

THE RARE ISOTOPE SCIENCE PROJECT: DEVELOPMENT PROGRESS OF ISOL SYSTEM

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The high quality intense Rare Isotope Beam (RIB) production system based on Isotope Separation On-Line method is being developed at Rare Isotope Science Project (RISP) of IBS in Korea for the first time. The RIBs are delivered to experimental facility for research such as nuclear physics, nuclear astrophysics, atomic physics, material science, etc. The first phase of the ISOL system, completed in 2021, is aimed for installation of basic ISOL system. In this phase, uranium carbide (UC_x) multi-disk target irradiated proton beam with the power of 10 kW is used for producing n-rich RIB via U fission reaction. We have started to develop the UC_x target disk with the diameter of 50 mm in order to reduce thermal heating by proton beam. The ISOL system consists of three main components, H- cyclotron driver system for 1 mA and 70 MeV proton beam, Target/Ion source (TIS) system, and beam separation/transport system which connects from TIS to RFQ of post-accelerator. To provide large variety of RIBs, surface ion source, FEBIAD-type plasma ion source and resonance ionization laser ion source are being evaluated. The Sn isotopes have been successfully extracted by laser ion source in our off-line facility. The RIB is delivered to ultra-low-energy experimental facility or delivered to post-accelerator capable of accelerating up to 18.5 MeV. The TIS is automatically remote-handled for the maintenance since it is located in high radiation level. We present the overview and development status of our ISOL system at RISP.