

ABSTRACT

An ion beam irradiation apparatus is provided with a plasma production device 30 which produces a plasma 12 through the radio frequency discharge and supplies the produced plasma in the vicinity of the substrate 4. The plasma production device 30 includes a plasma producing chamber 32 being elongated along an axis 33 extending in scanning directions X in which the ion beam is moved; a plasma emission hole 34 being provided in a side thereof and elongated along the axis 33 of the plasma producing chamber; and a magnet 36 provided outside the plasma producing chamber 32 for producing a magnetic field having a direction along the axis 33. The magnetic field developed by the magnet 36 contains a magnetic field which has a direction along the axis and bends to the substrate ions contained in the plasma 12 emitted from a plasma emission hole 34.