

Gaseous strippers at RI beam factory; R&D and operation

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Intensity upgrade of very heavy ions such as uranium or xenon beams is one of the main concerns at the RIKEN Radioactive Isotope Beam Factory (RIBF). The lifetime problem of carbon-foil strippers due to the high energy loss of beams was a principal bottleneck for the intensity upgrade.

We have developed and successfully operated a re-circulating He-gas stripper for 10-MeV/u uranium beams as an alternative to carbon foils.

The new stripping system was actually operated in user runs with $^{238}\text{U}^{35+}$ beams of more than 1 puA. Electron-stripped $^{238}\text{U}^{64+}$ beams were stably delivered to subsequent accelerators without serious deterioration of the system

Recently, the 2nd gas stripper with air dedicated for 50-MeV/u ^{124}Xe beams was also developed. The differential pumping techniques similar to that used in the He gas stripper was applied. We confined a very thick gas target, up to 20 mg/cm² of air, in a 0.5-m target chamber. One good feature of using air is that it can be inexhaustible for our use. The stripper was stably operated in user runs performed in June 2013. The service rate reached 91%. The maximum beam intensity reached 38 pnA and the average intensity provided to users becomes approximately four times higher than it was in 2012. The down-time free gas strippers greatly contributed to these improvements. We also discuss the applicability of the air stripper to 50-MeV/u ^{238}U beams.