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Challenges in p-type Doping of CdTe JEDIDIAH MCCOY, SANTOSH SWAIN, KELVIN LYNN , Center for Materials Research at Washington State University — We have made progress in defect identification of arsenic and phosphorous doped CdTe to understand the self-compensation mechanism which will help improve minority bulk carrier lifetime and net acceptor density. Combining previous measurements of un-doped CdTe, we performed a systematic comparison of defects between different types of crystals and confirmed the defects impacting the doping efficiency. CdTe bulk crystals have been grown via vertical Bridgman based melt growth technique with varying arsenic and phosphorous dopant schemes to attain p-type material. Furnace temperature profiles were varied to influence dopant solubility. Large carrier densities have been reproducibly obtained from these boules indicating successful incorporation of dopants into the lattice. However, these values are orders of magnitude lower than theoretical solubility values. Infrared Microscopy has revealed a plethora of geometrically abnormal second phase defects and X-ray Fluorescence has been used to identify the elemental composition of these defects. We believe that dopants become incorporated into these second phase defects as Cd compounds which act to inhibit dopant solubility in the lattice.

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