

The current status of studies about ion sources for research equipment in KBSI

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1. Introduction

After development of 28 GHz ECR ion source in Korea Basic Science Institute, we were started new topic for analytical instruments. Our research target to support researchers of bio-medical, industrial application and basic science was established. Firstly, we had interesting about supporting micro-dosing researches for biology and medicine. Feasibility studies has been performing for adoptable system design using ECR ion source of Korea University Sejong Campus. Secondly, we have studied compact ECR ion source for Accelerator Based Neutron Sources (ABNS). The (p,n) and (d,n) nuclear reaction are accomplished using generated high current proton and deuteron from ECR ion source. Also, we are developing miniaturized ion sources for Multiplexed ion beam imaging (MIBI). They are composed with duo plasmatron and RF ion source.

2. Items and current status

The ECR ion source of Korea University Sejong Campus as shown Fig. 1. is re-installing for positive ion mass spectrometry. For refurbish, we are manufactured and purchased many parts that are RF components, vacuum components and analyzing magnet. After refurbish, several works had been performed cooling test, magnetic field test and vacuum test.



Fig. 1. ECR ion source of Korea University Sejong Campus

Another ECR ion source was designed for ABNS system as shown Fig. 2.^[1] The dimensions of the ECR ion source are $\Phi 55 \text{ mm} \times L 50 \text{ mm}$ with a plasma chamber including a $\Phi 32 \text{ mm}$ RF window and an $\Phi 8 \text{ mm}$ electron multiplier.

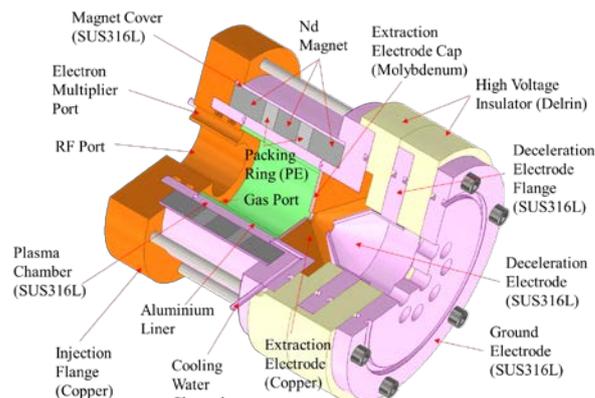
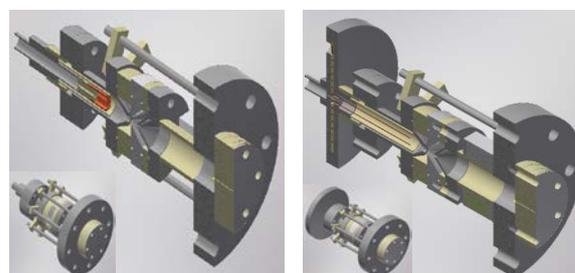


Fig. 2. Design of ECR ion sources for ABNS system

MIBI system lets you analyze and interpret cellular interactions. For MIBI system, we already developed gas cluster ion beam. The duo plasmatron source and RF ion source is designed for oxygen ion. They are showed in Fig. 3.



(a) Duo Plasmatron (b) RF ion source

Fig. 3. Design of ion sources for MIBI system

In this presentation, we will introduce detailed information about developing items and current status. we want to discuss about applications and design issue.

REFERENCES

- [1] J. Bahng, et al., Design of compact accelerator system for high flux accelerator based neutron source, Rev. Sci. Instrum. 91, 0233323 (2020)