

IonEtch

Sputter Ion Gun, GenII

The tectra IonEtch ion gun is a filamentless ion source based on a microwave plasma discharge. The IonEtch works by coupling microwave energy into a coaxial waveguide and from there via evanescent wave coupling, into an Alumina plasma chamber. The intense oscillating electric fields cause the gas to breakdown and a plasma discharge to take place. An axial magnetic field around the chamber further enhances the plasma density via the Electron Cyclotron Resonance (ECR) effect. Ions are extracted from the plasma using a two grid single-hole extraction optics.

The use of microwaves to sustain the plasma allows ions to be extracted at very low energies without the plasma collapsing (down to 25eV) and since there are no hot metal electrodes in the plasma also permits the use of reactive gases such as oxygen and hydrogen.

The new GenII is the second generation of the IonEtch sputter gun with some significant improvements in performance and features. To name only some: higher total beam current, high efficiency direct microwave coupling without need of tuning, Alumina plasma cup now standard, only 4 screws to undo non-bakeable parts and more compact, space saving air side setup.



Typical applications:

- sputter cleaning / surface preparation in surface science
- MBE and HV sputter processes
- ion assisted deposition, ion beam sputter coating
- reactive ion etching.

Key Features:

Filamentless Ion Source	Suitable for use with most gases including reactive gases such as oxygen, hydrogen, nitrogen etc.
No microwave tuning	Factory set. Simply turn the plasma on and off.
User configurable	The ion optics are designed to be quickly and easily exchanged allowing users to customise their source to suit a particular combination of sample size, working pressure and current density. Easily exchanged apertures enable beam diameter, gas load and current density to be optimised.
Cost effective:	IonEtch including power supply from €9.000,- (ca. US\$ 11.000,-)

Integration of the robust microwave generator and the ion source, mean that no tuning of the source is required and there is no waveguide to construct or install.

Due to the evanescent wave coupling, no electrodes are present in the plasma i.e. no filaments or other metal. The plasma is entirely surrounded by Boronnitride (BN) or other dielectric materials e.g. alumina. Therefore the source is also suitable for use with reactive gases such as oxygen and hydrogen. A selection of grids and grid conductances allows the optimum balance between gas flow, working pressure and beam current to be achieved.

Specification:

Ion Energy	25eV – 5keV
Total Beam Current	1mA (at 5kV with Ø1,5mm aperture and Argon), >3,5mA (with Ø3mm aperture)
Beam Divergence	Ion energy dependant (typically 15°)
Working Distance	10 cm (typically)
Mount	CF-35 (2.75"OD)
Gas Inlet	CF-16 (1.33"OD)
Gas Flow Rate	1 – 5 sccm (1,5 sccm typical, gas dependant)
Working Pressure	10 ⁻⁶ mbar – 10 ⁻³ mbar (1x10 ⁻⁵ mbar typical in chamber with 300l/s pump). Low 10 ⁻⁶ mbar range possible at reduced beam current.
Source	Microwave Plasma Discharge (No Filament)
Source Diameter	33mm (vacuum side)
Leak Valve	Required or mass flow controller
Options	Leak Valve, remote control options, differential pumping, different apertures

Dimensions:

