



独立行政法人理化学研究所 仁科加速器研究センター  
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RIKEN Nishina Center for Accelerator Based Science  
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Production cross section measurements and New isotope searches by BigRIPS separator  
at RIKEN RI Beam Factory

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The measurement of production cross sections of radioactive isotopes (RI) is important for designing RI-beam experiments, allowing accurate estimation of the RI-beam intensities. Since the commissioning of the RIKEN RI Beam Factory (RIBF) in 2007, a variety of RI beams have been produced by using the large-acceptance superconducting in-flight separator BigRIPS.

We have measured the production rates and production cross sections of the RIs, which were produced by projectile fragmentation of heavy-ion beams such as  $^{48}\text{Ca}$ ,  $^{70}\text{Zn}$ , and  $^{124}\text{Xe}$  at 345 MeV/u, and by in-flight fission of a  $^{238}\text{U}$  beam at the same energy.

The measured cross sections were compared with the EPAX2 and EPAX3 model in case of the projectile fragmentation and with the LISE++ fission models in case of the in-flight fission. The reproducibility of these models were also discussed.

Futhermore, in the measurements with the  $^{124}\text{Xe}$  beam, we have discovered four new isotopes on the proton-drip line. The measurements of projectile-fragment momentum distributions have been also performed with the  $^{124}\text{Xe}$  beam, in which the low-momentum tails of the distributions have been measuremd for the first time at 345 MeV/u.

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