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Development of 1 MV Electrostatic Accelerator with Compact RF Ion Source at KOMAC

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1 MV electrostatic accelerator is being developed in the KOrea Multipurpose Accelerator Complex (KOMAC), and has specifications of the 1 MV of maximum accelerating voltage and more than 1 mA of beam current to meet the needs from the users with a MeV range ion beam implantation. The accelerator consists of ion source, accelerating tube, beam transport system, switching magnets and target chamber. For the high-voltage power supply, ELV type was chosen due to its robustness and capability of high current. Because of the limited space and limited electrical power inside the pressure vessel, a compact RF ion source driven at 200 MHz was chosen. Before installation of the accelerator, we carried out several tests including high voltage and beam extraction at the 300 kV test-stand, test of strength and vacuum tightness of quartz tube used as plasma chamber under 0.53 MPa SF₆ environment, reliability test of electronics for RF ion source controlled by optical fiber. In this paper, the tests and installations for 1 MV electrostatic accelerator are described and the results of beam extraction measurement are presented.

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