Present status and future project of charge strippers at RIKEN RIBF (RI Beam Factory)

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The RIKEN Radioactive Isotope Beam Factory (RIBF) has been successfully operating for over seven years since the first beam at the end of 2006 with the aim of accessing the unexplored region on the nuclear chart, far from stability. The continuous efforts over these seven years have improved the performance of the RIBF accelerator complex. Furthermore, we have started the upgrade program to increasing the intensity of very heavy ions such as xenon and uranium just after the first beam was extracted. This program included construction of a powerful 28GHz superconducting ECR ion with a new injector. Figure 1 shows the acceleration scheme for acceleration of uranium. The two charge strippers are installed for the effective acceleration of the ions with higher charge states. These charge strippers could be a bottle-neck problem in high power heavy ion facility such as RIBF. We carried out elaborating R&D works to replace the conventional carbon foils with the new types of the charge strippers which can survive irradiation of high intensity heavy ion beams. We could reach to the solutions of helium gas stripping for the first stripper and rotating beryllium disks for the second stripper so far. This paper overviews R&D works for the charge stripper from 2008 and reports the present status of the charge strippers currently used for the operation.

A future upgrade plan is proposed to increase the intensity of uranium beam up to 1pμA (6x10^{12}#/s). This plan replaces the existing fRC with a new ring cyclotron which can accelerate U^{35+} extracted from the ion source from beam energy of 11 MeV/u to 48 MeV/u, in order to skip the first stripper with very low converting efficiency of around 20%. This paper will describe a plan to develop charge strippers at around 50 MeV/u which can survive higher power beam irradiation.

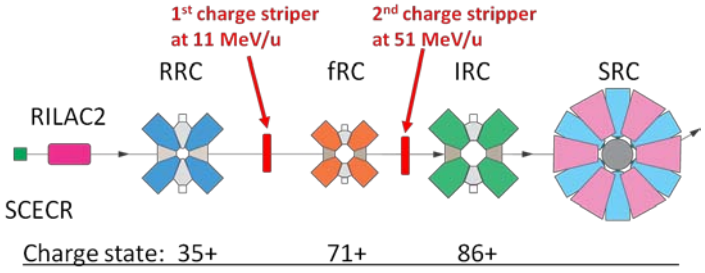

Figure 1: Acceleration scheme for uranium beam at RIBF