

Abstract Submitted
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Thin Film CdS/CdTe Diodes for Nuclear Radiation Detection JULIANNALIANNA CALKINS, Stephen F. Austin State University — In this study we have investigated thin film, polycrystalline CdS/CdTe PN diodes as solid state charged particle detectors. Solid state neutron detectors rely on the indirect detection of neutrons via a nuclear reaction, which produces charged particles detected by a semiconductor diode. The CdS/CdTe diodes were evaluated in terms of their sensitivity to alpha and gamma radiation when connected to a charge sensitive preamplifier. The devices were found to have an alpha particle counting efficiency of greater than 90%. The pulse height response of these diodes due to alpha radiation is found to be a function of applied bias, angle of incidence, and energy of the incident alpha particles. Preliminary gamma sensitivity measurements indicate an intrinsic gamma detection efficiency of less than 1×10^{-6} . The CdS/CdTe results were calibrated using a 1 cm² Ortec ULTRA silicon PIN detector and were also compared to data collected from silicon detectors fabricated at UT Dallas. The CdS/CdTe devices offer the possibility of large area neutron detectors with high gamma rejection rates and affordable production costs.

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