scia systems

GLANCING ANGLE DEPOSITION

scia Eva 200

Features & Benefits

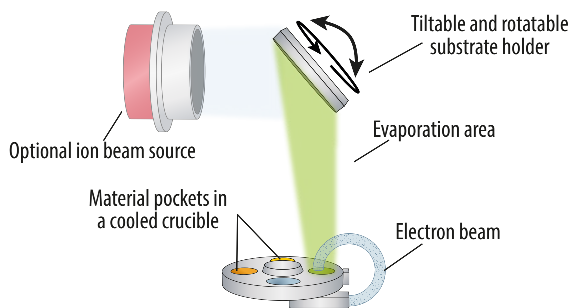
- Substrate holder precisely tiltable and rotatable, defined angle of incidence adjustable
- High deposition rates for evaporation of high temperature materials and refractory metals
- Up to 12 evaporation materials in water-cooled multi pocket rotatable crucible
- Optional ion beam source for pre-cleaning
- Fully automatic cassette handling in variable cluster layouts including SECS/GEM communication

Applications

- Glancing angle deposition (GLAD) of nano-structured thin film layers for production of photo-electrodes for efficient fuel generation
- Infrared-emitters for detection and spectroscopy for gas analyzer and smart applications
- Metallization of substrates
- Dielectric coatings
- Optical coatings

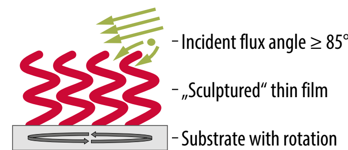
Principle

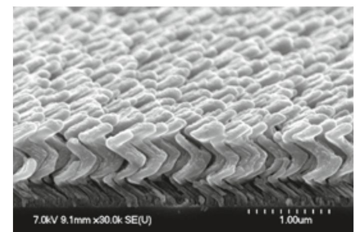
- Electron Beam (E-beam) Evaporation
  - Current through tungsten filament causes electron emission, which accelerates to an e-beam by high voltage.
  - A magnetic field deflects the e-beam so that it is focused into the crucible. This leads to evaporation of target material and deposition on the substrate.



Application Example

- Glancing incidence deposition under very small angles (typical: 85° in respect to the substrate normal)
- Porous nano-rod like structures due to self-shadowing effects, growth of nanostructures, such as nanowires, spirals or zig-zag structures is possible with substrate rotation
- Applicable for production of photo-electrodes for photo-catalytic generation of hydrogen





Principle of GLAD (left) and SEM picture of deposited silicon nanostructures (right) with courtesy of University of Nebraska

Technical Data

Substrate size (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 180° in 0.1° steps, optional heating
E-beam evaporator	4 to 12 pockets on a cooled crucible
Ion beam source (optional)	120 mm circular RF source (RF120-e) or 218 mm circular microwave ECR source (MW218-e)
Neutralizer	Plasma bridge neutralizer (N-RF or N3-DC)
Typical deposition rates	NiCr: 16 nm/min, SiO_2: 40 nm/min
Uniformity variation	≤ 0.3 % (σ/mean)
Base pressure	$< 5 \times 10^{-8}$ mbar
System dimension (W x D x H)	1.80 m x 1.50 m x 2.40 m, for single chamber with single substrate load lock (without electrical rack and pumps)
Configurations	Single chamber with single substrate load lock or cassette handling, Cluster system possible
Software interfaces	SECS II / GEM, OPC