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Purification of Germanium Crystals by Zone Refinement: Theoretical and Experimental Approaches GANG YANG, YUTONG GUAN, GUO-JIAN WANG, HAO MEI, FANYI JIAN, DONGMING MEI, University of South Dakota, CRYSTAL GROWTH TEAM — The results of single germanium crystals grown from zone-refined germanium ingots, identified by photon thermal ionization spectroscopy (PTIS), show that there are four main impurities, aluminum (Al), phosphor (P), boron (B) and gallium (Ga) in the crystals. Based the PTIS results, we investigated the influences of zone speed, zone width and the number of passes on effective segregation coefficient of Al, P and Ga in the process of zone refinement, then the further calculation of distribution of Al, P and Ga along the zone refined ingots has been conducted. In terms of trend of impurity distribution, the calculated results have a very good agreement with the experimental results. We report both the theoretical calculations and the experimental results. This work is supported by DOE grant DE-FG02-10ER46709 and the state of South Dakota.

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