

Further Development of RIKEN 18 GHz ECRIS,
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- To increase the beam intensity of highly charged ion beams, it is necessary to increase the electron density of plasma and to achieve the proper ion confinement. For this purpose we have applied two methods to RIKEN 18 GHz ECRIS. 1) Al₂O₃ coating on the plasma chamber and 2) a movable electrode installed in the plasma chamber. The Al₂O₃, which is obtained by oxidizing the Al tube surface, works as an electron donor. In the case of the electrode method, the best results are obtained at floating potential. We found that the electrode works to change the plasma potential depth by the careful measurements under the pulsed mode operation. From this result, it is suggested that the electrode can be used to select the proper ion confinement time. We observed the strong enhancement of Ar¹¹⁺ from 160 to 280 e micro A and Ar¹⁶⁺ from 5 to 18 e micro A at the extraction voltage of 15 kV and RF power of 500 - 700 W using 1) and 2). In this paper, we present the results of various kinds of highly charged ion production and discuss about the mechanism of ion confinement.

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