

Abstract Submitted
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Measuring Shallow Impurities in High-Purity Germanium Crystals with Photo-Thermal Ionization Spectroscopy (PTIS) FANYI JIAN, JAYESH GOVANI, GANG YANG, GUOJIAN WANG, HAO MEI, DONGMING MEI, The University of South Dakota, CUBED COLLABORATION — High-purity germanium (HPGe) single-crystals grown for the fabrication of radiation detectors required extremely low level (10^9 - 10^{10} atoms/cm³) of shallow impurities, which are from different sources. As a result it is exceptionally imperative to identify them and understand the associated sources. Among available different semiconductor characterizations techniques, only Photo-Thermal Ionization Spectroscopy (PTIS) is sensitive to the identification of low-level shallow impurities. PTIS characterization helps to identify these impurities and their possible sources in the crystal growth so that the methods to reduce them can be developed, which allows us to grow crystals with the required qualities reliably. In the present study, we have carried out PTIS analysis on HPGe single crystals grown at USD. Our results demonstrated that Al, B and Ga are the dominant impurities in p-type samples and P is the dominant impurities in the n-type samples. Sponsored by Department of Energy - DE-FG02-10ER46709 and the State of South Dakota

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