scia systems

PRECISE SURFACE CORRECTION

scia Trim 200

Features & Benefits

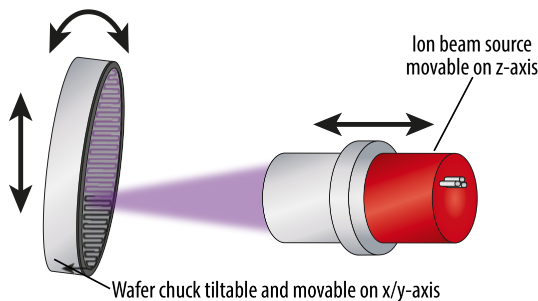
- Significant yield improvement
- Film thickness homogeneity to be adjusted down to atom level of 0.1 nm
- No edge exclusion with electrostatic chuck
- Sub-nanometer removal with zero base etch function
- Processing of film and wafer materials without restrictions
- Throughput and maintenance optimized design for low production costs
- Processing of wafers with photoresist masks due to good wafer cooling

Applications

- Frequency trimming of bulk acoustic wave (BAW) or surface acoustic wave (SAW) filters
- Thickness trimming of silicon on insulator (SOI), quartz, lithium tantalate (LT) or lithium niobate (LN) wafers
- Film thickness error or step height correction in thin film head (TFH) manufacturing
- Dimensional correction of MEMS structures

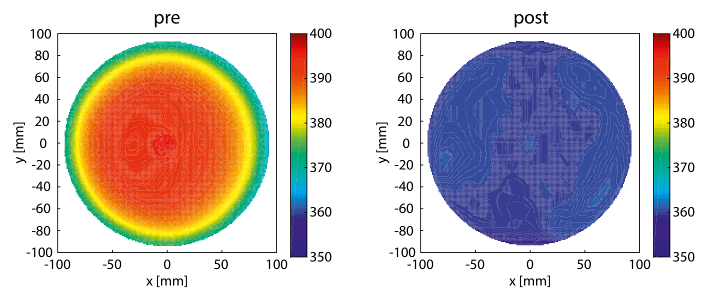
Principle

- Ion Beam Trimming (IBT)
  - Focused broad ion beam scans across wafer surface in vertical setup for low contamination
  - Local material removal is controlled by adjusting the dwell time



Application Example

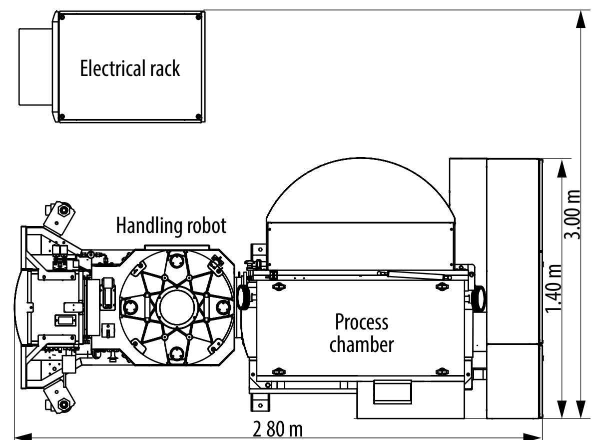
- Al_2O_3 trimming on a 200 mm wafer
  - Standard deviation: Pre: 9.4 nm Post: 0.4 nm
    Improvement factor: 23.5
  - Average thickness: Pre: 382.3 nm Post: 360.1 nm
    Target: 360 nm



Pre (left) and post (right) ion beam trimming results

Technical Data

Substrate size (up to)	200 mm dia., all standard wafer sizes possible
Substrate holder	Helium backside thermal contact, electro-static clamping without edge exclusion
Axes performance	Max. velocity 0.5 m/s, max. acceleration 15 m/s^2
Ion beam source	37 mm circular RF source (RF37-i) with 7 ...15 mm (FWHM) or 80 mm circular RF source (RF80-i) with 12 ... 20 mm (FWHM)
Neutralizer	Hot filament neutralizer (N-Fil) or RF plasma bridge neutralizer (N-RF)
Typical removal rate	SiO_2: 6 x 10^{-3} mm^3/s (RF37-i), 11 x 10^{-3} mm^3/s (RF80-i)
Film variation after trimming	< 0.5 nm RMS (dependent on input quality)
Throughput	15 Wafer/h (50 nm Si on 150 mm wafer)
Base pressure	< 1 x 10^{-6} mbar
System dimensions (W x D x H)	2.80 m x 1.40 m x 2.20 m, for single chamber with cassette handling (without electrical rack and pumps)
Configurations	Single chamber with cassette handling, Cluster system with 2 process chambers and cassette handling
Software interfaces	SECS II / GEM, OPC



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