

The Status of Ion Beam Analysis System Based on the Tandem Accelerators of KOMAC

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Ion Beam Analysis (IBA), which can analyze surface composition, depth distribution, and multi-layered thin film structure using an ion beam, widely used in the various fields for the developments of thin films for semiconductors, safety related materials for nuclear power and nuclear fusion and standard materials. It also can be used for the standard material development, cultural property research, and environmental research such as fine dust.

Korea Multi-purpose Accelerator Complex (KOMAC) of the Korea Atomic Energy Research Institute has a 1.7-MV tandem accelerator and a 3-MV tandem accelerator. Ion beam analysis devices such as a RBS (Rutherford Backscattering Spectroscopy), a ERD (Elastic Recoil Detection), a PIXE (Proton Induced X-ray Emission), and an external beam PIXE were installed and are in operation, and the ERD-TOF (Time-Of-Flight) device is under test. Two ion sources (SNICS, Alphasross) of 1.7-MV tandem accelerator are used to extract ion beams such as H, He, Cl, etc. for ion beam analysis with the ion beams energies of 2~3 MeV. In addition, the 3-MV tandem accelerator has higher energy than the 1.7-MV tandem accelerator, so PIGE (Proton-Induced Gamma-ray Emission), NRA (Nuclear Reaction Analysis), and high energy ERD can be applied. In this conference, we present the current status of the ion beam devices built on the 1.7-MV tandem accelerator, and the construction and utilization of the ion beam analysis device based on the 3-MV tandem accelerator. In particular, in the case of the IBA devices based on the 3-MV tandem accelerator, emphasis was placed on the multipurpose conceptual design of the analysis chamber in order to implement a simultaneous analysis system capable of performing two or more types of ion beam analysis simultaneously.



Fig. 1. Beam Lines of 1.7 MV Tandem Accelerator and 3 MV Tandem Accelerator of KOMAC

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