QUANTUM | SYSTEM

Ion & Neutral Deposition Rate Monitor

A unique instrument to measure the deposition ratio of ions & neutrals at a surface inside a plasma reactor.

Measures

- Ion neutral fraction
- Deposition rate
- Ion energy
- Ion flux
- Bias voltage

Functionality

- Time averaged
- Time trend

Features

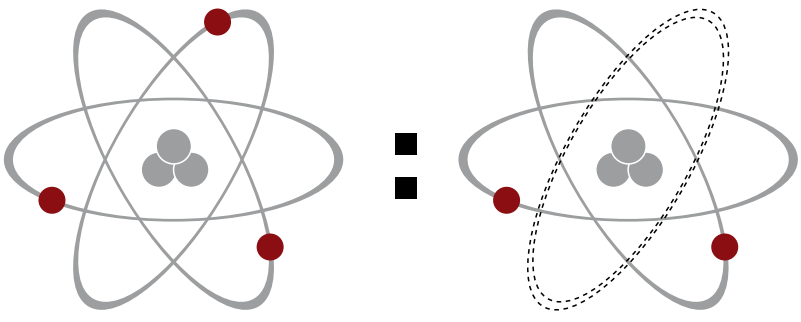
- Quantum electronics unit
- Advanced analytical software suite
- Replaceable button probe sensors
- Quick start and advanced user modes

The Quantum System is an energy resolved gridded quartz crystal microbalance, used to measure the ion neutral fraction at a surface inside a plasma reactor.

This cutting edge technology also measures the deposition rate, ion energy, ion flux and bias voltage.

The Quantum System is used across industry and research with applications in plasma deposition, coatings, plasma sputtering, PECVD, etching and ion beam.

The Quantum System is perfect for users researching plasma recipes, ionization, plasma processes, tool development and fundamental plasma research.



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Measuring Parameters

Ion Energy Range	2000 eV - Vdc
Ion Current	2 mA DC max
Ion Flux Range	Std: 0.01 - 50 (A / m²)
IEDF Resolution	± 1 eV nominal

Crystal Monitor

Frequency Range	3.5 MHz to 6.1 MHz
Frequency Resolution	1 Hz
Mass Resolution (at crystal)	12.3 ng / cm²
Mass Resolution (at sensor surface)	372.73 ng / cm²
Film Thickness Resolution (Copper)	4 Å
Measurement Update Rate	10 measurements / second

RFEA Probe

Probe Configuration	4-grids plus Quartz Crystal
Button Probe Diameter	33 mm
Holder Diameter	100 mm (4"), 300 mm (12") as standard
Holder Thickness	5 mm
Max Operating Temperature	200° C
Max RF Bias Voltage	1 kV pk-to-pk
MAX DC Bias Voltage	-1940 V
RF Bias Frequency Range	400 kHz to 80 MHz
Probe Enclosure and Holder Material	Aluminium, anodized aluminium, stainless steel* and ceramic (Al2O3)*
RFEA Probe Cable Length	650 mm standard (custom available)

*On request

Feed-Through Assembly

Flange Type	CF40 (custom available)

Control Unit Electronics

Grid Voltage Range	-2 kV to +2 kV
Current Range	100 pA to 2.4 mA
Connectivity	USB 2.0

Application Software

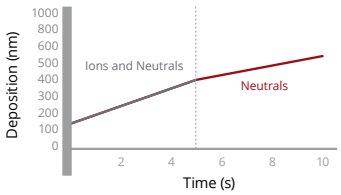
Operating System	Windows 2000 / XP / Vista / Windows 7 / Windows 8 / Windows 10

Operating Parameters

Pressure (Pascal)	0 to 40 Pa*
Pressure (Torr)	0 to 300 mTorr*
Density (for Ar at 3 eV)	10^{12} to 10^{18} m^{-3}
Gas Reactivity	Inert to highly reactive

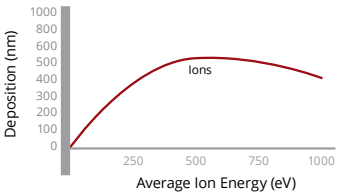
*Dependent on ion mean free path

Deposition as a Function of Time showing Flux Fraction



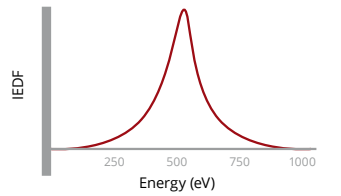
Total deposition rate versus neutral deposition rate in a plasma deposition chamber

Deposition as a Function of Average Ion Energy



Deposition as a function of increasing average ion energy hitting a substrate in a plasma deposition chamber

Ion Energy



The ion energy distribution function in a single location