MeV bombardment of  $^{104}\text{Pd}$ , and analysis of this data is also in progress.

Further study of  $^{106}\text{In}$  and possible extensions to lighter In isotopes will be carried out using short-lifetime decay spectroscopic techniques. These studies will await the installation and testing of our He-jet recoil transport system, which has been built and which should be operating in the next few months.

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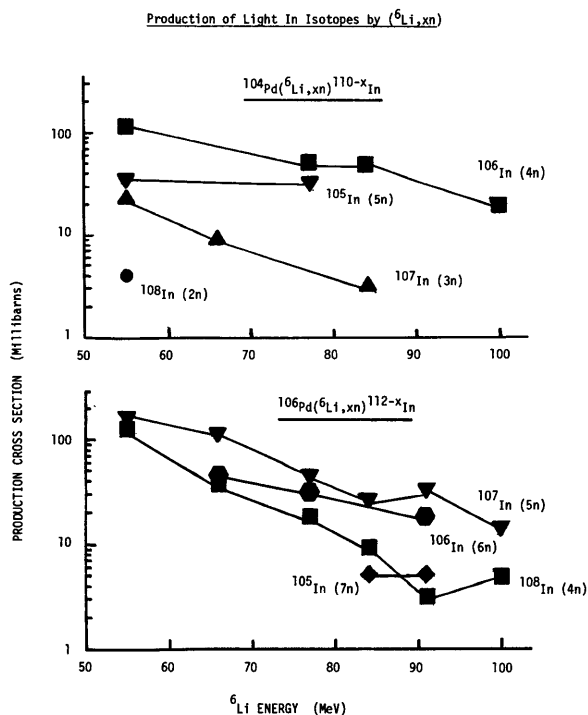


Figure 1.