K1050X RF Plasma Etcher/Asher/Cleaner

Quick Overview

The K1050X is a modern, solid-state RF plasma barrel reactor designed to meet the requirements of research and development and small-scale production for a wide and varied range of plasma etching, plasma ashing and plasma cleaning applications.

Key Features

* **Drawer type specimen stage -** gives easy convenient specimen access
* **Micro-controller: fully programmable by the operator -** easy, flexible operation
* Fully-automatic operation

Modern solid state 100 RF 13.56MHz power supply - rugged and reliable

* **Automatic tuning of forward and reflected power -** ensures optimum power conditions for plasma ashing and plasma etching protocols
* **LCD display -** operator sees all conditions (vacuum, RF power, elapsed time) during operation
* **Two gas flow meters -** allows precise control and mixing of process gases, especially useful for plasma etching processes
* **Pump-down to predetermined vacuum before admitting gases**
* **Vent control - minimal specimen disturbance** - especially useful for fine plasma-ashed specimens
* **Three-year warranty**

Product Description

Built to withstand heavy use - 24 hours a day for some plasma ashing schedules - the K1050X features microprocessor control with automatic operation and offers durability and simplicity of operation. Barrel systems plasma etch or plasma ash isotropically (in all directions) and are suitable for the majority of applications.

The K1050X uses a low pressure, RF-induced gaseous discharge to modify specimen surfaces or remove specimen material in a gentle, controlled way. A significant advantage over alternative methods is that the plasma etching and ashing processes are dry (no wet chemicals needed) and take place at relatively low temperatures.

A wide range of surface modification methods are available, using a variety of process gases. Using oxygen (or air) as the process gas, the molecules disassociate into chemically-active atoms and molecules and the resulting ‘combustion’ products are conveniently carried away in the gas stream by the vacuum system.

Chamber, specimen handling and gas control

The K1050X has a 110mm diameter x 160mm borosilicate glass chamber horizontally mounted with a slide-out specimen drawer and viewing window. Evacuation of the

chamber is achieved by an optional 50L/m mechanical rotary vacuum pump. Ingress of reactive gases is controlled by two built-in flow-meters backed by solenoid valves.

NB: For applications where borosilicate glass needs to be avoided, the K1050X can be fitted with a quartz chamber (EK4222).

Power, tuning and vacuum monitoring
RF power of up to 100W at 13.56MHz is available and can be infinitely controlled and pre-set to required values. Automatic tuning of forward and reflected power is standard. Forward power and vacuum levels are indicated by the digital display.

Automated microprocessor control
The K1050X is fully automatic. Control parameters for time, power and vacuum are easy to preset and can be monitored and adjusted throughout the process run.

'Autotuning' of RF power for optimum control and reproducibility
During the plasma process the 'autotune' facility ensures that the RF power is automatically impedance-matched to any variation in the system or loading. This means conditions in the chamber are maintained at their optimum - important as it gives faster reaction times, greater reproducibility of results and protects the power supply during the RF cycle.

Pumping options
A working system requires only the addition of a specified rotary pump. A fomblinised rotary pump (EK3176) is strongly recommended for safety reasons when applications involve the use of oxygen as a process gas. Where oil-based rotary pumps need to be avoided, we offer dry pumping options (see Specifications).

Additional Information

Applications
* Asbestos and man-made mineral fibre detection using plasma ashing preparation techniques - see Downloads for UK Health and Safety Executive method for detecting man-made mineral fibre (including asbestos)
* Plasma etching (removal) of photoresist and epi-layers
* Low temperature plasma ashing of organic materials (eg epoxy resins, filters, foodstuff, etc)
* Surface treatment of plastics for hydrophobic to hydrophilic conversion
* Improving painting and inking characteristics of plastics
* Plasma etching and plasma ashing of organic specimens for SEM and TEM examination
* Plasma cleaning SEM, TEM and SPM parts
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Options and Accessories
* EK3176 RV3 50L/m fomblinised rotary pump with oil mist filter (recommended)
* EK3171 XDS5 Scroll pump
* EK4221 Capacitance Manometer (for use with CF_4 and similar reactive gases)

* EK4222 Quartz chamber and door (replaces standard borosilicate chamber and door)

K1050XT
A turbomolecular-pumped version is available - please contact us for information on the K1050XT.

Options for reactive gases
Reactive process gases, such as CF_4, significantly reduce the life of the standard Pirani gauge. Therefore use of the optional EK4221 Capacitance Manometer for vacuum measurement is essential.

Specifications

Instrument case	450mm W x 350mm D x 300mm H
Barrel work chamber	Borosilicate glass 110mm Ø x 160mm D. Weight: 25kg
Rack out drawer	Sliding drawer assembly with specimen holder tray
Plasma output	RF power supply - solid state 150W RF
Vacuum gauge	Active gauge head with fully operating vacuum range display (atmosphere to $1x10^{-5}$mbar. Normal operating vacuum 0.5mbar to 1.0mbar)
Timer	Displays elapsed time with range selection: 99.9 hours with automatic termination of the plasma process
Dual gas flow gauges	Dual gas needle valve flow control, selectable for either or both gases
Electrical supply	230V/50Hz (5A max including pump), 115V/60Hz (10A max including pump)
Services	Process gas at nominal 5psi (0.33bar)
Vacuum pump	Requires a rotary pump with a capacity of 50L/m or greater. A fomblinised version is recommended for oxygen gas applications (see EK3176 50L/m fomblinised rotary pump).

Ordering Information

EK3158	K1050X RF plasma barrel reactor (rotary pump also required - see optional accessories)
EK3161	K1050XT RF plasma barrel reactor with built in 50L/s turbomolecular pump (rotary pump also required - see optional accessories)

Pumps and optional accessories

EK3176	Edwards RV3 50L/m fomblinised rotary pump with oil mist filter (recommended)
EK3171	Edwards XDS5 scroll pump
EK4221	Capacitance manometer
EK4222	Quartz chamber and door (replaces the standard borosilicate chamber and door)

Site Requirements

Mains electricity supply: Ensure that a suitable mains electricity supply is available - 230V/50Hz (5A max including pump) or 115V/60Hz (10A max including pump). Check that the voltage label attached to the side of the cabinet is suitable for the local voltage and frequency. The units are supplied for either 230V or 110V operation at 50/60Hz.

Position: The K1050X should be in a convenient position for the process gas supply and/or cylinders, and needs to have safe venting of toxic process gases. There needs to be adequate access to the rear of the unit for gas and vent connections.

Vacuum pump: Ensure the rotary pump is filled with oil in accordance with the manufacturer's instructions. The exhaust should be filtered or expelled to a safe area. All pumps we supply are fitted with an exhaust filter.

Rotary pumps and process gases: When using RF plasma equipment, the following precautions are necessary with regard to rotary pumps and exhaust gases:

* If the process gas is oxygen it is essential that Fomblin - a non-hydrocarbon oil - is used. This requires the use of a fomblinised pump.
* For process gases that contain fluorine or chlorine, precautions must be taken for the safe removal of exhaust gases from the pump as they may contain free halogens.
* Some etching gases - such as sulphur hexafluoride - require special rotary pump oils. If in doubt please contact us, or the manufacturers of the rotary pump.

Space requirements: 450mm W x 350mm D x 300mm H. Weight: 25kg. Additional space is required for the rotary pump, which can be located either on the floor or on the bench with the K1050X.