

# Development of RI production target for ERIS

## at RIKEN RI Beam factory

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The electron-beam-driven RI (Radioactive Isotope) separator for SCRIT (ERIS) [1] at the SCRIT electron scattering facility [2] is employed to produce low-energy, high-quality, and high-intensity RI beams used for the electron scattering of unstable nuclei. In ERIS, the photofission of uranium driven by an electron beam is used for RI production, and the estimated production rate of fission products is  $2.2 \times 10^{11}$  fissions/s with 30-g uranium and a 1 kW electron beam.

For the production target, uranium carbide is used because its vapor pressure and density are lower and higher than those of uranium oxide, respectively. Uranium carbide is obtained by the carbothermic reduction of uranium oxide in presence of carbon at 1800 °C. In order to control the total amount of uranium and the density of the target, we formed uranium oxide powders with graphite into a disk without a binder at 180-MPa compression. As a result, the obtained disk was 20 mm in a diameter and around 2 mm in a thickness. Mass concentration of uranium in the disk was estimated as 1.9 g/cm<sup>3</sup>. Recently, a 1-mm thickness disk was also successfully fabricated.

The RI production has been started using the prepared uranium carbide disks, and produced RI, especially <sup>132</sup>Sn, was well separated. In this paper, we would like to report details of the target fabrication and recent results of the RI production at ERIS.

### References

- [1] T. Ohnishi et al., Nucl. Instrum, Methods B 317 (2013) 357.
- [2] M. Wakasugi et al., Nucl. Instrum, Methods B 317 (2013) 668.