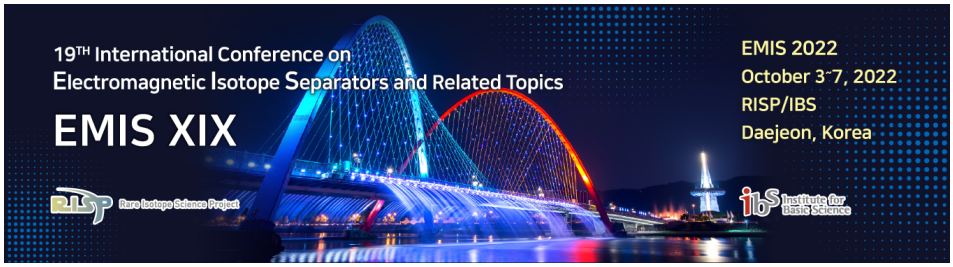

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Design and Fabrication of Beam Dump System for the RAON μSR Facility in Korea

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The beam dump system was designed and fabricated to absorb residual protons of the μSR facility at the Rare Isotope Science Project in Korea. In the μSR facility, protons with 600 MeV energy are incident on the graphite target to generate muons, and only about 10% of the power is absorbed in the graphite target and the remaining power is either absorbed in the beam dump or used to break binding energy. This study introduces a design method a beam dump that safely absorbs residual protons when the current of the facility is 165 μA (100 kW). The material of the beam dump was determined to be oxygen-free copper(OFC) in consideration of thermal conductivity and corrosion resistance. The target performance of the beam dump system was set such that the temperature, stress and effective dose did not exceed 200 ℃ (softening temperature of OFC), 69 MPa (yield stress of OFC) and 5 μSv/hr, respectively. In order to achieve this performance, absorbed energy at beam dump and effective dose were simulated using MCNP6 code. Temperature and stress were simulated using ANSYS code. As a result, the beam dump consisted of six copper plates, and the maximum temperature and stress were evaluated at 154℃ and 61 MPa, respectively. After that, a structure for the designed beam dump and movement alignment was manufactured and fabricated in the facility.

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