

SEMPREP SMART

AI-powered sample preparation
for SEM applications

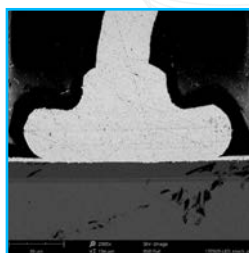


SEMPREP SMART is an award-winning ion milling solution designed for high-precision SEM and EBSD sample preparation. The device is equipped with a high-energy and, optionally, a low-energy argon ion source. Ion polishing allows for the improvement and cleaning of mechanically polished SEM samples and the preparation of damage-free surfaces for EBSD analysis. Outstanding cross-sectional results and precision are achieved even in demanding and sensitive cases, such as semiconductor testing and investigation of Li-ion battery separator membranes.

KEY FEATURES OF SEMPREP SMART

- AI-assisted, easy-to-use operation
- Highly automated workflow
- Extreme-precision cross-sectioning
- Intuitive control software
- Wide range of sample dimensions
- High-energy ion source for rapid milling
- Optional low-energy ion source for ultimate polishing results
- Vacuum sample transfer capability
- Automated liquid nitrogen or easy-to-use Peltier sample cooling
- Widest energy range on the market

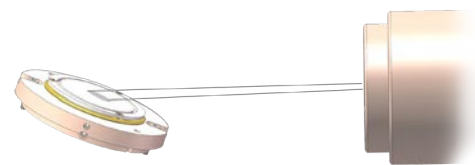
POLISHING WITH AR-ION BEAM



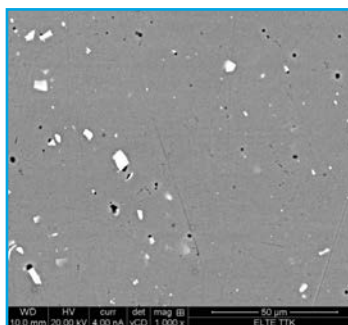
Mechanically polished surface of an LED electrode.



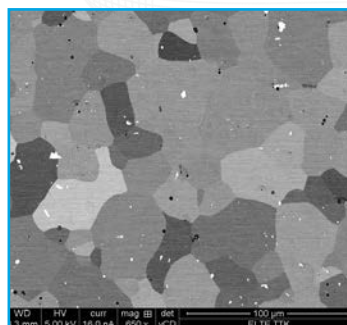
The same LED electrode after Ar-ion polishing.



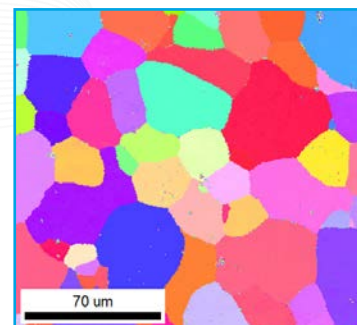
▲ Polishing for cleaning and enhancing huge surfaces to the ultimate quality.



Aluminium plate with holes and precipitates after mechanical polishing.



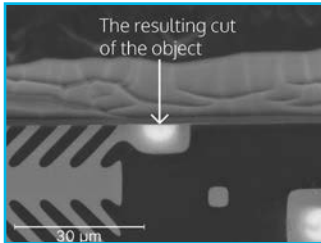
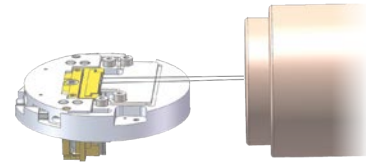
The same aluminium plate after Ar-ion polishing.



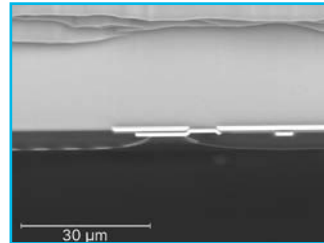
An EBSD inverse pole figure of the Al plate after Ar-ion polishing.

90° CROSS-SECTIONAL CUT AND 30° SLOPE CUT

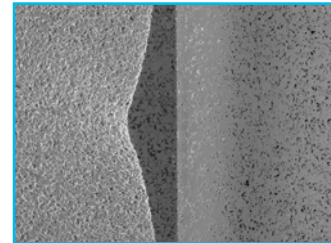
Cross-sectional cutting for accurate measurements and real cross-section investigations. 30° slope cutting for EBSD-quality surfaces anywhere inside the sample.



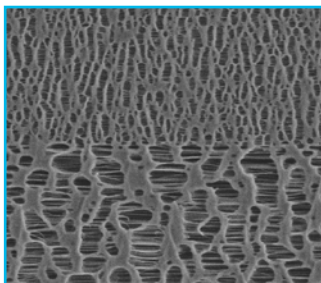
90° cut of TFT board. The accuracy of the cutting position is $\pm 1 \mu\text{m}$.



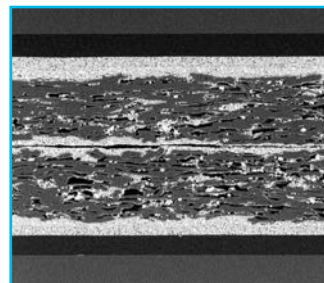
The TFT detail of the cut surface behind the spot.



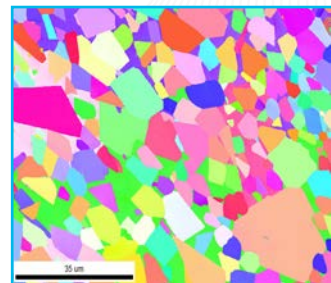
30° slope cut of a cemented carbide (WC-Co) sample.



Cross-section of a PE/PP multilayer battery separator membrane, prepared at room temperature.



Cross-sectional cut of laminated paper with liquid nitrogen cooling.



The slope cuts and cross-sections made with the Ar-ion beam are EBSD-ready without any additional treatment - an EBSD inverse pole figure of the same cemented carbide sample.

SPECIFICATIONS

Ion sources

- High-energy ion source operating up to 16 keV
- Maximum milling rate: $>500 \mu\text{m/h}$
- Optional low-energy source

Sample size

Slope cutting (30°) and cross-sectional cutting (90°) sample holders:

- 30° holder: max. 35 mm (l) x 16 mm (w) x 4.5 mm (th)
- 90° holder: max. 18.6 mm (l) x 16 mm (w) x 6 mm (th)

Sample holder for surface polishing (EBSD) with three different head types:

- Flat head type: max. $\varnothing 50 \text{ mm} \times 4 \text{ mm}$
- Standard type: max. $\varnothing 32 \text{ mm} \times 15 \text{ mm}$
- Hollow type: max. $\varnothing 25 \text{ mm} \times 23 \text{ mm}$

Sample stage

- Tilting: $\pm 30^\circ$
- Rotation: 360°
- Oscillation: $\pm 1^\circ$ to $\pm 360^\circ$

Sample cooling (optional)

LN2 cooling or Peltier cooling

Vacuum system

Oil-free diaphragm and turbomolecular pumps

Gas supply system

99.999% purity argon working gas, flow controlled with a needle valve, optional dry nitrogen venting

Turbomolecular pump

Pfeiffer HiPace 80 Neo

Imaging system

High-resolution CMOS camera with magnification-tracing measurement capabilities within the live image

Computer control

Easy-to-use graphical interface with ergonomic, built-in multi-touch screen, automated ion source operation, and stage position calibration