BAL-TEC

Preparation to view information

High Vacuum Sputter Coater

SCD 500

High Vacuum Sputter Coating System for SEM and TEM applications

Coating Cryo Preparation
Ion Etching Solid State Preparation
Acessories and more...

Super Cool High Vacuum Sputter Coating Unit

The SCD 500 is designed for high vacuum coating for applications in electron microscopy and where small samples require metal coatings.

Key Features include:

- Compact bench unit
- membrane and turbo molecular pump for oil-free vacuum included in the housing
- Programmable coating thickness by means of quartz film thickness monitor (option)
- Simple, user friendly operation.
- Suitable for all kind of different metal targets
- Suitable for high resolution FE-SEM coatings.

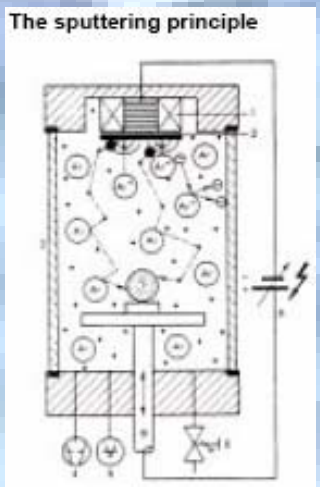
Applications:

- Fine grained coatings for high resolution in TEM / SEM (Cr, W, Au/Pd, Pt)
- Uniform coatings also for other than SEM/TEM applications
- Carbon coating for EDX / WDX analysis or to reinforce carbon collo-dium films with CEA 050 carbon thread attachment (option)
- Etching mode for surface cleaning to improve adhesion of the subsequent coating

The High Vacuum Sputtering Method

For very fine-grained sputter coated films BAL-TEC recommends high vacuum sputtering. Undesired residual gas components such as water vapor are virtually eliminated from the vacuum chamber by a high vacuum pump. The working pressure required for sputtering - approx. 10^{-2} mbar - is then re-established in the chamber with the admission of argon gas.
To start the sputtering process a high voltage is applied to the target (cathode). This produces a high voltage field between the target and the specimen table (anode). The free electrons in this field are forced into a spiral path by a magnet system where they collide with the argon atoms in the field. Each collision knocks out an electron of the outer shell of the argon atom, positively charging the otherwise neutral argon. This is a cascading process that causes a glow discharge (plasma) to ignite. The positively charged argon ions are now accelerated to the cathode (target) where they impinge, knocking off metal atoms as they hit the target. Collisions also occur between the metal atoms thus released and the other gas molecules in the vacuum chamber. This causes the metal atoms to scatter widely, forming a diffuse cloud. The metal atoms from this cloud impinge on the specimen from all directions and condense evenly on it. Thus even very fissured specimen surfaces are coated with an even, thin metal film that is sufficiently electrically conductive for examination in the SEM. The fine grained structure of the sputtered film is a function of the target material, the working distance, the gas pressure and the sputtering current as well as of the process length.

The sputtering principle



Possible attachments

- Quartz crystal thickness monitor
- planetary drive stage
- carbon thread evaporation accessory

Technical Data:

Dimensions

Unit:		
Vacuum chamber:	inner diameter	108mm
	Height	106mm
Specimen table	diameter	82mm
Foil target	diameter	54mm
	Thickness	0,2mm
Working distance	minimum	32mm
	Maximum	102mm

Weight 67kg

Connecting data

Electrical connection

Voltage	220/240/115V
Frequency	50/60Hz
Power consumption	
Main fuse for 220-240V	1A (delay-action)
Main fuse for 115V	2A (delay-action)

Argon process gas

Hose nipple connection	6mm (G1/8")dia.
Connection pressure	1-2 bar
Gas consumption	approx. 0,3mbar l/sec.

Venting gas (N2 recommended)

Hose nipple connection	6mm (G1/8")dia.
Connection pressure	1-2bar

Cooling water

Hose nipple connection	8mm (G 1/4")dia.
Connection pressure	1-4 bar
Recommended temperature	10-15°C
Throughput	approx. 0,5l/min.

Operational data

Sputtering current	max. 150mA
Open circuit voltage	approx. 1000V DC
Sputtering power	max. 100W
Sputtering rate for gold (at a working distance of 40mm in argon atmosphere of $5x10^{-2}$mbar)	~90nm/min.
process time adjustable	0 to 999 sec.
Pumping time to $5x10^{-5}$mbar	approx. 4min.

Membrane pump

Pumping speed (at atmospheric pressure)	13l/min

Turbo molecular pump

Pumping speed	68l/s

Scale drawing