

Advancement of Zone Refining for Purifying Germanium Ingots at USD

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Detector grade High-Purity Germanium (HP-Ge) crystals are largely needed for rare event physics. At the University of South Dakota (USD), we have successfully built a product chain that can purify the commercially available germanium raw materials to detector-grade HP-Ge crystals and fabricated them into Ge detectors. Zone refining is a prerequisite procedure to purify germanium ingots. The principle is based on the difference in the solubility of the impurities in the molten and solid phase of germanium. The existing research facilities in our lab can purify

commercially available germanium ingots(5N) to a impurity level of $10^{10-12}/\text{cm}^3$ by zone refining. We have been working on a method which can produce high purity germanium ingots consistently. A summary of our current achievement and inventory of detector grade ingots will be reported.

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