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Measurement of Radiation Induced Damages in Semiconductor Materials Useful as Photovoltaic and Nuclear Detection Devices RUBI GUL, KARA KEETER, RENE RODRIGUEZ, Idaho State University — Radiation interactions with materials cause a change in electronic and physical properties of the material, which affect the performance of the devices. It is a key issue in the employment of these materials in medical, space, security and other scientific applications. In our research we have determined the defects and their generation rate induced by gamma rays of energy 0.11-22 MeV, in $CuInS_2$. We have used a simple model consisting of classical physics principles and Monte Carlo simulation software. The simulation results are in agreement with other published results done for other semiconductor materials. Our collaborators at INL will investigate different techniques for fabrication of thin films of CdZnTe and $CuInS_2$ by using Radiofrequency Pulsed Plasma Enhanced Chemical Vapor Deposition and Pressurized Solvent techniques. Next, defects will be induced in the thin-film samples by exposure to a bremsstrahlung gamma-ray beam. The radiation dose will range from 5 to 25 kGy. Qualitative and quantitative measurements of the defects in the crystals will be done by gamma-ray spectroscopy and PICTS (Photo induced current transient spectroscopy).

Rubi Gul
Idaho State University

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