rbd instruments
innovations for surface science

2 kV backfill ion source and control

IG2 ion source package

description

RBD Instruments' IG2 Ion Source Package is the ideal solution for sputter cleaning of samples under UHV conditions. The IG2 Ion Source Package consists of the Model 04-165 2 kV Backfill Ion Source and the Model 32-165 Ion Source Control. These units are interchangeable with the PHI® 04-161 and 04-162 ion guns and the PHI® 20-045 control, respectively.

The Model 04-165 Backfill Ion Source generates an energetic inert gas ion beam for sputter-etching solid surfaces. The source requires a static pressure of $5x10^{-5}$ torr with an inert gas such as argon. Ions are generated by electron impact within the ion source's dual filament ionization chamber and are then focused at the target with energies of up to 2 kV. The impurity content of the ion beam is minimized by using an off-axis filament geometry. A focusing lens permits high ion current density to be obtained for a given operating pressure and source-to-sample distance. A dual tungsten filament assembly permits continued operation when the first filament opens. The expected lifetime of the filament assembly is several years under normal usage at the recommended operating conditions. The filament assembly is easily replaced in the field.

The Model 32-165 2 kV Ion Source Control provides all the necessary voltages and currents required to operate the Model 04-165 2 kV Backfill Ion Source. The beam voltage may be activated manually, remotely, or with the built-in timer. Additionally, the anode (ion) and filament currents, as well as the beam and focus voltages, may be externally monitored to ensure accurate reproduction of sputtering conditions.

benefits

04-165:

- **"Cleaner" Ion Beam:** Uses an off-axis filament geometry to minimize impurities
- **Longer Use:** Expect several years of use from the filament assembly. Additionally, there are two filaments: If one opens, simply use the filament switch to select the second filament so that the 04-165 continues to work without breaking vacuum.
- **Easy to maintain:** The filament assembly is easily replaced in the field.

32-165:

- **Multiple Ways to Sputter:** Activate the beam voltage manually, remotely, or with the built-in timer.
- **Know Ahead of Time That You Need to Replace Your Filament:** The hour meter lets you track your filament's lifetime so you'll know *before* it's time to replace it.
- **Replicate Your Sputtering Conditions:** Externally monitor the ion and filament currents as well as the beam and focus voltages.

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04-165 ion source specifications

Source Type	Hot filament electron impact (dual filament, backfill type)
Beam Energy	≤ 2 keV in 500 eV increments
Beam Diameter	
at 25 mm working distance	2.5 mm FWHM (at target)
at 50 mm working distance	3.5 mm FWHM (at target)
Maximum Total Target Current	10 µA at V_B = 2 kV
Current Density	
at 25 mm working distance	200 µA/cm2 when V_B=2 kV, Emission Current = 30 mA
at 50 mm working distance	100 µA/cm2 when V_B=2 kV, Emission Current = 30 mA
Mounting	Standard 70 mm (2.75") CF bored flange OD, approx. 34.3 mm (1.35") ID minimum tube required
Flange to End-of-Optics	7.00" or 9.25", 2.25" less with optional X-Y Aligner (RBD P/N IG2-EA)
Working Distance	Typically 25-50 mm from end-of-optics to target
Source Gases	Typically Argon, but can also use He, Ne, Kr & Xe
Bake-out Temperature	200° C maximum

32-165 ion source control specifications

Input Power	90-264 VAC @ 47-63 Hz, single phase
Beam Supply Voltage	500 to 2000 V in 500 V increments
Controls	
Beam Control	Manual, Timer, Remote (TTL high → on)
Beam Voltage	4-position switch
Focus Voltage	5-turn potentiometer
Filament Current	5-turn potentiometer
Timer	1-turn potentiometer (0-60 min.)
Front Panel Monitors	
Beam	0 to 2 V corresponds to 0 to 2 kV
Focus	0 to 2 V corresponds to 0 to 2 kV (referenced to V_B)
Filament	0 to 2.5 V corresponds to 0 to 2.5 A
Anode Current	0 to 10 mV corresponds to 0 to 10 µA
Cooling	Convection
Dimensions	19" rack mount x 14" deep x 3" high

All specifications are subject to change without notice.

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2437 NE Twin Knolls Drive • Suite 2 • Bend, Oregon • 97701
Phone: 541.330.0723 • Fax: 541.330.0991
email: sales@rbdinstruments.com • web: www.rbdinstruments.com