Abstract Submitted
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Study of effective segregation coefficient of impurities in HPGe for developing Ge detectors in searching for rare-event physics[1] PRAMOD ACHARYA, SANJAY BHATTARAI, MATHBAR RAUT, HAO MEI, DONGMING MEI, Univ of South Dakota, PIRE-GEMADARC COLLABORATION — Developing large-size high-purity Germanium (HPGe) detectors is necessary for detecting rare-event physics. Fabricating large-size HPGe detectors requires to grow large-size HPGe crystals, which is strongly coupled to the control impurity segregation in the growth process. We study the effective segregation coefficient of impurities Al, B, Ga and P in HPGe identified through PTIS method in a crystal grown by Czochralski technique. Hall effect measurement was used to determine the impurities concentration profile in HPGe. The average value of effective segregation coefficient, K_{eff}, for B, Al, Ga, and P was obtained to be 9.45, 0.70, 0.29, and 0.18 respectively using normal segregation equation. The thickness of the critical boundary layer at which the segregation occurring was analyzed for each of these impurities in a BPS model. The results were compared with the physical model. This study allows us to better control the crystal growth process in growing large-size crystals for developing HPGe detectors.

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