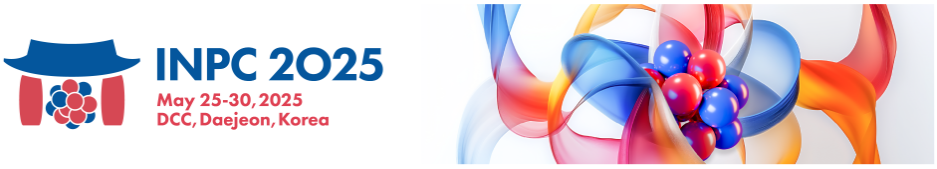

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Transport and breeding of rare isotope ions at RAON: Na isotopes

The Isotope Separation On-Line (ISOL) system at the Institute for Rare Isotope Science (IRIS) successfully generated a variety of rare isotopes (RI). A variety of devices are used to verify the RI generated. The produced ions from the Target Ion Source (TIS) are cooled and bunched using the Radio Frequency Quadrupole Cooler Buncher (RFQ CB) to improve the charge breeding efficiency of the Electron Beam Ion Source (EBIS) charge breeder and the performance of the Multiple-Reflection Time-of-Flight Mass Spectrometer (MMS) and the Collinear Laser Spectroscopy (CLS). The RFQ CB can deliver up to 1E+8 ions per bunch to the EBIS by cooling and bunching CW beam. In order to accelerate the RI at SCL3, it is necessary to adapt the beam condition to 10 keV/u. To meet these specifications, an EBIS charge breeder, operating with up to 2 A of the electron beam within a 6 T magnetic field, was installed to produce highly charged RI ions within the ISOL system. Using an electron beam of up to 1 A, 133Cs27+ (A/q=4.93), 120Sn24+ (A/q=5), 85Rb17+ (A/q=5), and 23Na7+ (A/q=3.29) have been produced and transported to the A/q separator magnet to identify the A/q value of each ion. 25Na5+ (A/q=5) among the generated RIs was targeted to be transported to the post-accelerator. After charge breeding to 25Na5+ ions, they were transmitted to the post-accelerator. This presentation will discuss the charge breeding and beam transportation results with stable and rare isotope beams.

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