scia systems

scia Magna 200

ADVANCED WAFER COATINGS

Features & Benefits

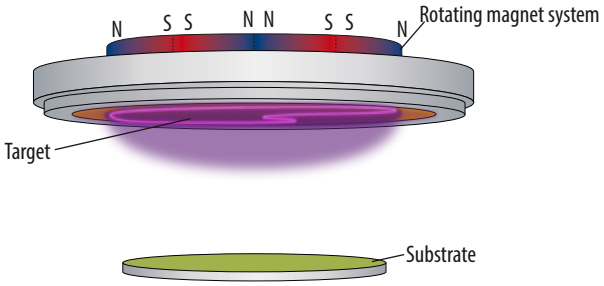
- RF bias for conformity and stress control
- Superior uniformity with rotatable substrate holder
- Low substrate temperature with helium cooling contact and electrostatic chuck
- High deposition rates with reactive sputtering in unipolar and bipolar mode
- Variation of film properties by adjustable energetic substrate bombardment
- Co-sputtering with confocal arrangement of magnetrons

Applications

- Temperature compensation films for TC-SAW devices (SiO_2)
- Piezoelectric films with excellent and defined crystal orientation (AlN)
- Optical high- and low-refractive coatings (SiO_2, TiO_2, HfO_2, ZrO_2, Nb_2O_5, Ta_2O_5)
- Electrical insulating films (Si_3N_4, SiO_2, Al_2O_3)
- Co-sputtering of metals and alloys

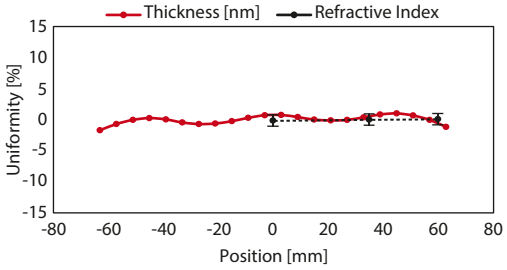
Principle

- Magnetron Sputtering in several configurations:
  - Single magnetron with rotating magnetic field, magnetron dia. > substrate dia. (see picture) or
  - Up to 4 magnetrons in confocal arrangement, magnetron dia. < substrate dia. (rotation required) or
  - DRM 400 from Fraunhofer FEP with two concentric targets, magnetron dia. > substrate dia.



Application Example

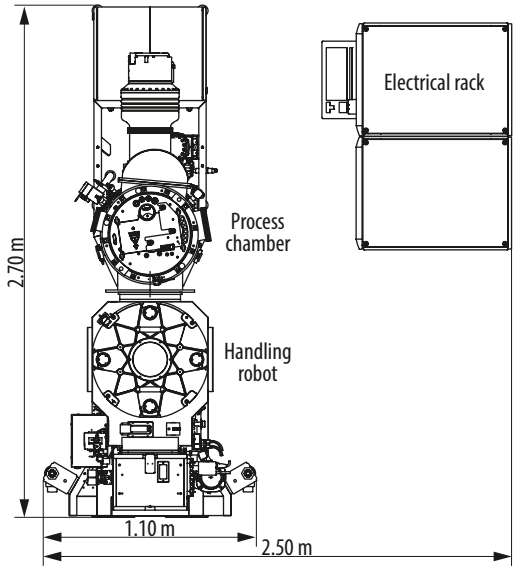
- Reactive sputter deposition of SiO_2 in confocal arrangement with bipolar pulsed DC on a 150 mm dia. Si wafer
  - Uniformity variation < 0.8 % (σ/mean), stress -300 MPa, deposition rate 7 nm/min
  - Refractive index of 1.48 indicates stoichiometric and dense SiO_2 deposition



Thickness and refractive index on a 150 mm dia. wafer

Technical Data

Substrate size (up to)	200 mm dia.	
Substrate holder	Water-cooled, helium backside cooling contact, rotation up to 20 rpm, optional RF bias, electrostatic clamping and wafer heating (up to 750 °C)	
Sputter sources	Substrates ≤ 150 mm 250 mm magnetron with rotating magnetic field or up to 4 magnetrons (125 mm dia.) in confocal arrangement	Substrates up to 200 mm 300 mm magnetron with rotating magnetic field or Double Ring Magnetron (DRM 400) from Fraunhofer FEP
Sputter modes	DC in uni- or bipolar pulse mode (up to 10 kW) and/or RF (up to 3 kW, 13.56 MHz)	DC in uni- or bipolar pulse mode (up to 2 x 10 kW) and/or RF (up to 6 kW, 13.56 MHz)
Typical deposition rates	SiO_2: 90 nm/min (single), 7 nm/min (confocal), 180 nm/min (DRM 400)	
Uniformity variation	≤ 1.5 %* (single), ≤ 0.8 %* (confocal), ≤ 0.5 %* (DRM 400) *(σ/mean)	
Base pressure	< 1 x 10^{-6} mbar	
System dimensions (W x D x H)	2.70 m x 1.10 m x 1.60 m, for single chamber with cassette handling (without electrical rack and pumps)	
Configurations	Single chamber with single substrate load lock or cassette handling, Cluster system with up to 5 process chambers and cassette handling	
Software interfaces	SECS II / GEM, OPC	



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