scia systems

scia Mill 200 for Ion Beam Etching (IBE)

The scia Mill 200 is designed for highly uniform Ion Beam Etching and Milling of wafers up to 200 mm diameter. Carriers or wafers are loaded via an automatic handling system. A typical application is structuring of complex multilayers of materials with very low contamination. For that reason a SIMS end point detection system can be integrated for recognition of etched species and a defined etch stop.

The scia Mill 200 can be used for Ion Beam Etching (IBE) with inert gases. Additionally the system can be applied for Reactive Ion Beam Etching (RIBE) as well as for Chemically Assisted Ion Beam Etching (CAIBE).

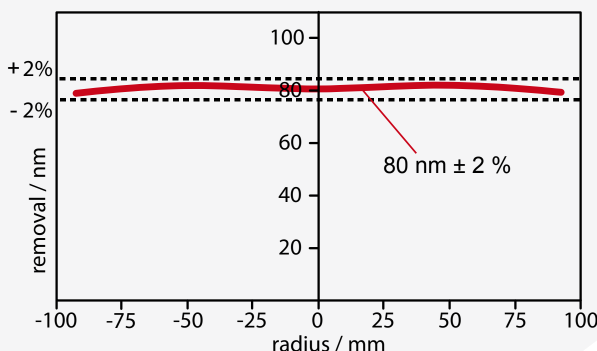
The system can be upgraded for Dual Ion Beam Deposition (DIBD), with an additional ion beam sputter source RF120-e and a target holder.

Features

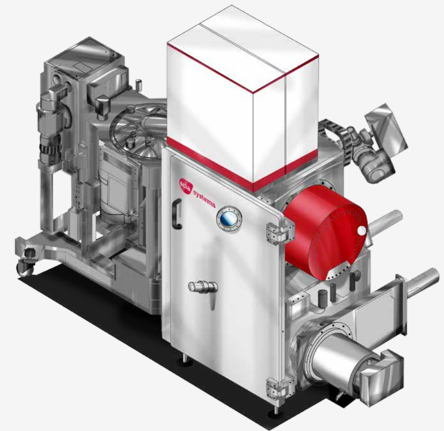
- Large area Ion Beam Etching
- IBE with inert gases
- RIBE and CAIBE with reactive gases
- Etching under a defined angle
- Water cooled substrate holder with helium backside cooling contact

Applications

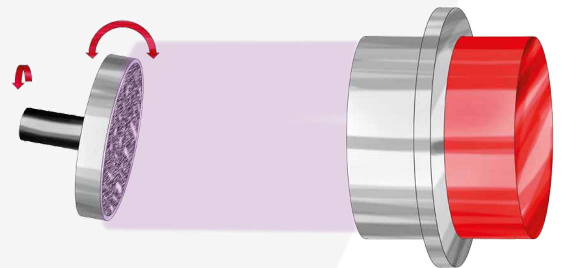
- Structuring of MEMS and sensors
- Structuring of MRAM and TMR/GMR sensors
- Structuring of metallic and dielectric multilayers
- Ion Beam Smoothing
- Microstructuring
- Reactive etching of III/V Semiconductors (e.g. GaAs, GaN, InP)



Ion Beam Etching with Argon on a 200 mm wafer with SiO_2: uniformity variation 2 %, rate 16 nm/min



scia Mill 200 with handling robot



Schematic principle of scia Mill 200

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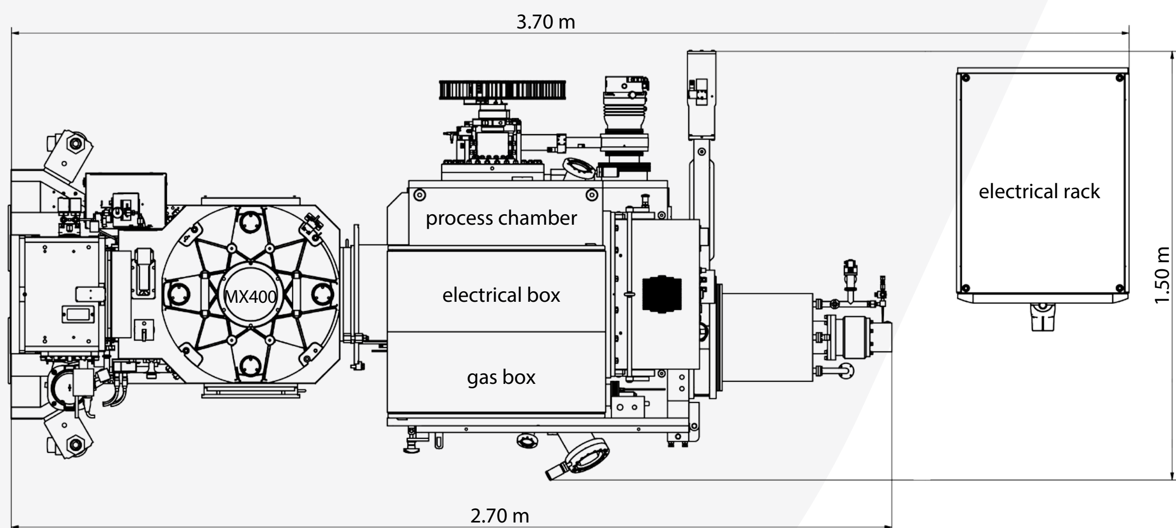
Technical Data

Substrate diameter	Up to 200 mm dia.
Substrate holder	Water cooled, helium backside cooling contact Substrate rotation 5 to 20 rpm Tiltable in-situ from 0° to 170° in 0.1° steps
Ion beam source	Circular ion beam source RF350-e
Neutralizer	Plasma bridge neutralizer N-RF
Typical removal rates	SiO_2: 20 nm/min TiW: 12 nm/min Cu: 24 nm/min
Uniformity variation	≤ 2.0 %
Base pressure	< 1 x 10^{-6} mbar
System dimensions (W x D x H)	2.70 m x 1.50 m x 2.40 m (without electrical rack and pumps)
Tool configuration	Single wafer load-lock, Cluster system with cassette handling
Software interfaces	SECS II / GEM



Footprint of scia Mill 200 with handling robot MX400

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