

MoO₃ and NaI powder purification for AMoRE and COSINE to make ultra-low background crystals

Friday, 26 May 2017 16:10 (0:20)

Content

The AMoRE (Advanced Mo based Rare process Experiment) is searching for neutrinoless double beta decay of ¹⁰⁰Mo using radiopure molybdate-based crystals. The COSINE collaboration is searching for dark matter with ultra-low background NaI crystals either to confirm or to refute the DAMA signal. Since there are no commercially available powders with required purity levels to grow Mo-based crystal and NaI crystal, one of important programs in the Center for Underground Physics at IBS in Korea is the purification of initial materials to reduce the internal radioactive contamination. In the purification of MoO₃ powder, a double sublimation, fractional crystallization and co-precipitation from aqueous solution were used as purification methods. The other important requirements for the study are its high performance, high efficiency of purification and minimal irretrievable losses of material. In the purification of NaI, we used recrystallization method to remove radioactive isotope impurities, mainly K, from NaI powder. In order to check effectiveness of purification, concentrations of impurities (K, Sr, Ba, Pb, Th and U) were measured by ICP-MS and radioactivities were checked by HPGe detector at Yangyang underground laboratory in Korea.

Summary

Primary author(s) : Dr. GILEVA, Olga (Center for Underground Physics, IBS); PARK, HyangKyu (ibs); Mrs. SHIN, KeonAh (Center for Underground Physics, IBS)

Co-author(s) : Ms. ARYAL, Pabitra (Department of Physics, Kyungpook National University); Ms. KARKI, Sujita (Department of Physics, Kyungpook National University)

Presenter(s) : Dr. GILEVA, Olga (Center for Underground Physics, IBS)

Session Classification : Session 8