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Electron Beam Doping with CdTe for Radiation Detectors.

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CdTe as a semiconductor has advantages when used as a radiation detector, such as sensitivity to high energy and the ability to operate at room temperature. However, the disadvantage is that the charge collection efficiency is lower than that of Si and Ge, and a high voltage must be applied to collect a sufficient amount of charge. Therefore, it is necessary to suppress the leakage current associated with the application of high voltages.
To conduct the experiments, we used 0.75 mm thick, 3 mm square Acrorad CdTe crystals and deposited In on one side and Au on the other side to fabricate a sample with an In/CdTe/Au structure. The In side of the sample was doped with an electron beam, which allows local heating and diffusion near the surface. Hall effect measurements revealed an n+ layer doped with In, forming a pn-junction diode with p-type bulk CdTe:Cl. This allows doping of CdTe:Cl, which is thermally sensitive. The sample was evaluated for I-V characteristics and γ spectral characteristics.
As a result of these evaluations, diode-like characteristics were confirmed, and a peak was also confirmed in the γ spectral characteristics.

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