

scia Mill 300

FULL SURFACE ETCHING ON 300 mm WAFERS

Features & Benefits

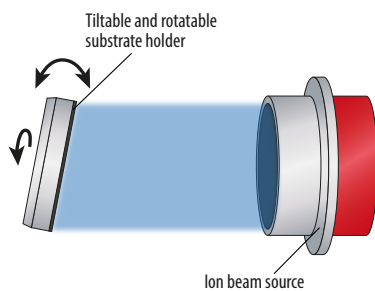
- Etching angle adjustment with tiltable and rotatable substrate holder
- Excellent uniformity without shaper
- Enhanced selectivity and rate with reactive gases
- Process control with exact SIMS based or optical end point detection
- Processing of wafers with photoresist masks due to good wafer cooling
- Fully automatic cassette handling in variable cluster layouts including SECS/GEM communication

Applications

- Structuring of magnetic memory (MRAM) and sensors (GMR, TMR, etc.)
- Structuring of metals, piezoelectric, and dielectric materials (PZT, KNN, AlScN, InP, Cu, Pt, Au, ...), e.g., for MEMS production
- Delayering of multilayer structures for failure analysis
- Patterning of waveguides (LiNbO₃, BTO, ...) for Photonic Integrated Circuits (PIC)
- Production of slanted surface relief gratings (SRG) for Augmented Reality
- CAIBE of compound semiconductors (GaAs, GaN, InP, ...)
- Ion beam smoothing for reduction of microroughness

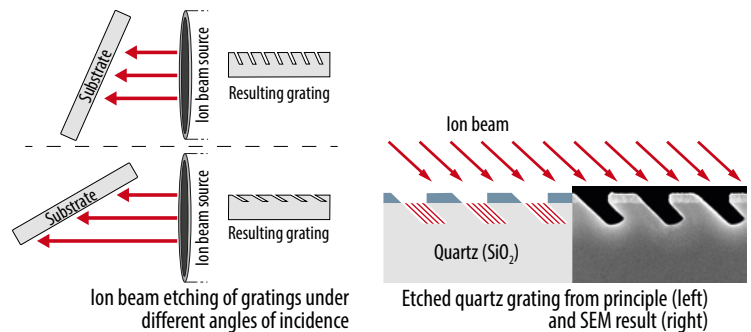
Principle

- Ion Beam Etching (IBE) / Ion Beam Milling (IBM), Reactive Ion Beam Etching (RIBE), Chemically Assisted Ion Beam Etching (CAIBE)
 - Circular ion beam source etches full substrate area under a defined angle with inert or reactive gases



Application Example

- Reactive ion beam etching of slanted surface relief gratings (SRG) as optical couplers for Augmented Reality (AR)
 - Flexible angle of incidence and independent control of ion energy and ion current to adjust slant geometry and selectivity



Technical Data

Substrate size (up to)	300 mm dia.
Substrate holder	Water-cooled, helium backside cooling contact, substrate rotation 1 to 20 rpm, tiltable in-situ from 0° to 170° in 0.1° steps
Ion beam source	450 mm circular RF source (RF450-e)
Neutralizer	RF plasma bridge neutralizer (N-RF)
Typical removal rates	Cu: 60 nm/min, Pt: 35 nm/min, W: 18 nm/min, SiO ₂ : 20 nm/min (inert), SiO ₂ : 40 - 60 nm/min (reactive)
Uniformity variation	≤ 2 % (σ/mean)
Throughput	12 Wafer/h (100 nm SiO ₂ removal)
Base pressure	< 5 x 10 ⁻⁷ mbar
System dimension (W x D x H)	2.70 m x 1.50 m x 2.00 m, for single chamber with single substrate load lock (without electrical racks and pumps)
Configurations	Single chamber, optional single substrate load lock or cassette handling, cluster system with up to 3 process chambers and cassette handling, optional OES or SIMS based end point detection
Software interfaces	SECS II / GEM, OPC

