Préparation ionique pour observations MEB & analyses EBSD

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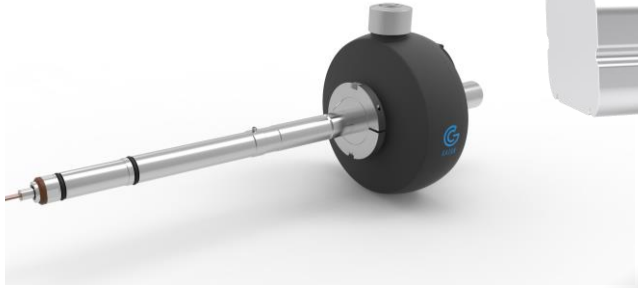
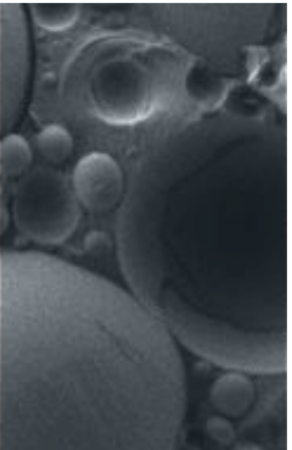
GATAN

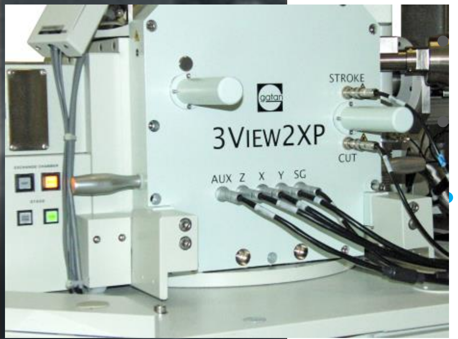


GATAN : accessoires pour MEB & MET

… from Specimen preparation to EELS analysis



- Specimen Prep : PIPS, PECS, Ilion 2, Solarus, …
- Holders : Analytical, CryoTransfer, Cooling/heating, Tensile, Tomography, multis tiaxes,…
- Imaging : Direct and undirect detection : Rio, Oneview, K2, K3
- Analytical : EELS spectrometers and filters, CL Systems
- SEM accessories : 3View, CL Systems (Monarc), Heating/cooling stages,…

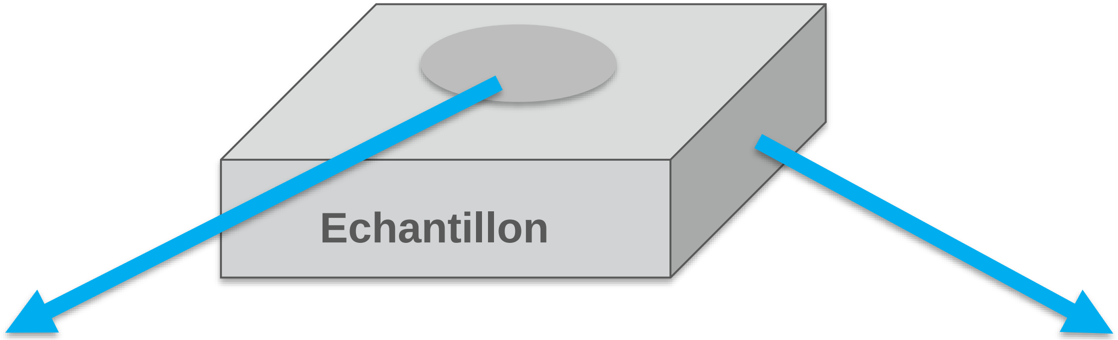


Préparation ionique pour observations MEB & analyses EBSD

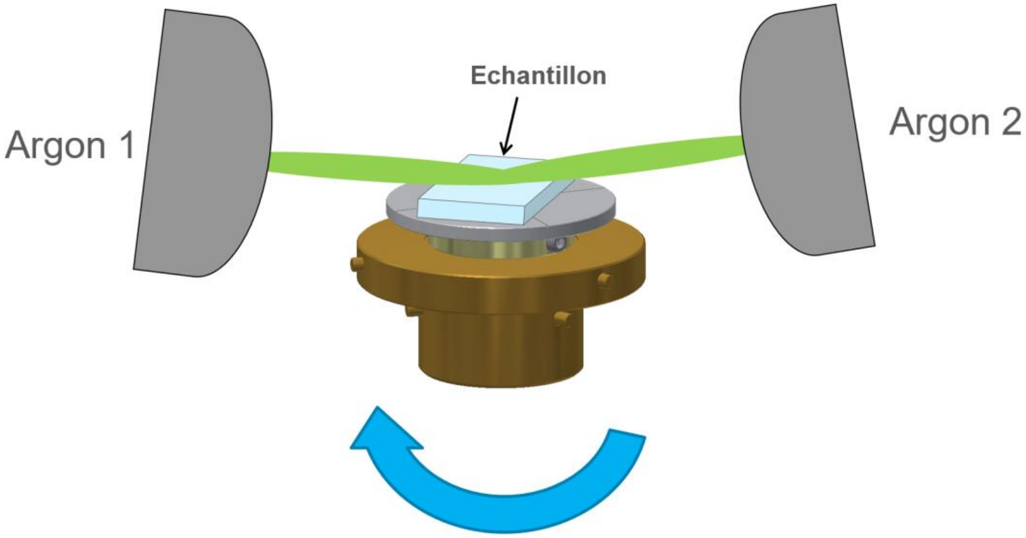
GATAN

Techniques préparations ioniques

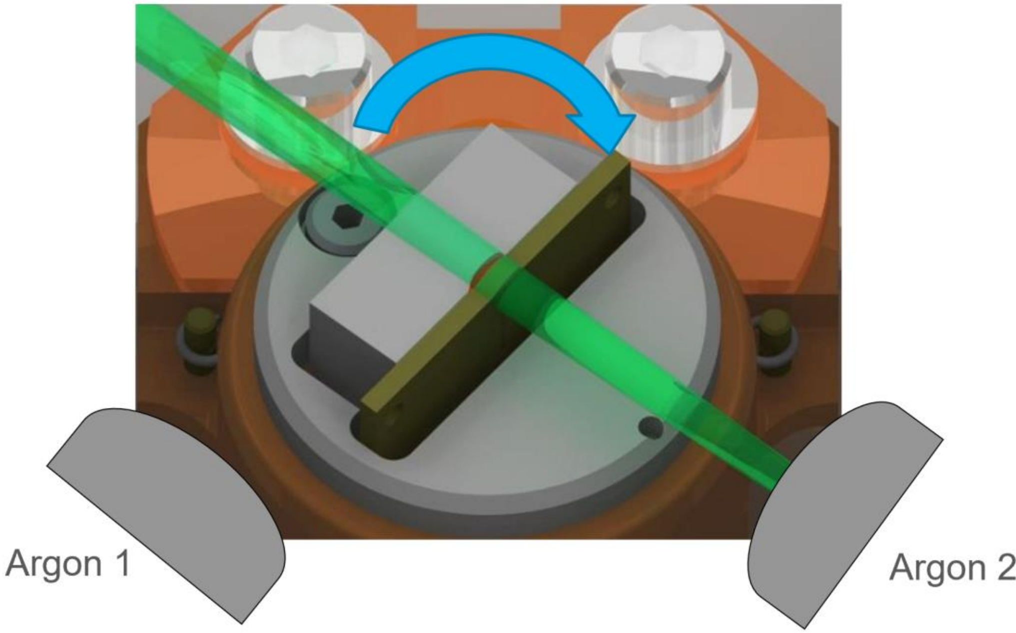
(Par faisceaux d'ions Argon non focalisés)



Polissage plan



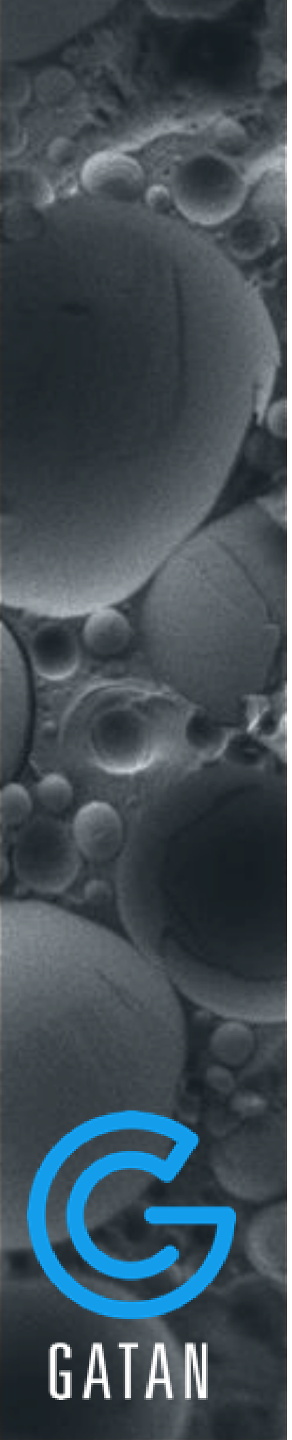
Coupe transverse



Ilion II & PECS II spécifications

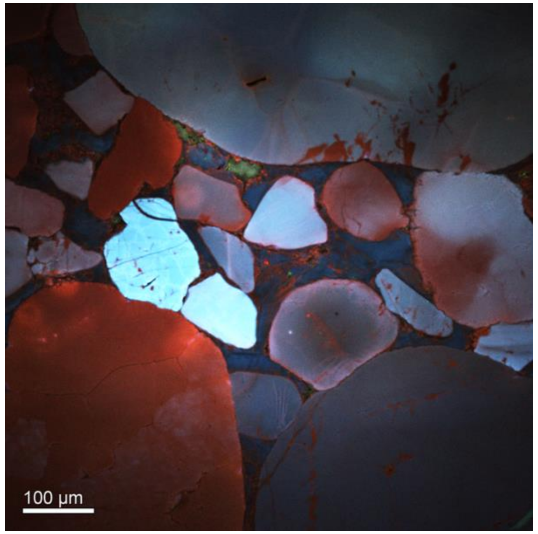
- Polissage plan et coupe transverse
- 2 faisceaux d'ions Argon
- Tension d'accélération : 100 Volts - 8000 Volts
- Recettes
- Polissage sectoriel
- Gestion automatique des canons
- Microscope et caméra avec Digital Micrograph
- Platine froide (Azote liquide)
- Sas d'introduction

- Métallisation In-Situ
- Echantillons plus grands
- Transfert sous vide ou atmosphère

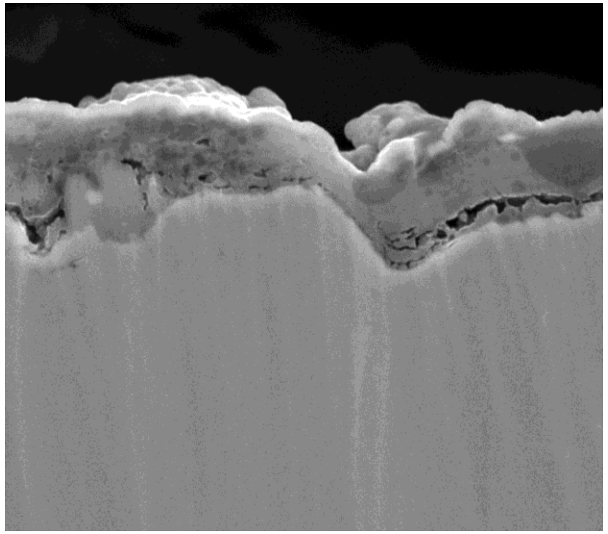


Coupes transverses par faisceaux d’ions

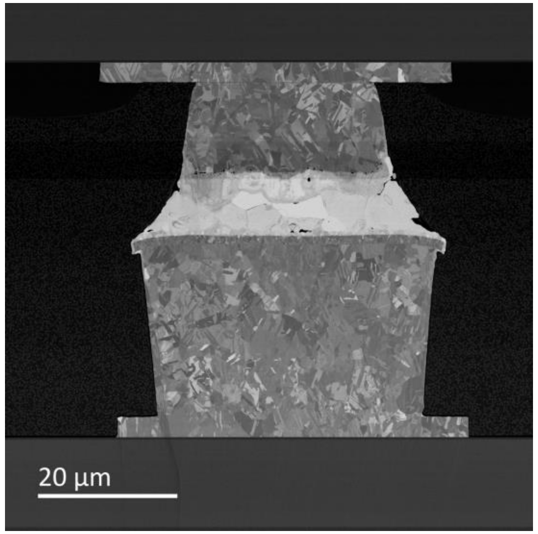
Shale



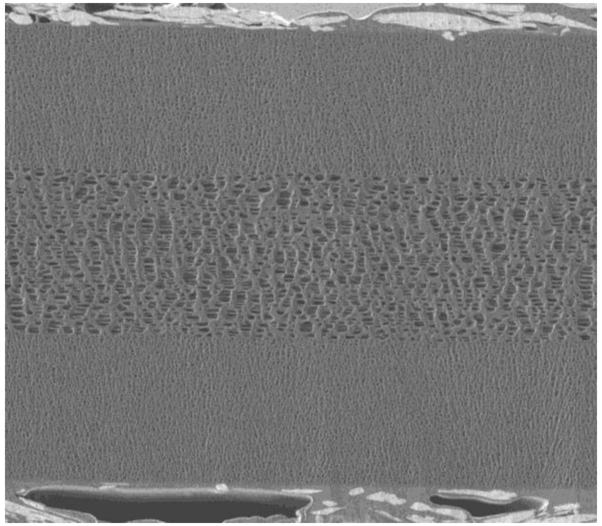
Ceramic coating on metal



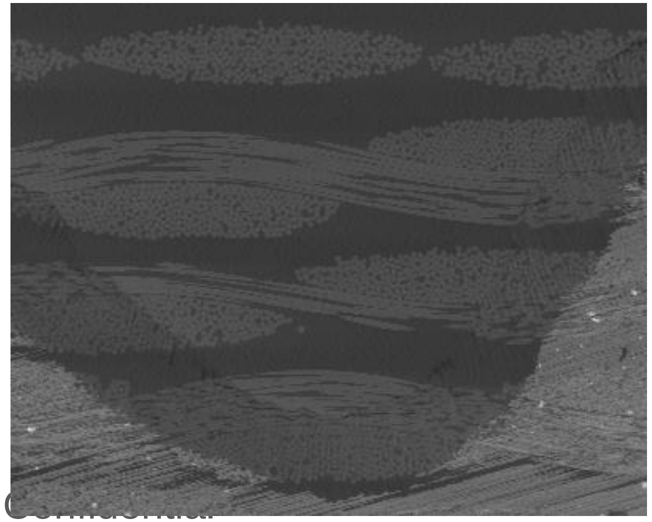
Semiconductor



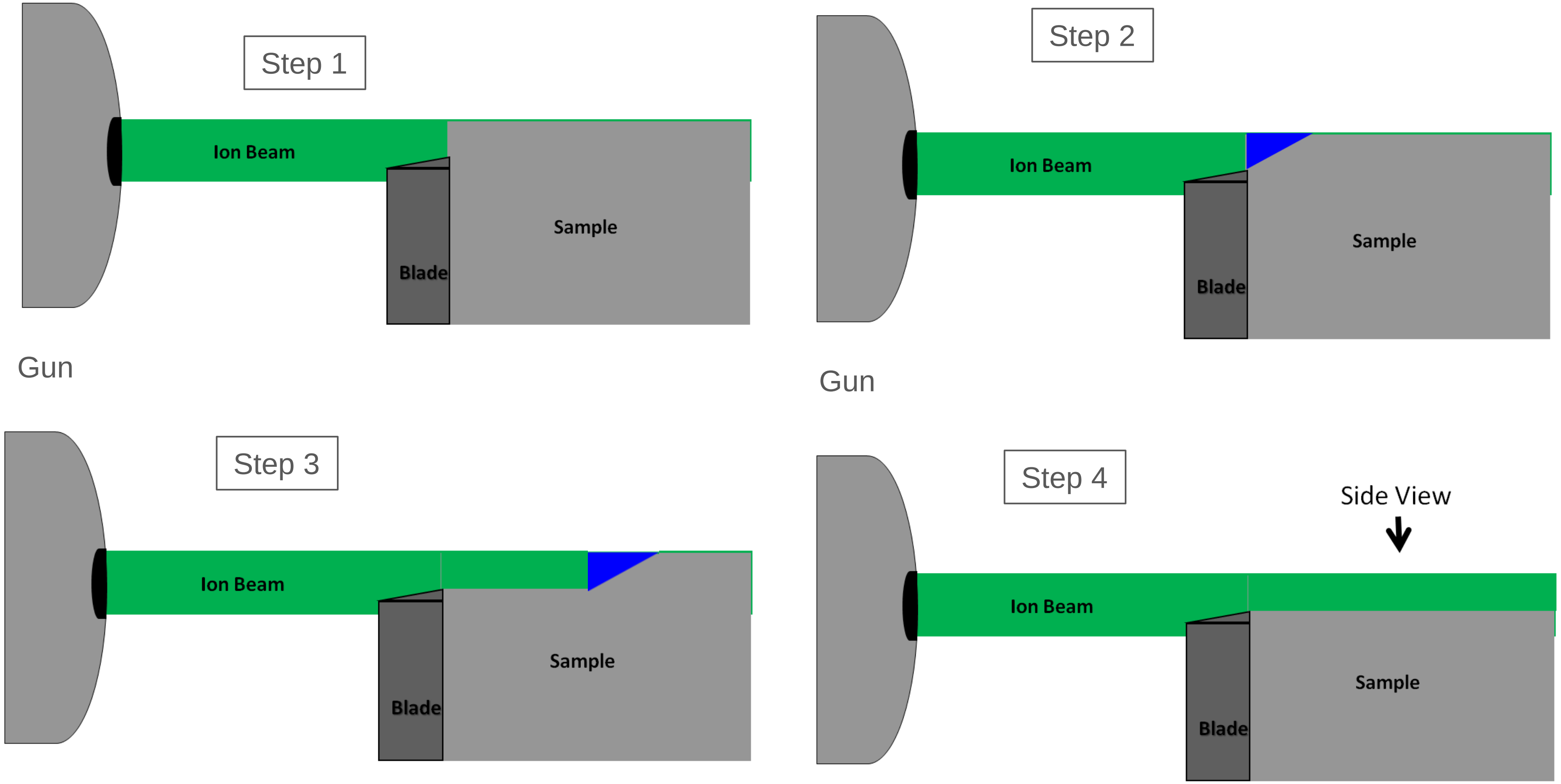
Polymer



Composite

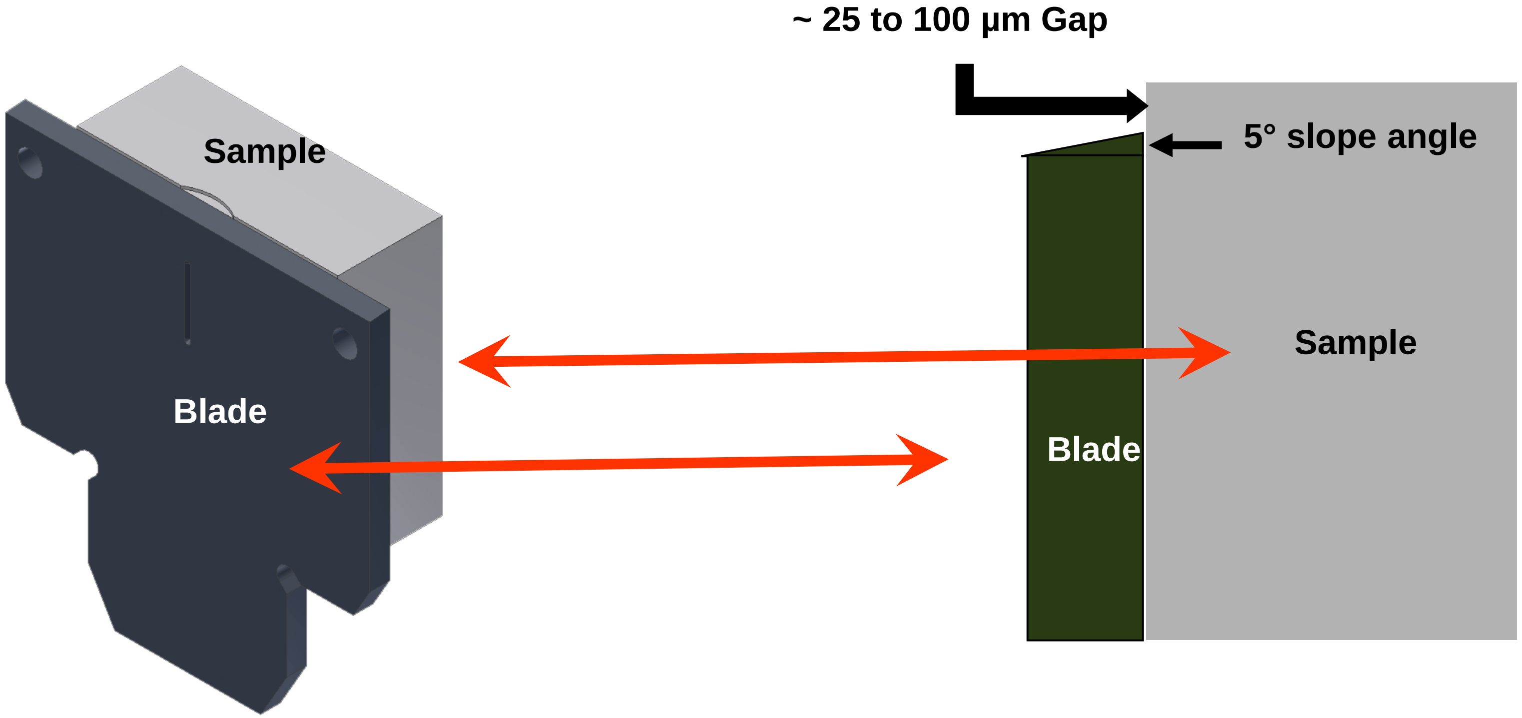


Coupes transverses par faisceaux d’ions (principe)

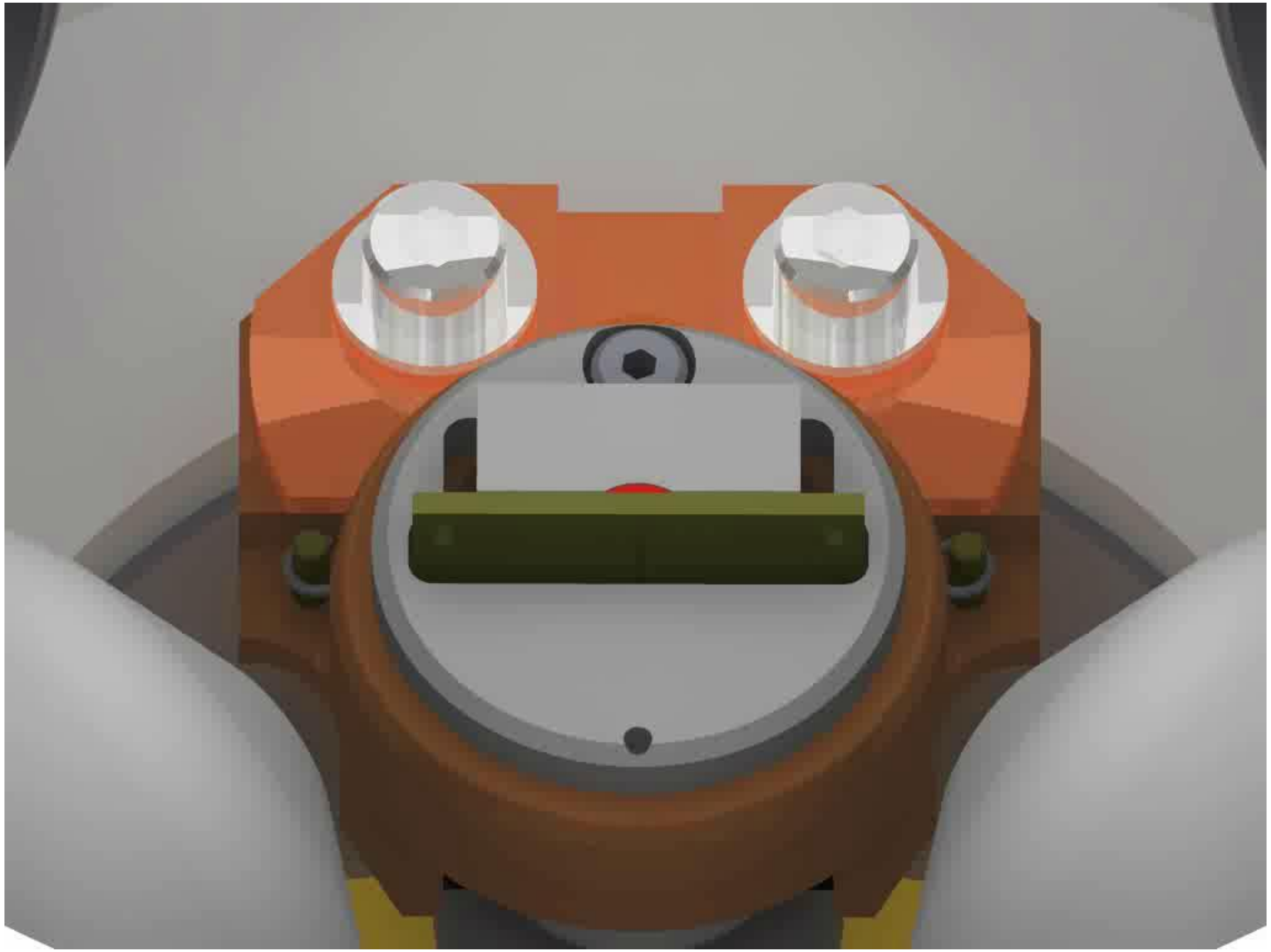


Coupes transverses par faisceaux d’ions (montage de l’échantillon)

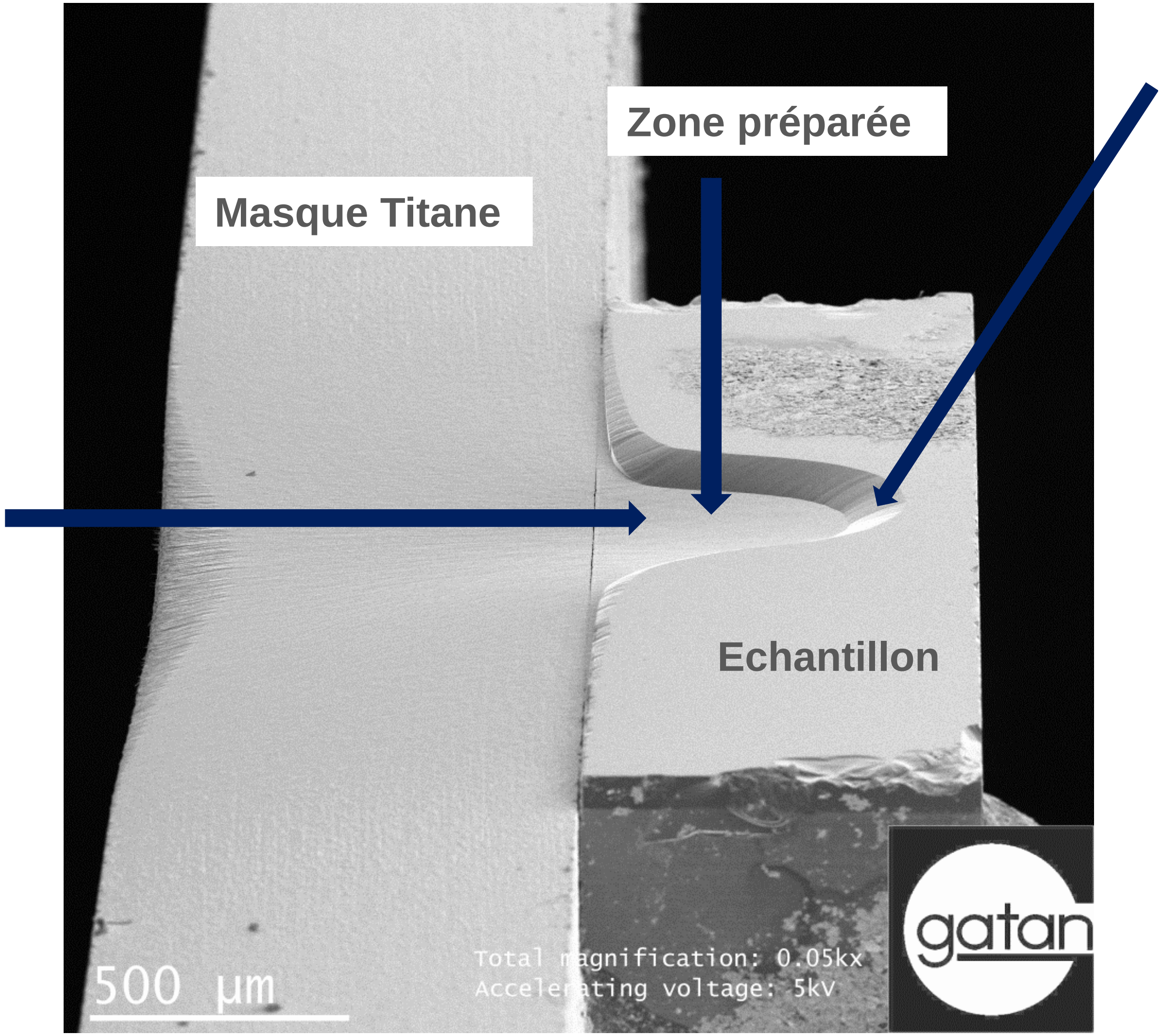
Un masque est fixé à l'échantillon de 25 à 100 µm sous la surface supérieure (cet écart va déterminer l'épaisseur enlevée)



Coupes transverses par faisceaux d'ions (polissage sectoriel)



Coupes transverses par faisceaux d’ions (Ex Silicium)


Front de coupe

Zone préparée

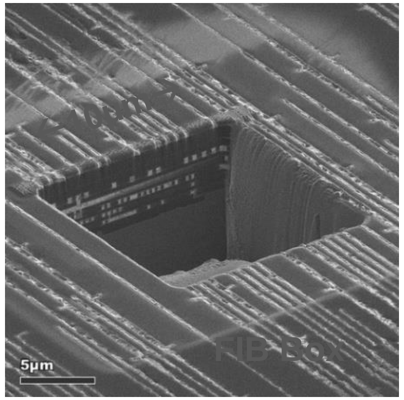
Masque Titane

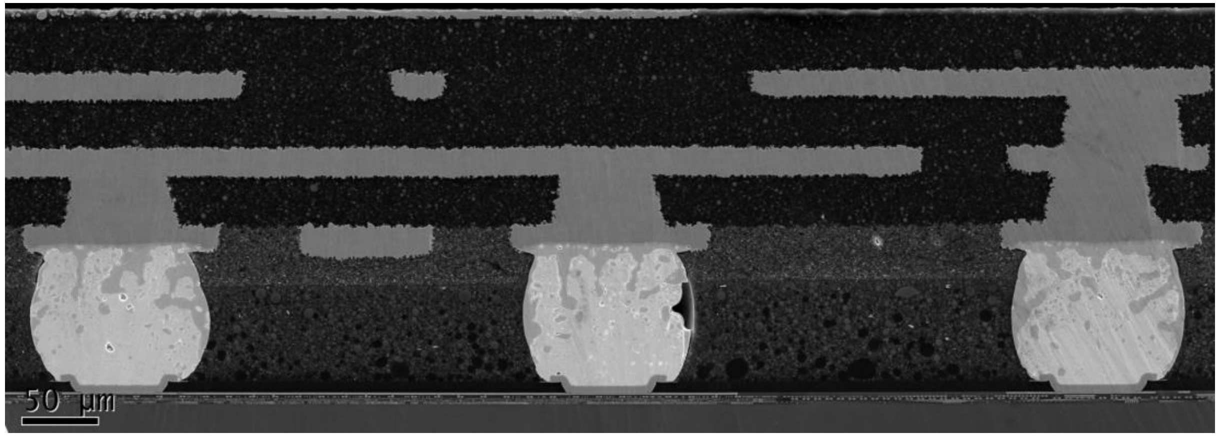
Faisceau d’ions Ar

Echantillon

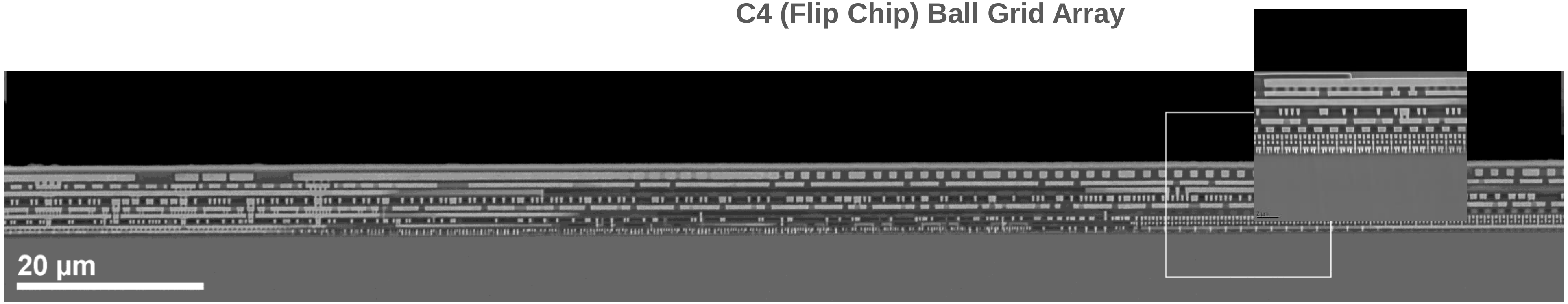
X-Sections

Wide horizontal view of sample is ~200X that of FIB



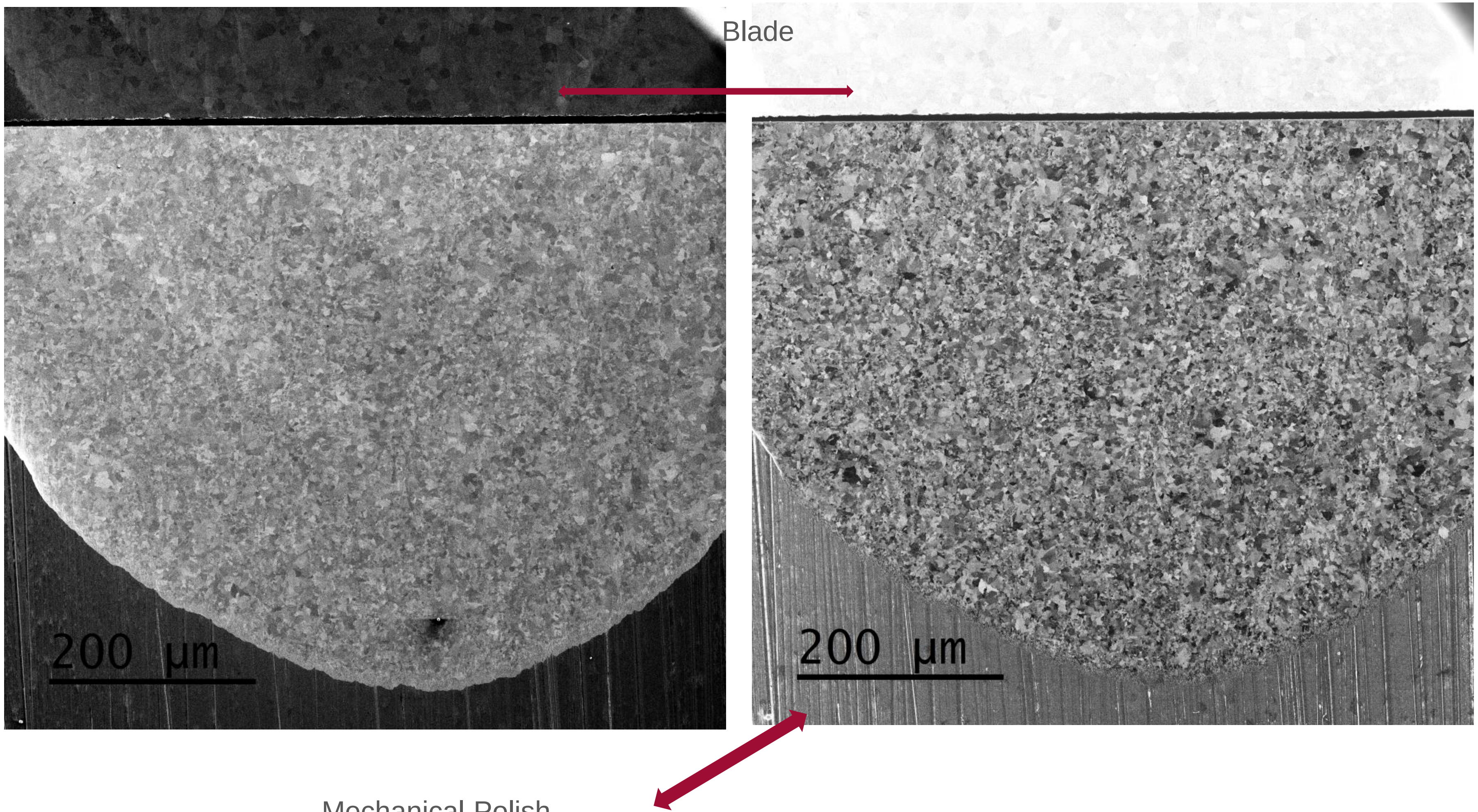


C4 (Flip Chip) Ball Grid Array



Large area cross section on CMOS facilitates fault/defect surveys

Coupe transverse sur acier



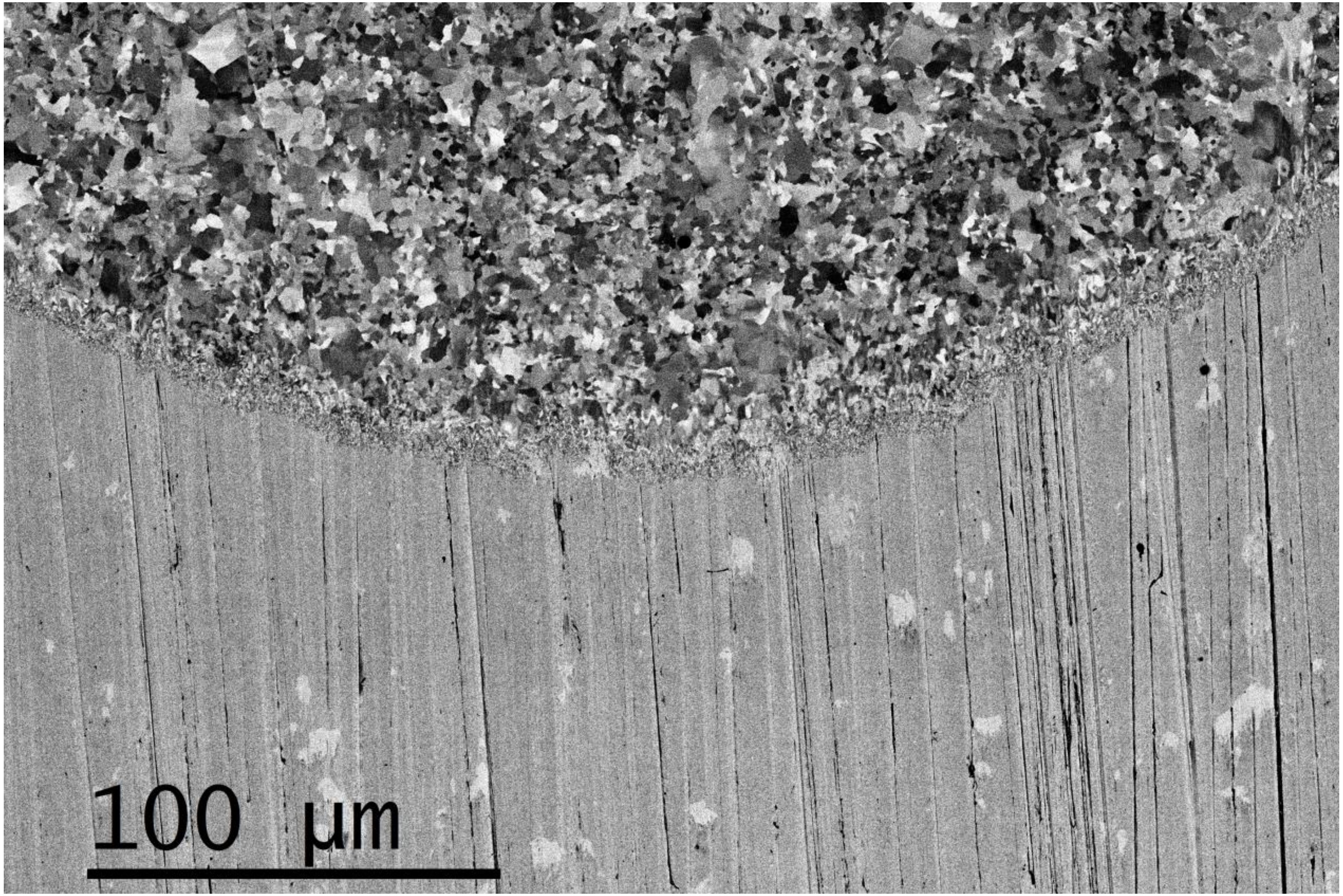
SE Image

BSE Image

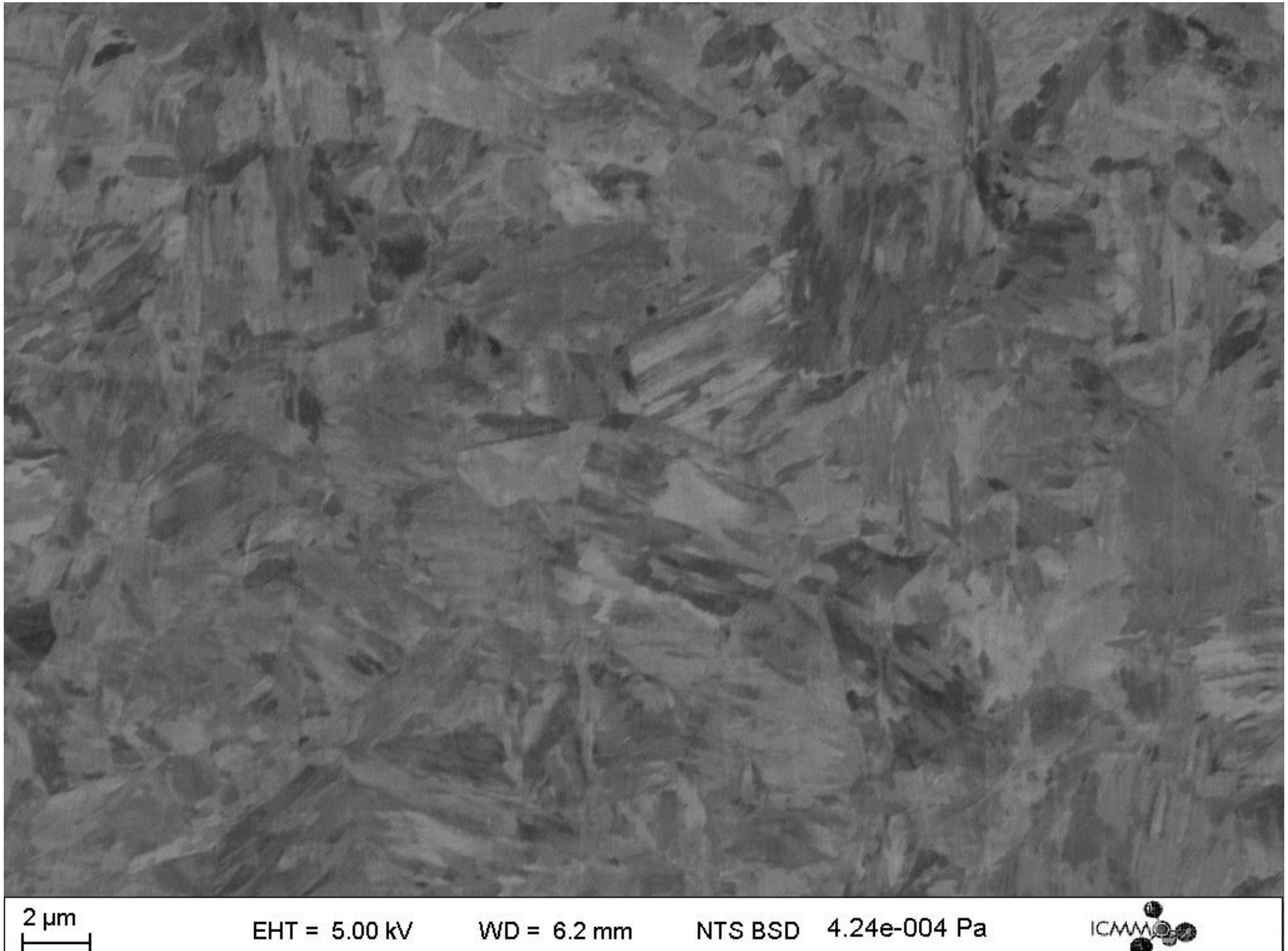
Blade

Mechanical Polish

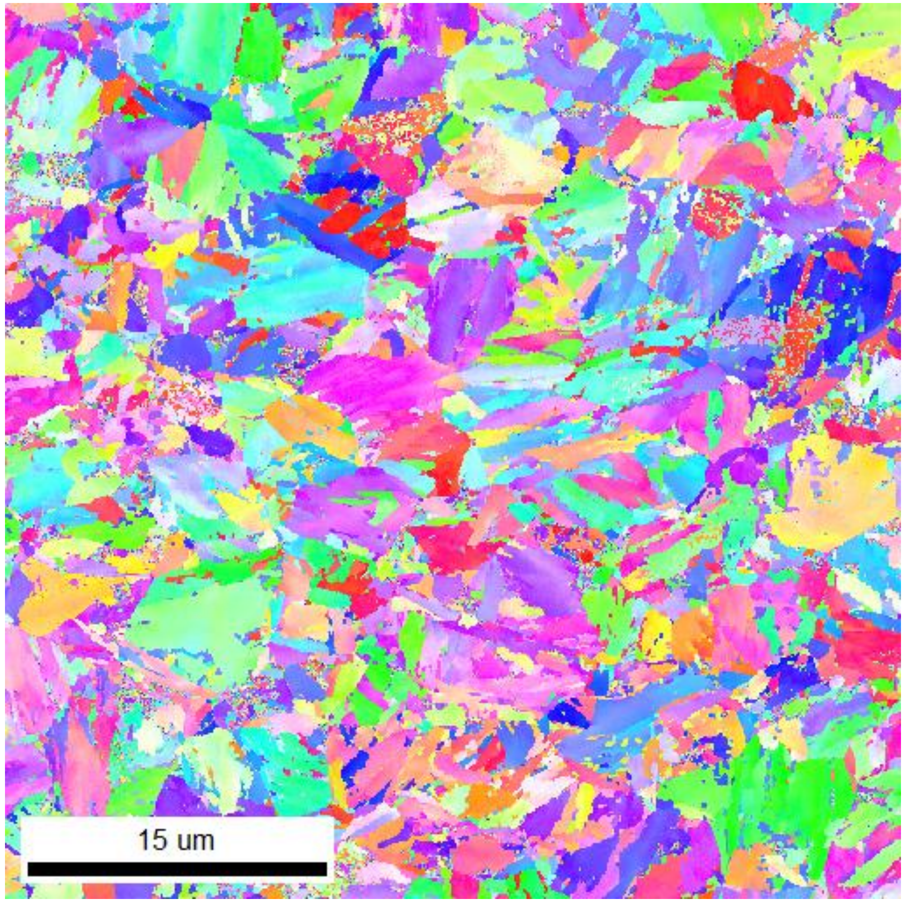
Interface entre coupe ionique et polissage mécanique



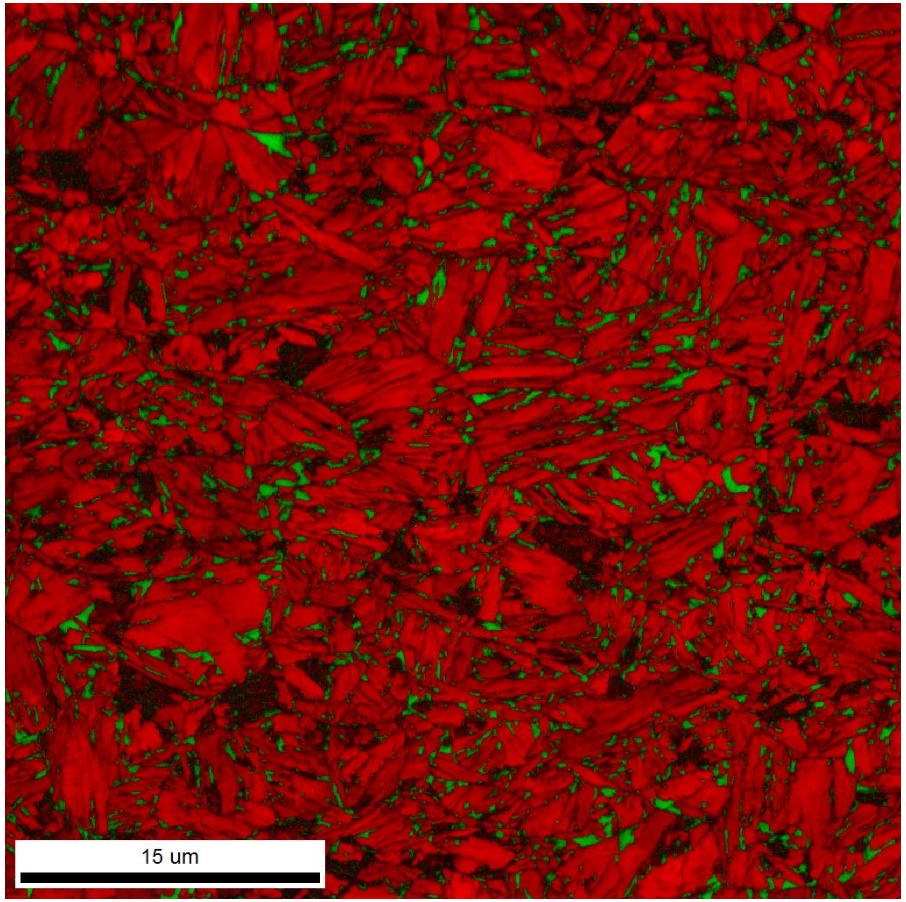
Acier martensitique (BSE)



EBSD on Martensite



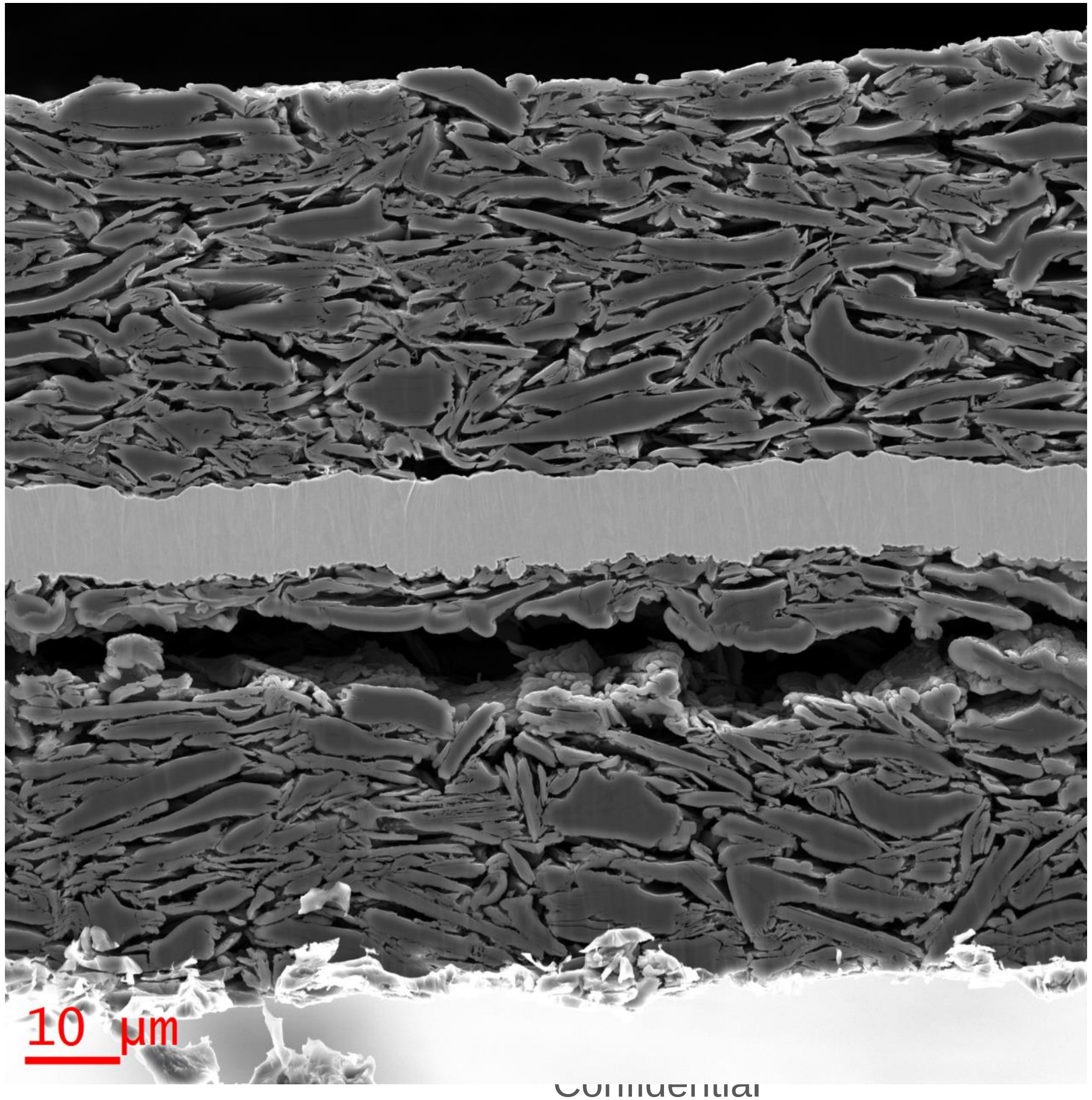
IPF



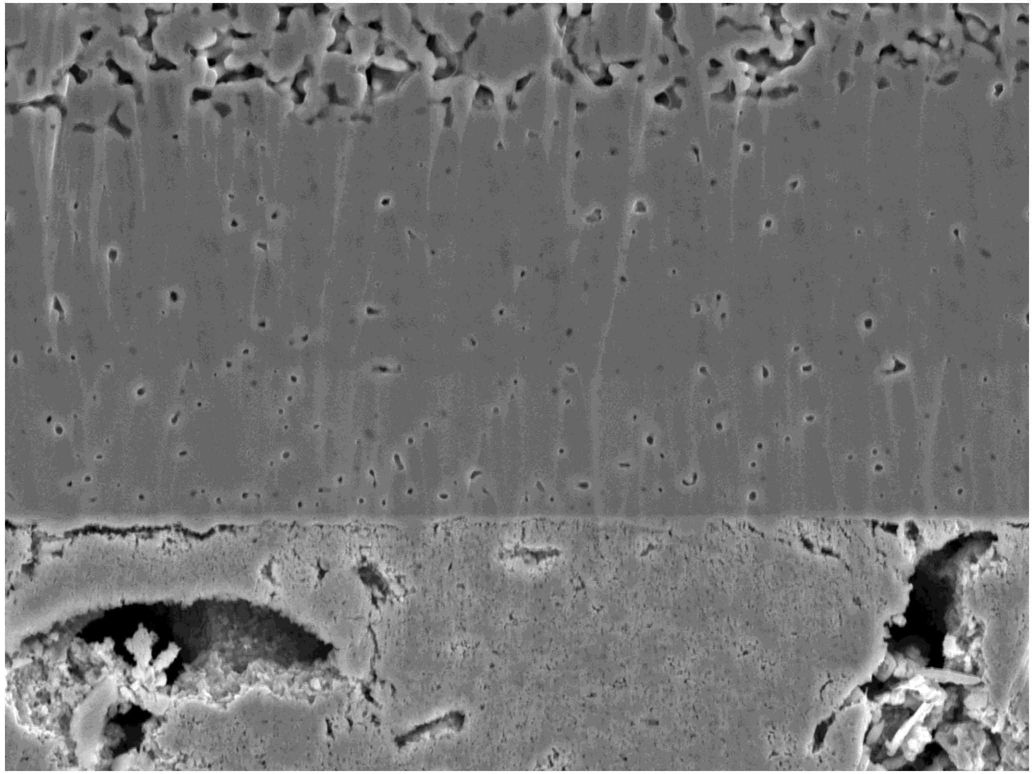
Phases +IQ

Rouge CC
Vert CFC

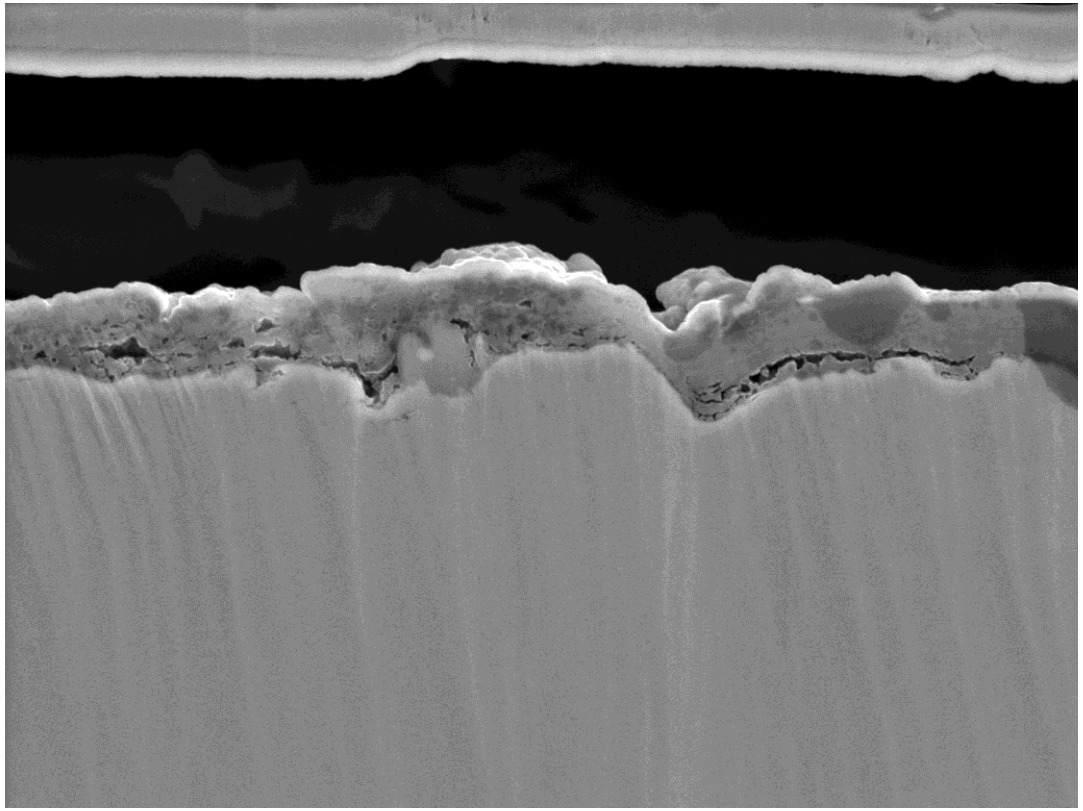
Li Battery Prep



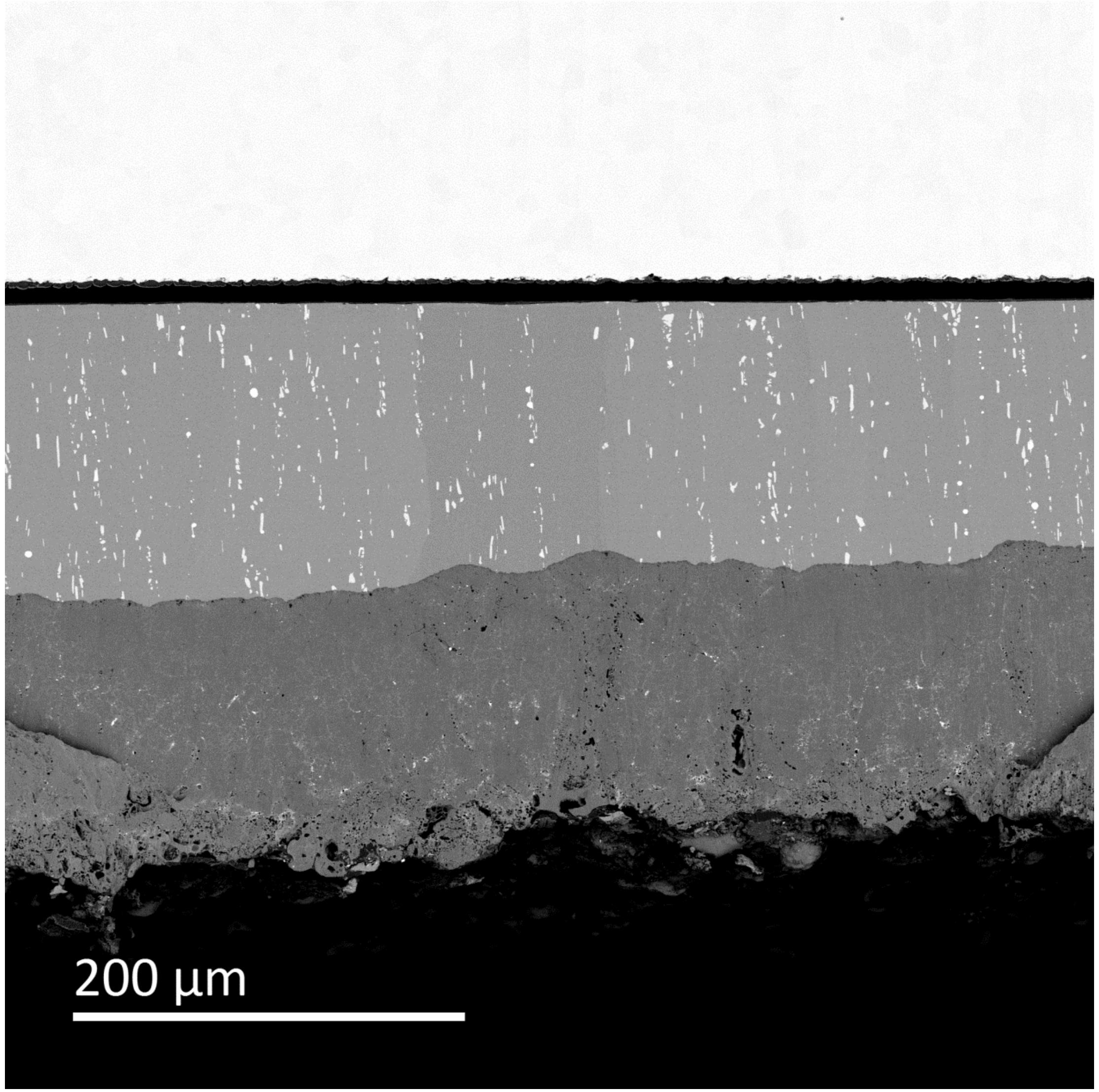
Ceramic Coating



Ceramic Coating on Metal

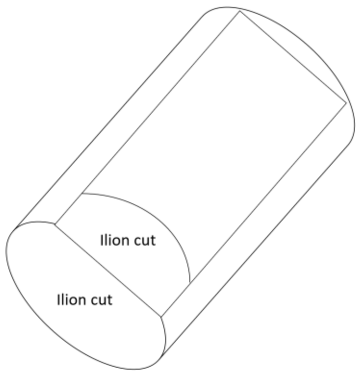


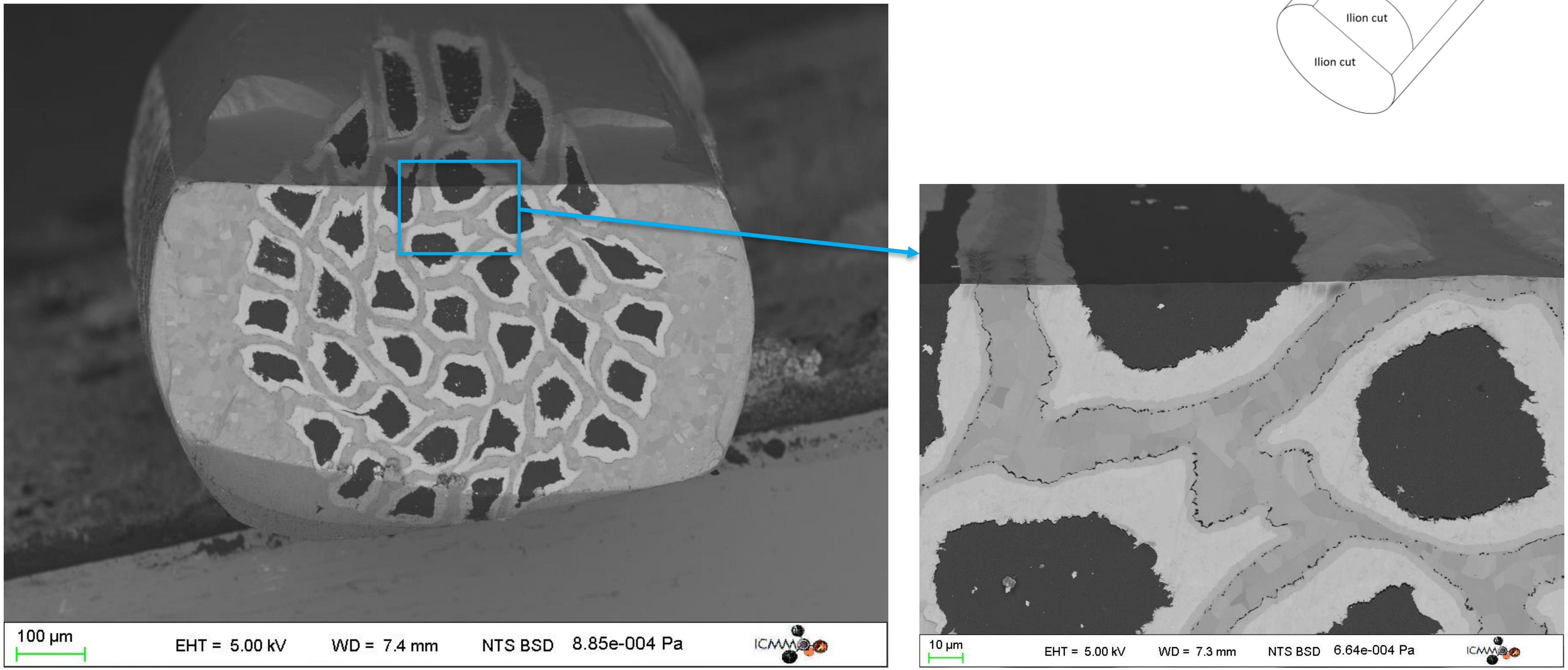
Alumina on Aluminum

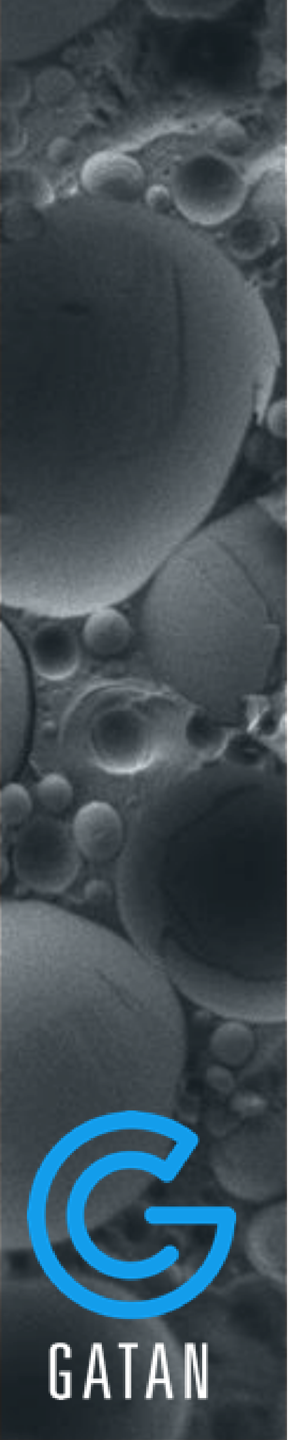


BSE Image

CABLE SUPRA CONDUCTEUR (CERN) ILION 2
Préparation pour 3D EBSD FIB



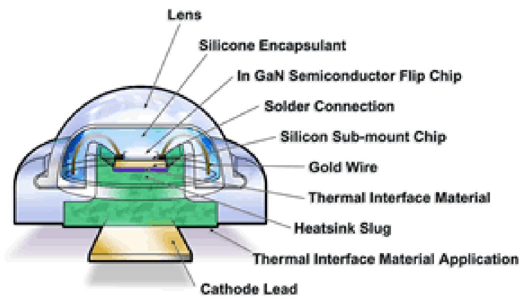


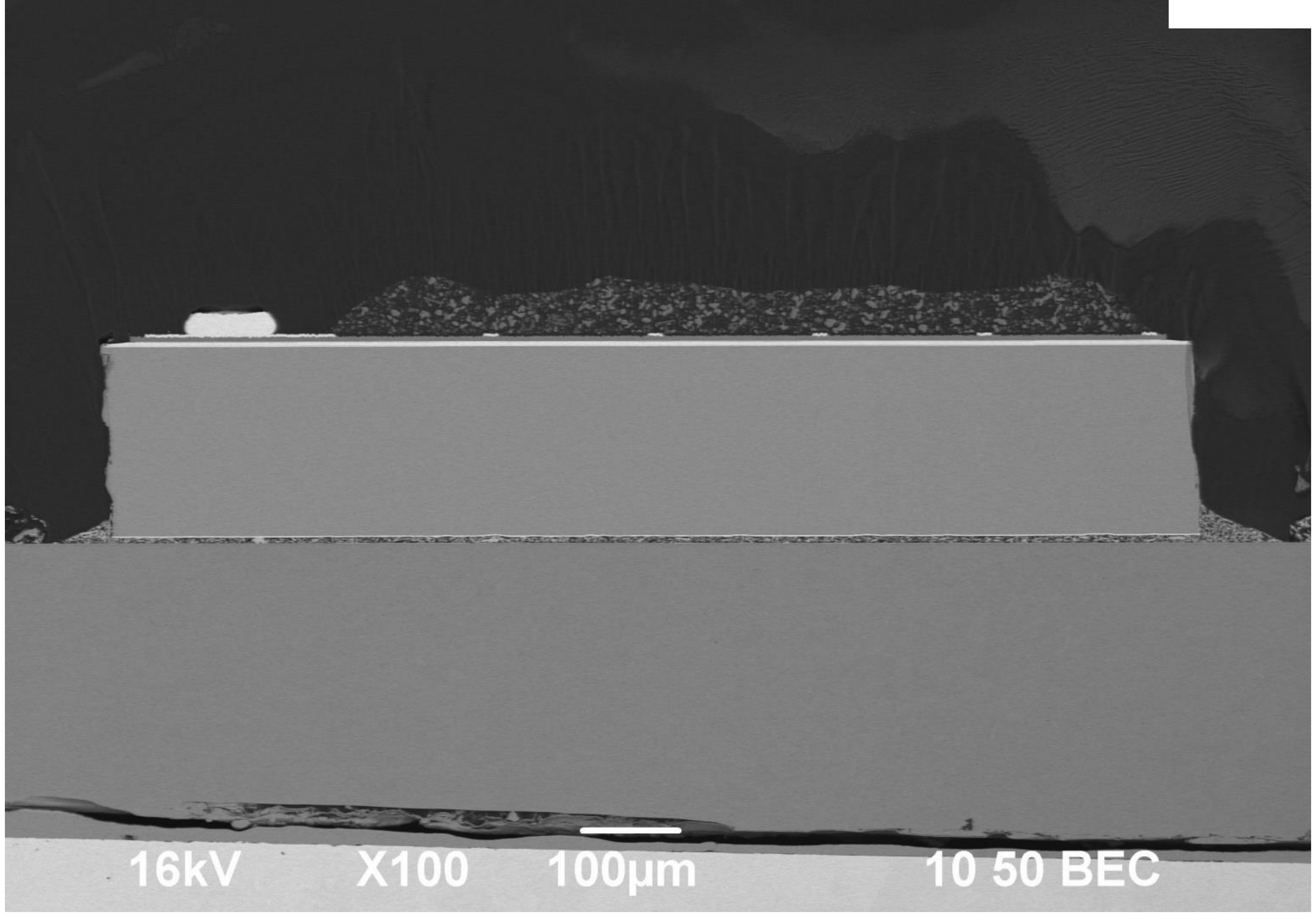


Platine froide (N_2 liquide):

Polymers, CIGS, Paints, LED, zinc, …

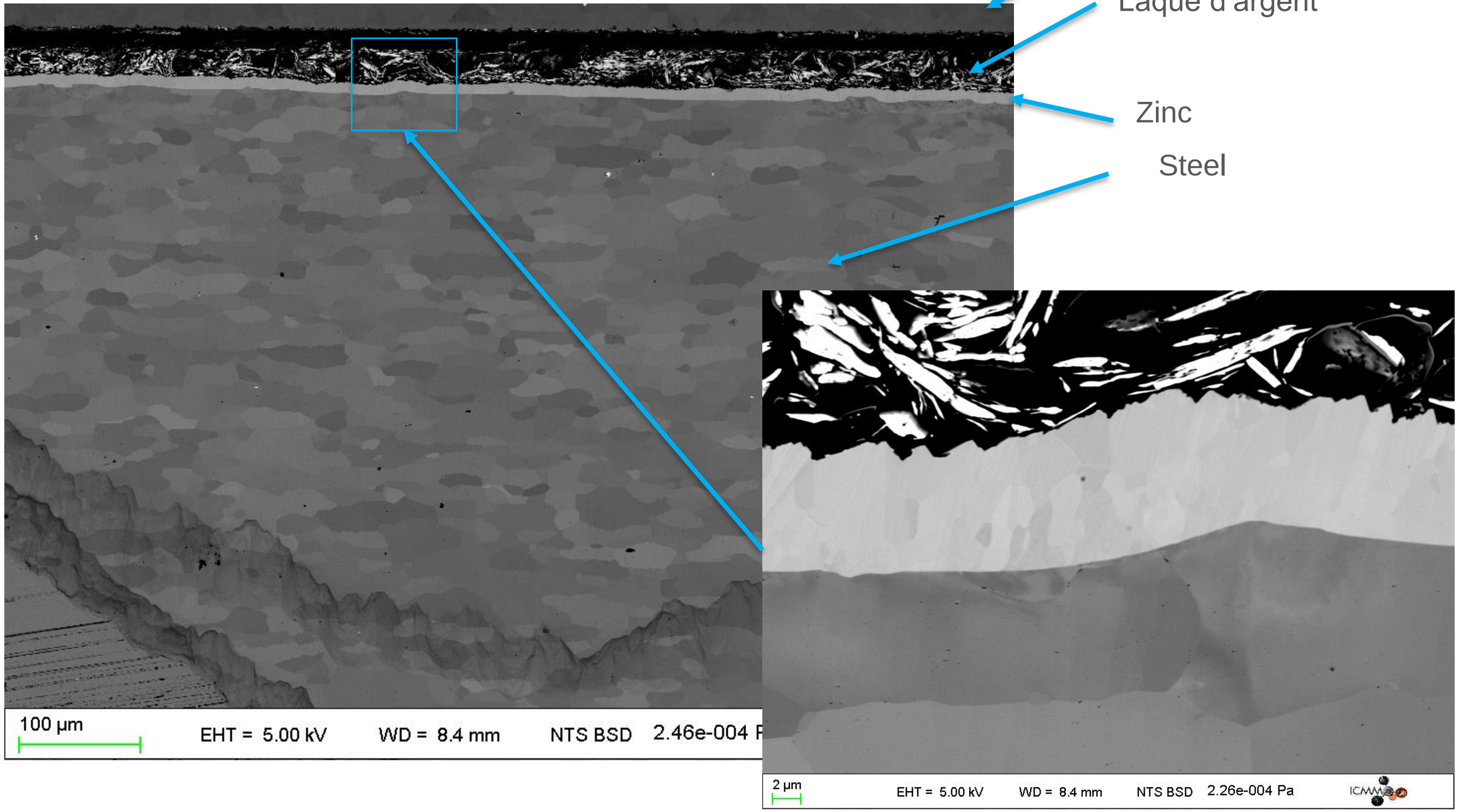
Complete HB LED





- 1mm Cut Width
- 4 hr cut time
- Materials from Plastic, Sapphire, Phosphor, Gold, Silicone Gel, Silicate
- Great for CL as well
- 20 interfaces of interest in this one sample

Acier galvanisé



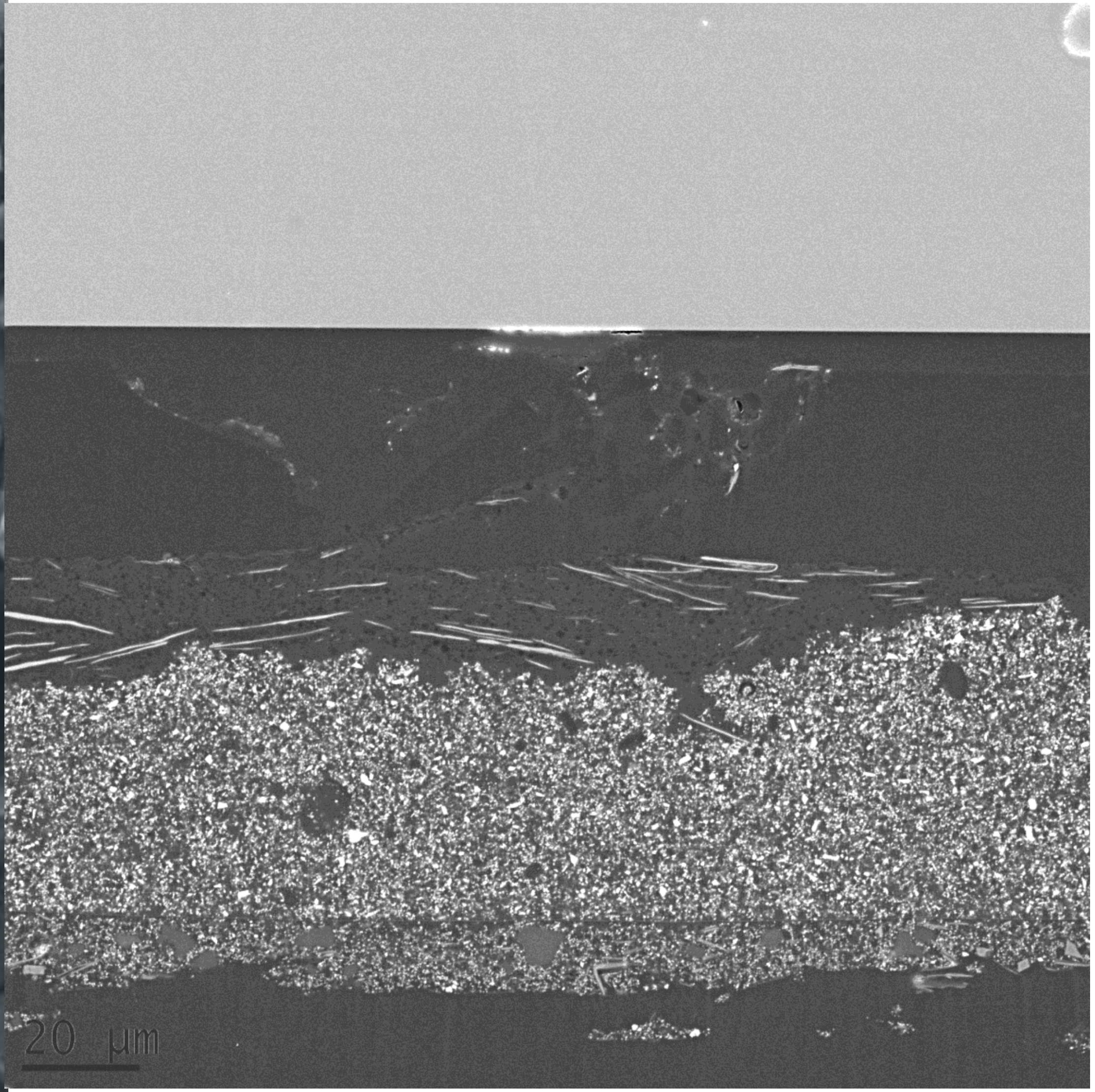
Masque Ti

Laque d’argent

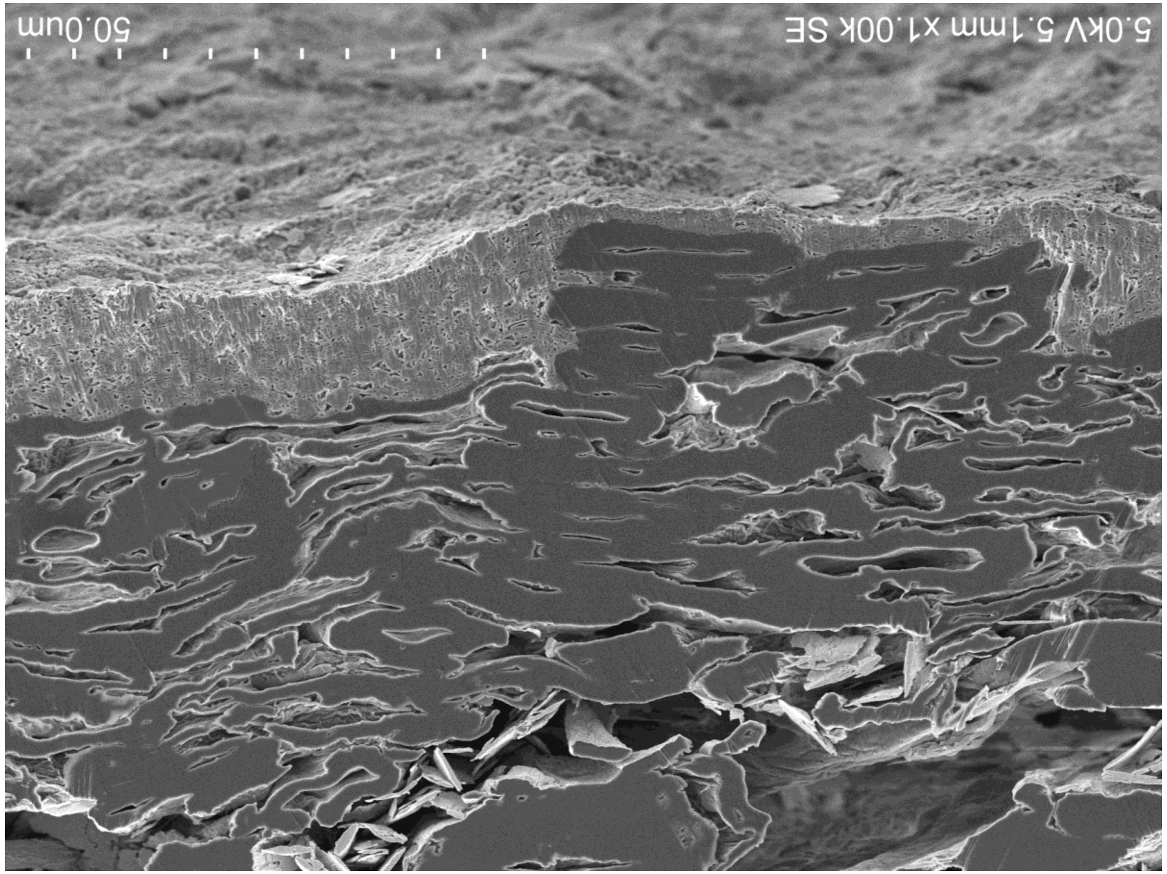
Zinc

Steel

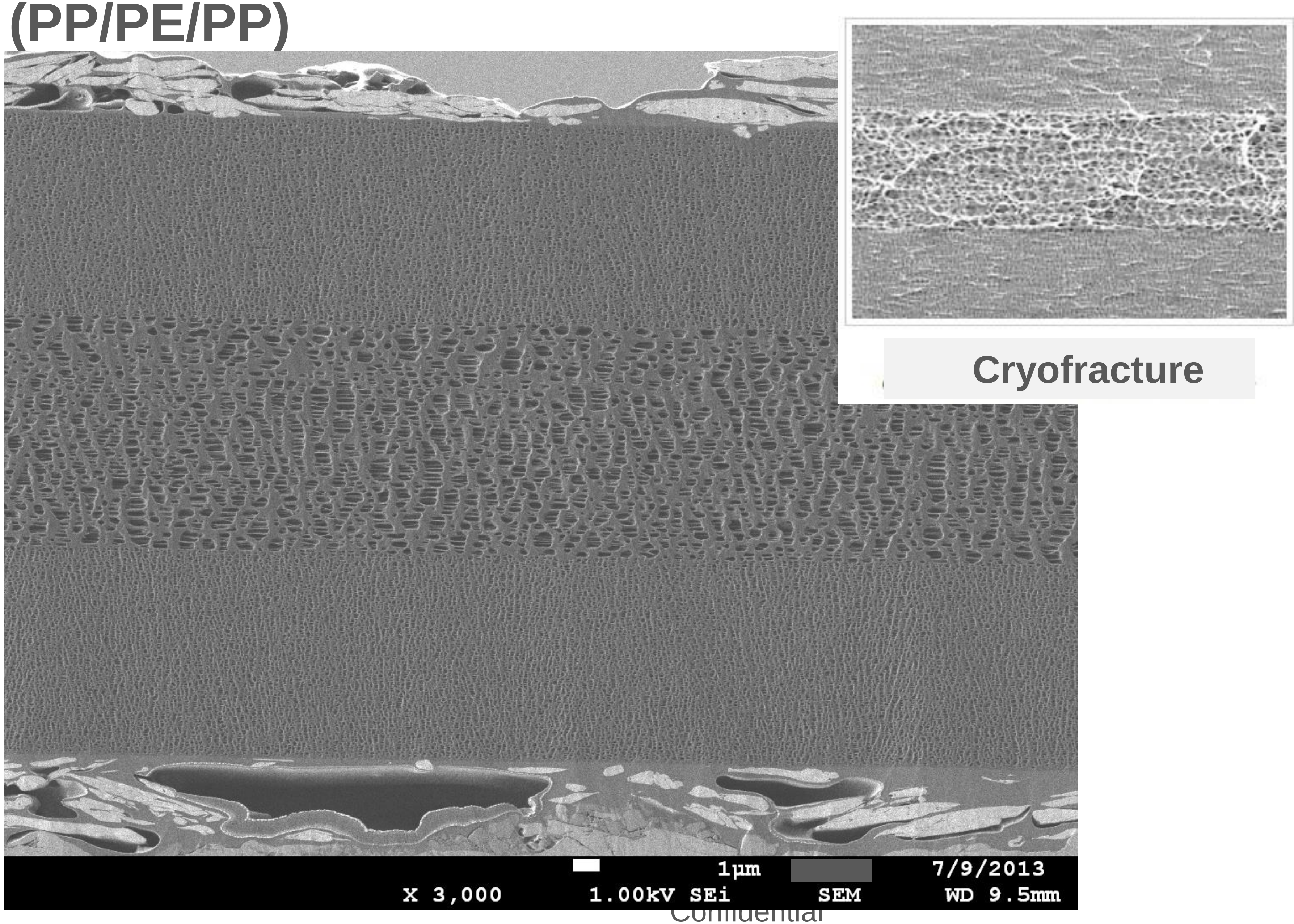
Peinture



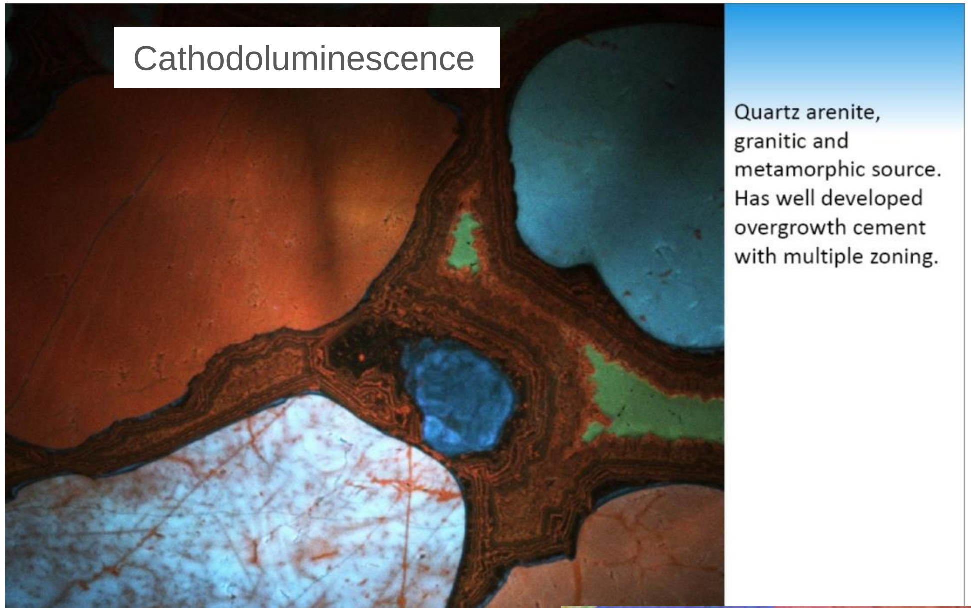
Papier



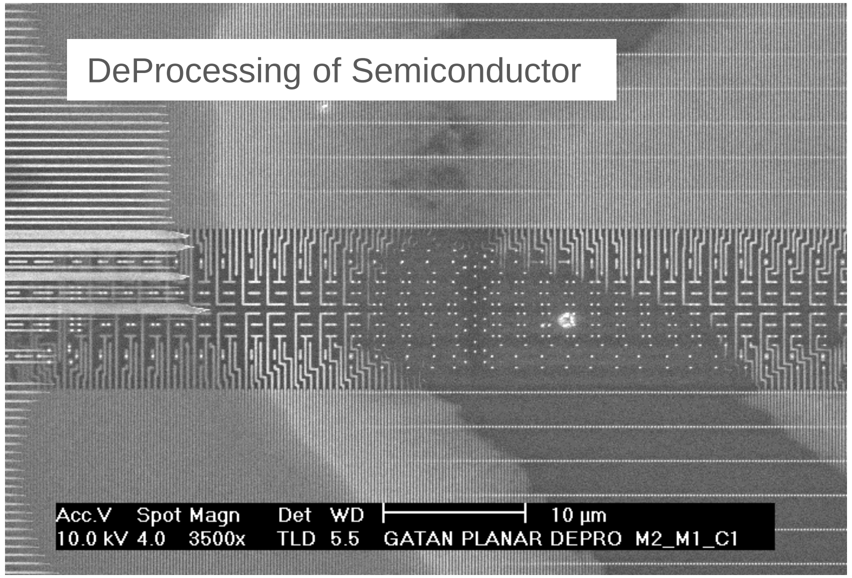
Trilayer Polypropylene / Polyethylene (PP/PE/PP)

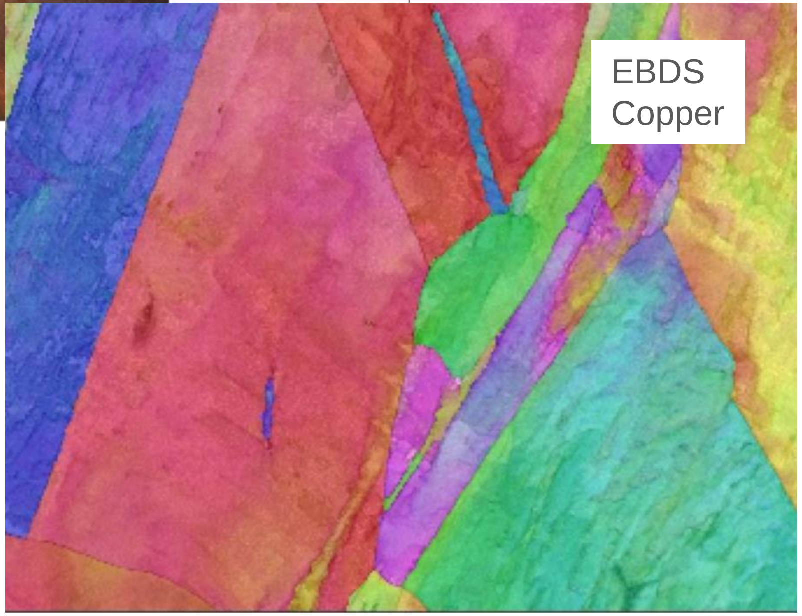


Polissage plan par faisceaux d’ions

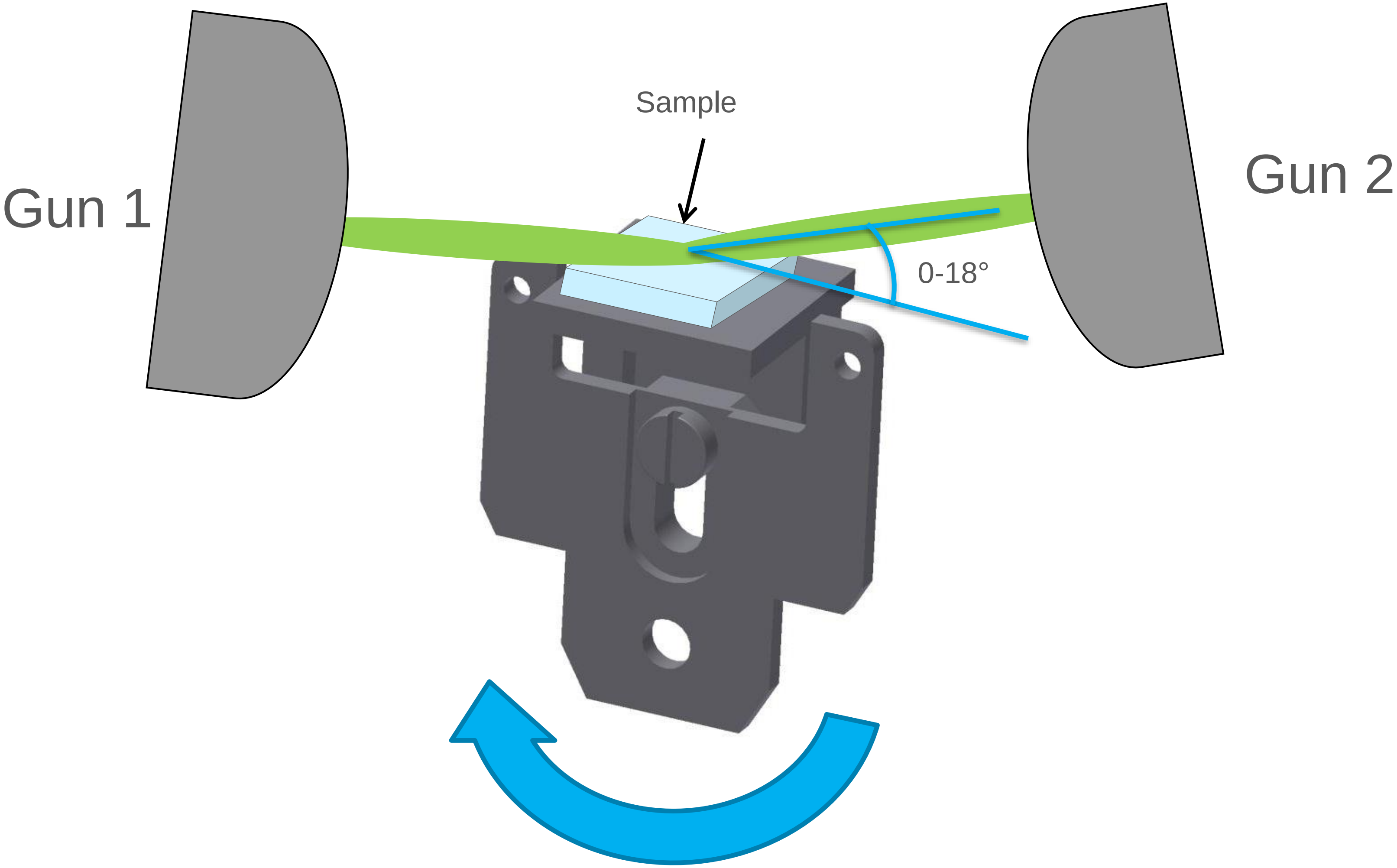

Cathodoluminescence

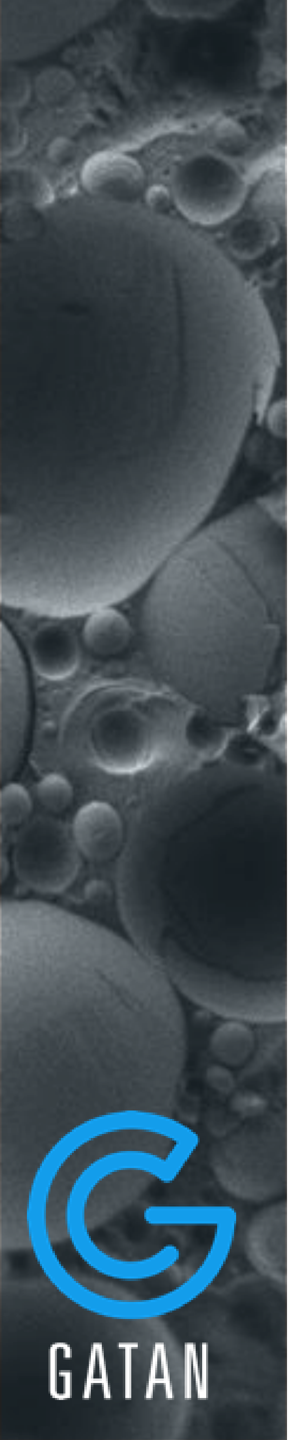
Quartz arenite, granitic and metamorphic source. Has well developed overgrowth cement with multiple zoning.


DeProcessing of Semiconductor

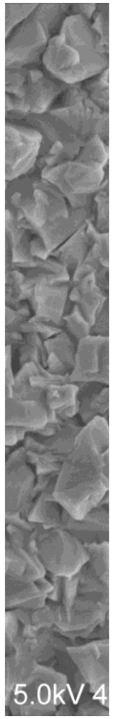

EBDS Copper

Polissage plan par faisceaux d'ions (principe)

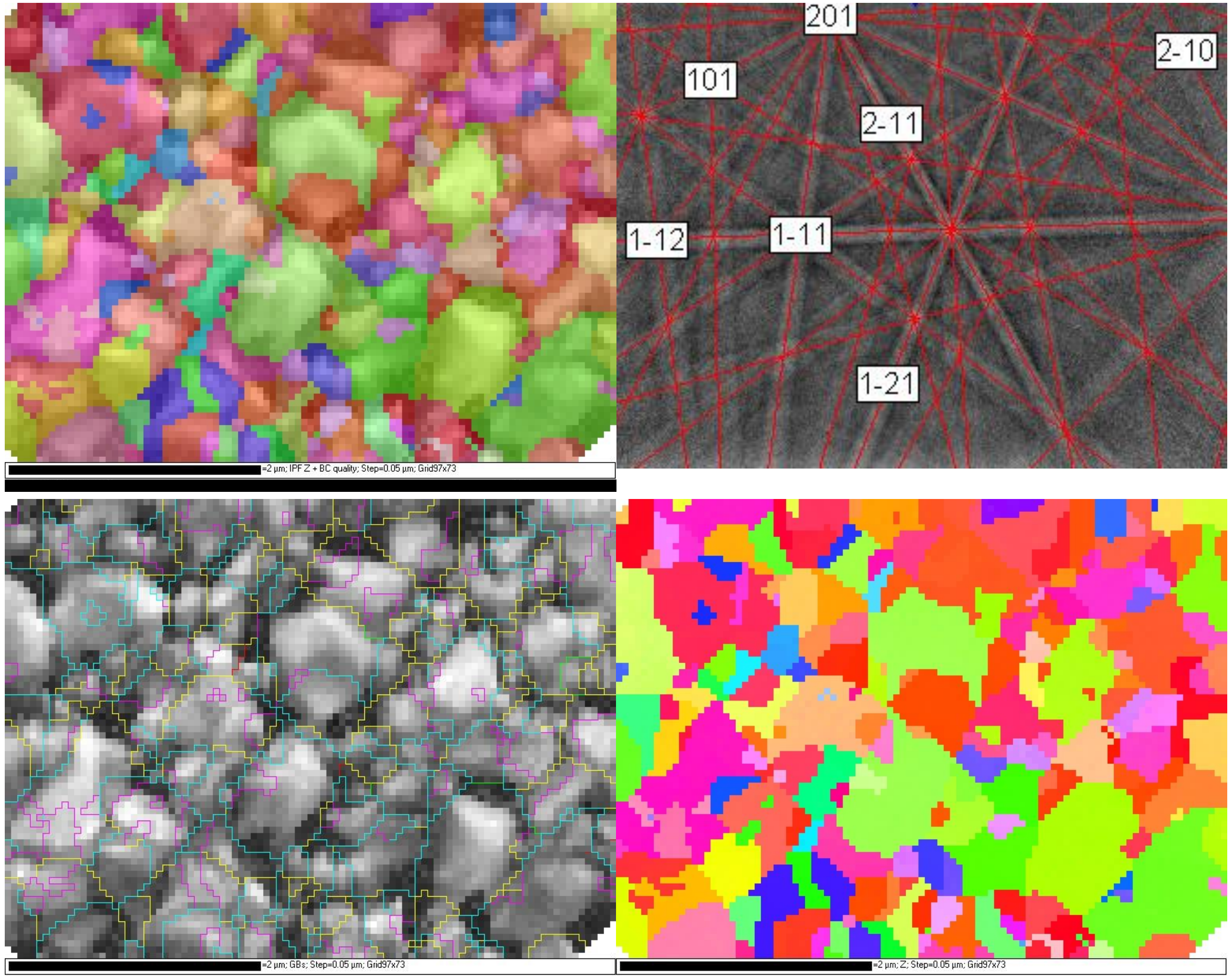




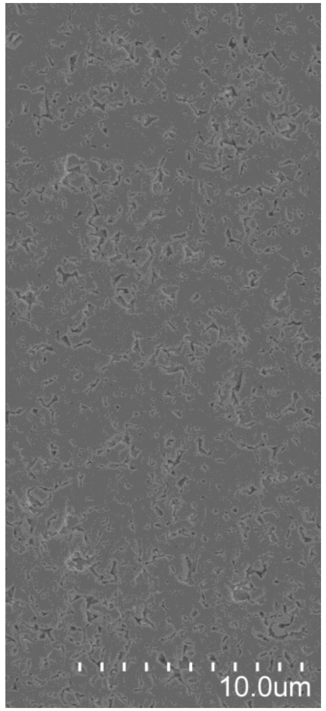
Dépôt CuInSe2



EBSD on $CuInSe_2$ sample prepared on Gatan Ilion+ polisher

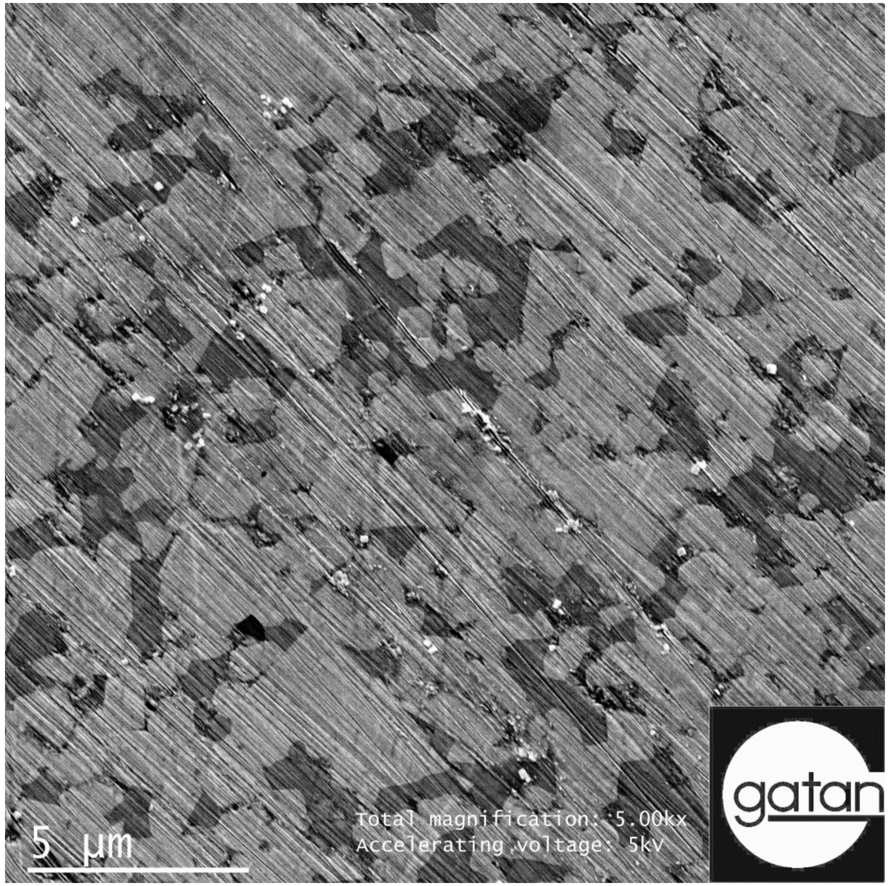


90 Seconds

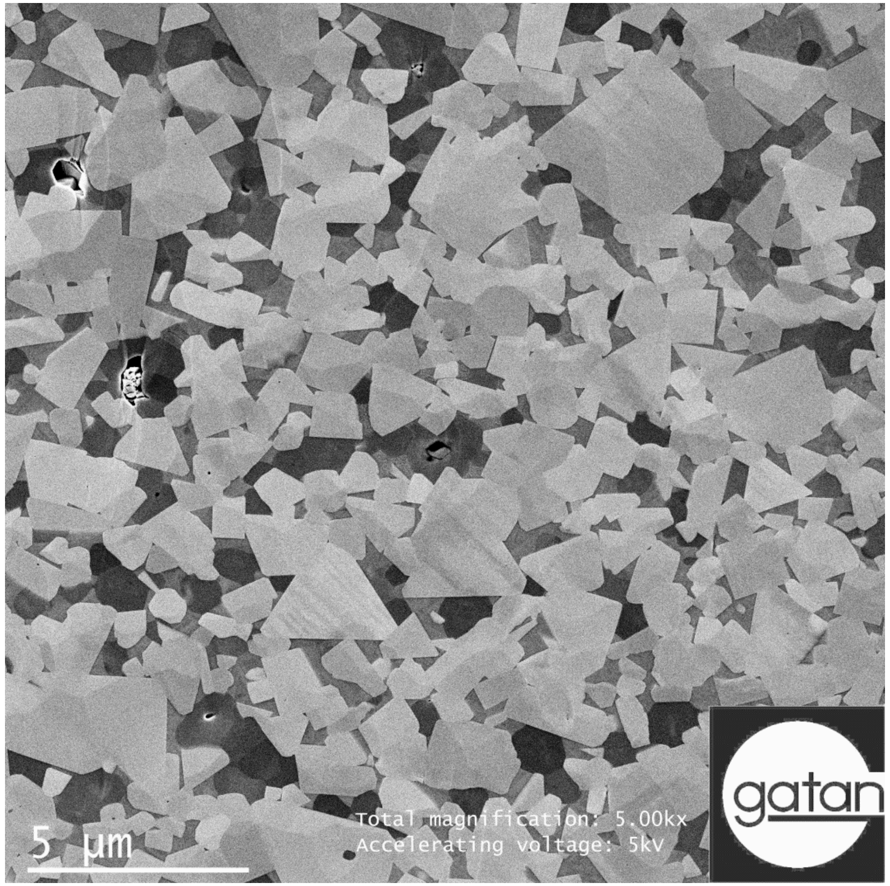


WC- Co

Mechanical Polished to 3 µm diamond

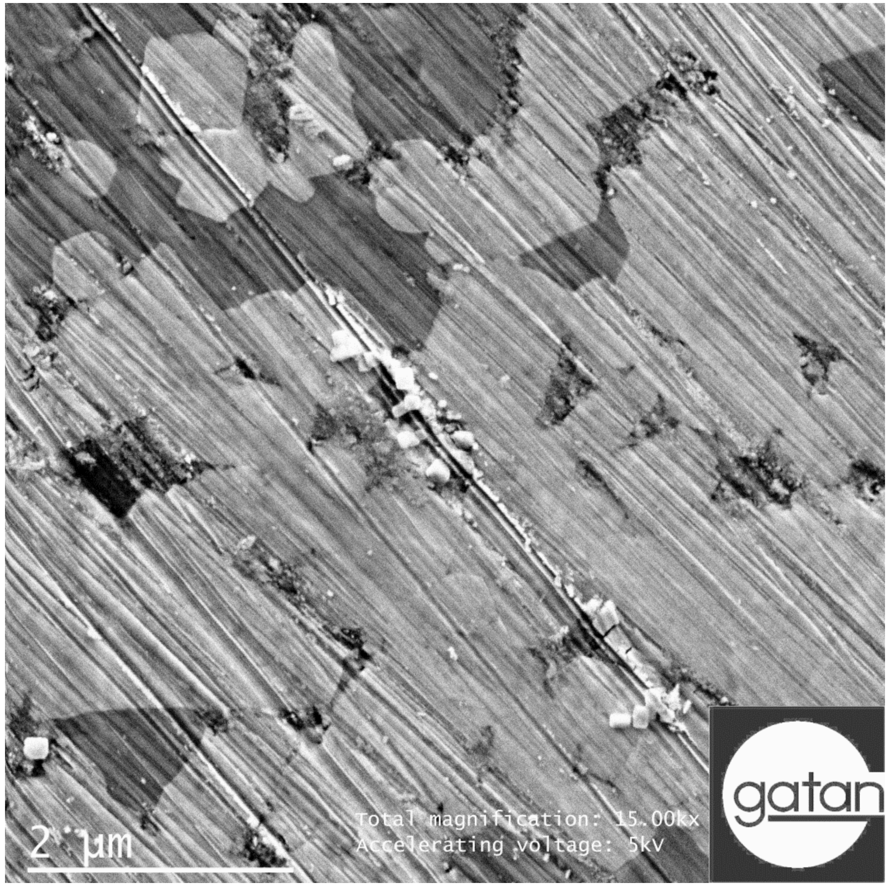


Planar Polish In Ilion

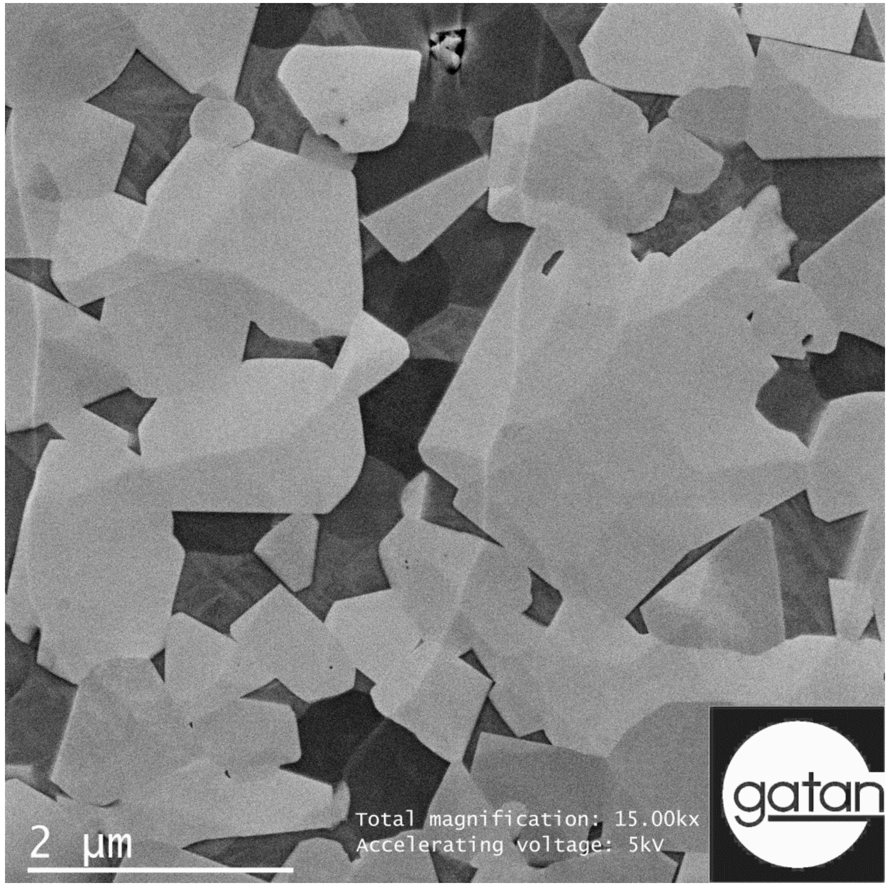


WC- Co

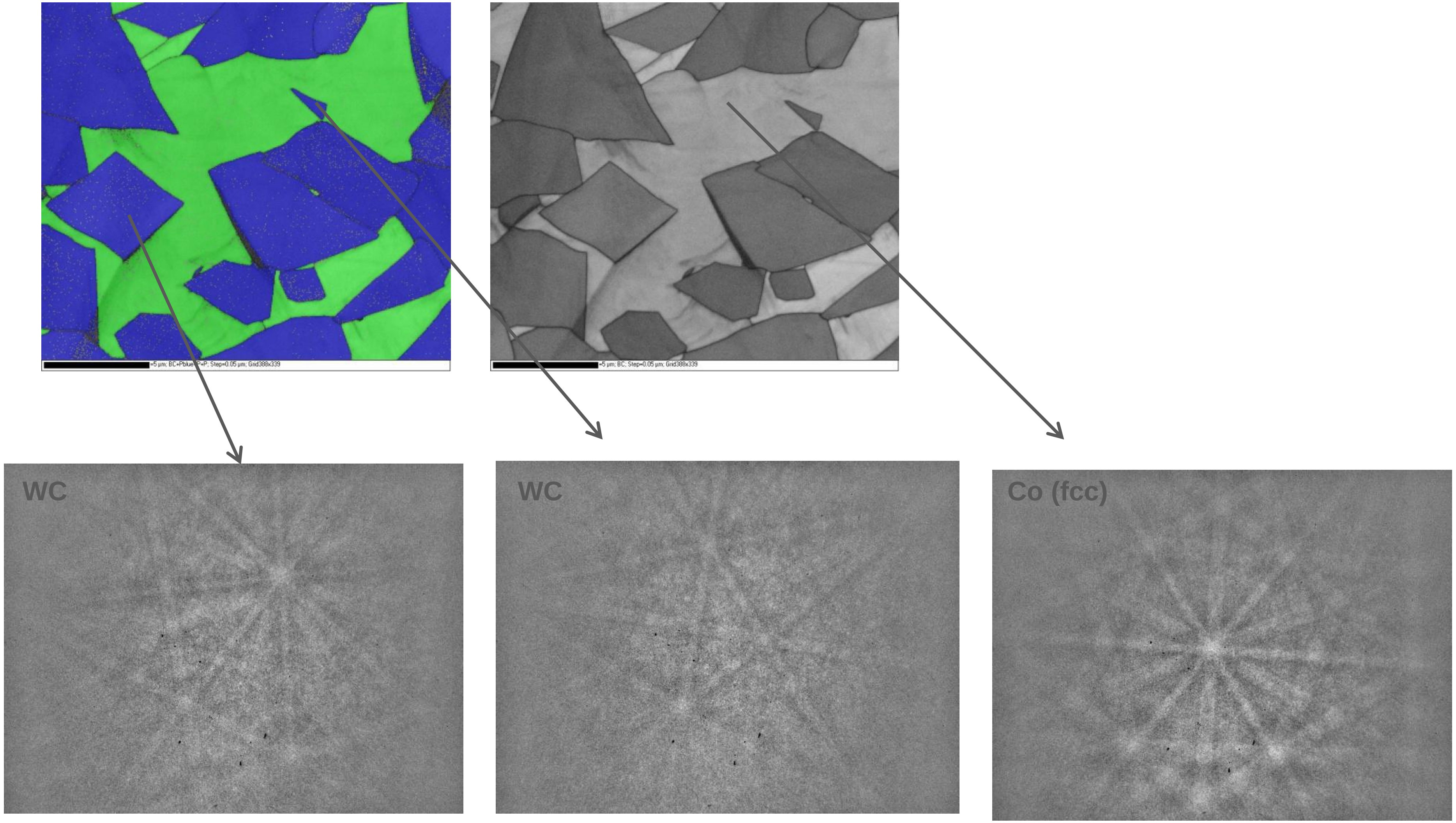
Mechanical Polished to 3µm diamond



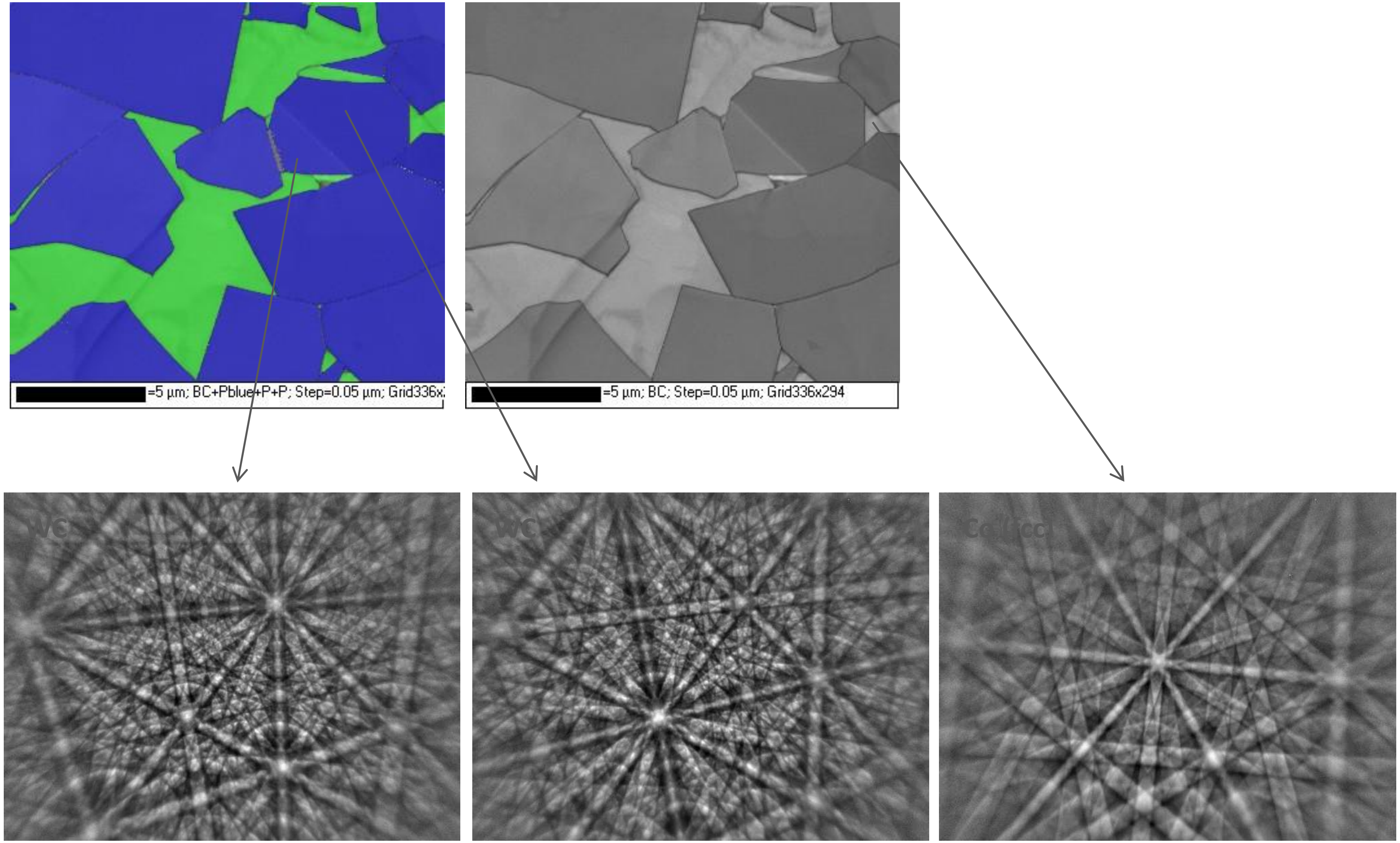
Planar Polish In Ilion



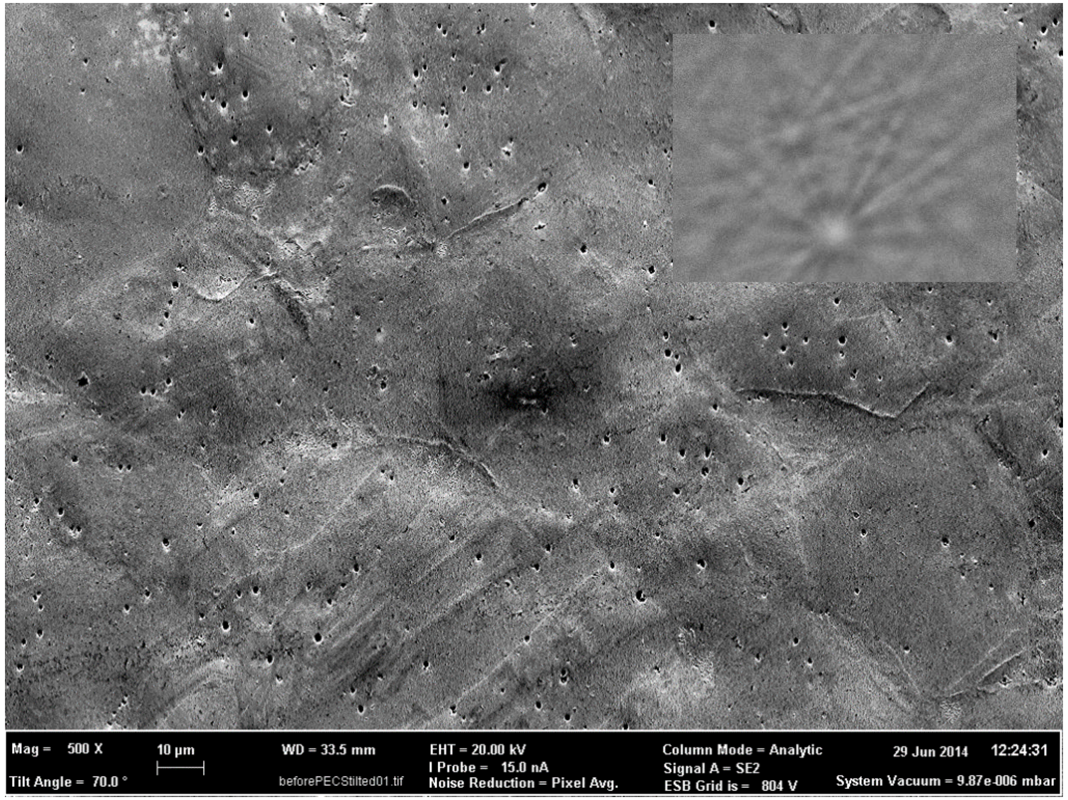
WC- Co (Argon 8KV)



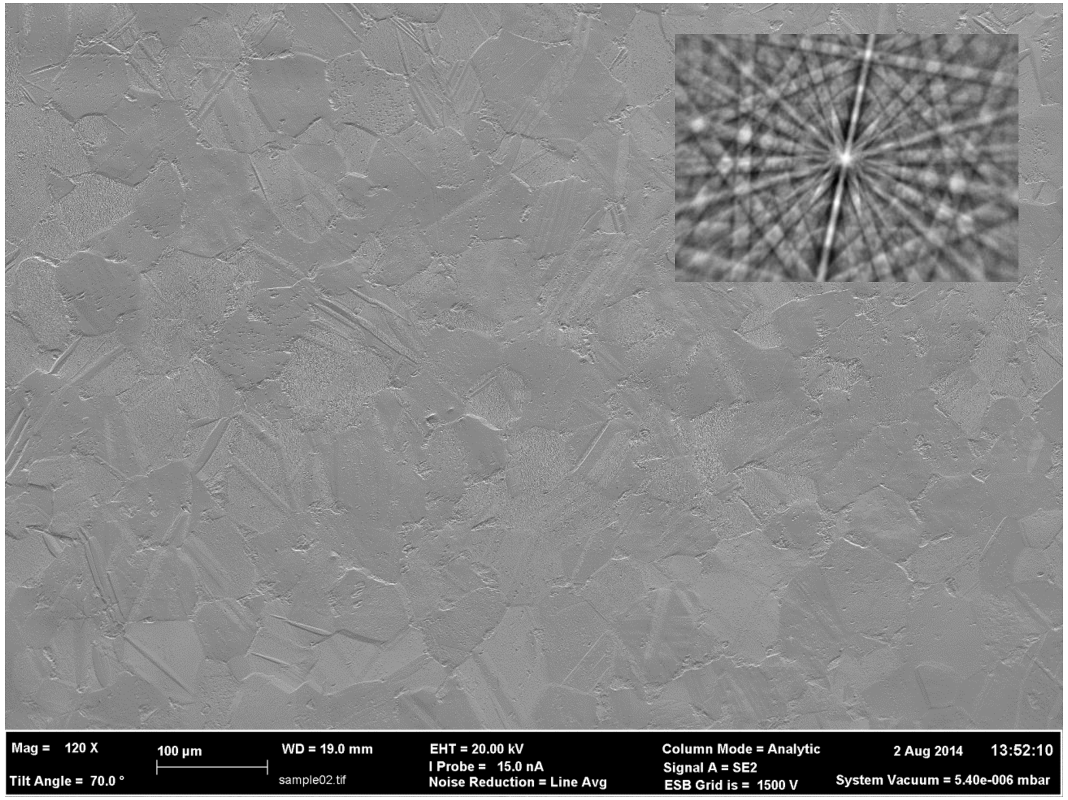
WC- Co (Argon 1KV)



PECS II Zircaloy

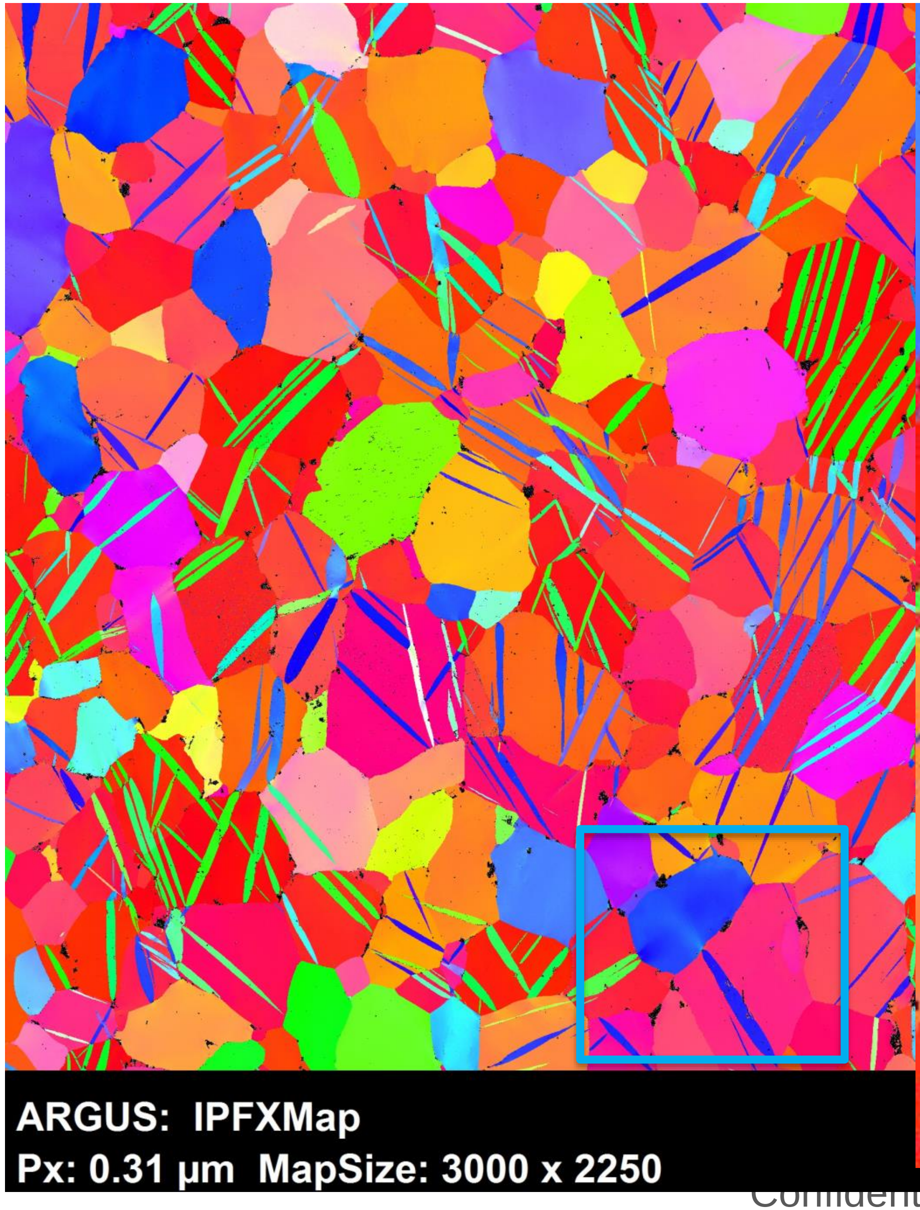


Mech. Polish + etch colloidal silica



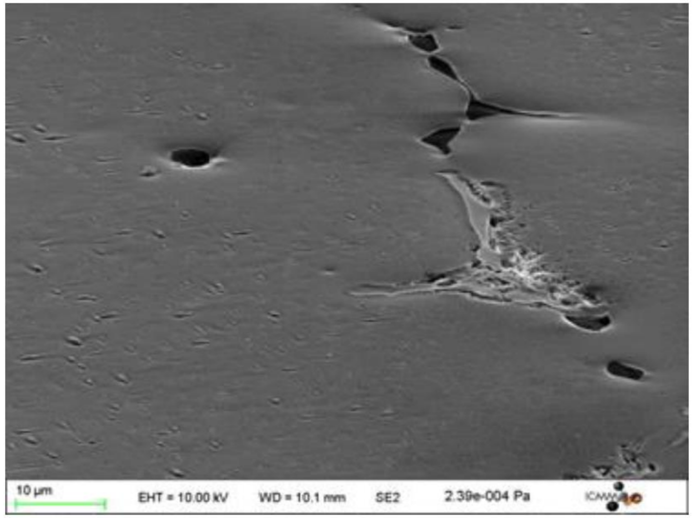
PECS 2 8kev, 15 minutes

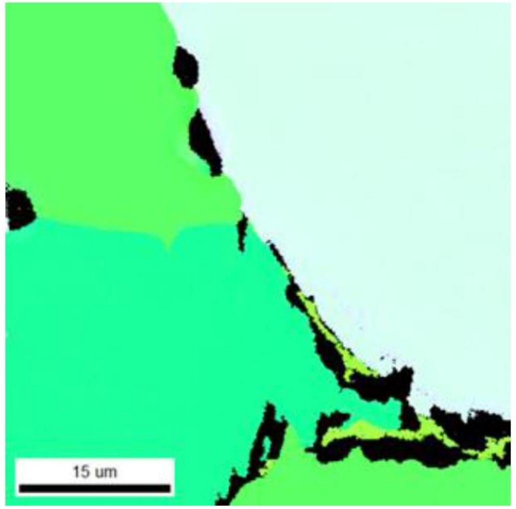
IPFZ Map: Pixel size 0.31 µm Acquisition Time 18 hr



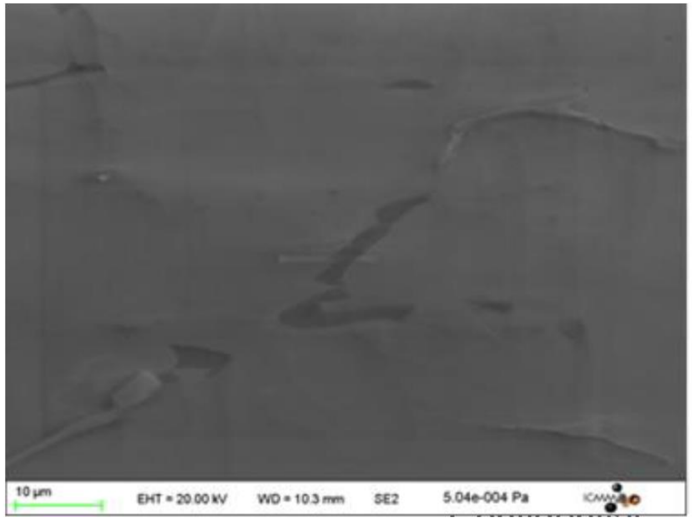
Al 6061 : polissage électrolytique versus PECS II

Polissage électrolytique



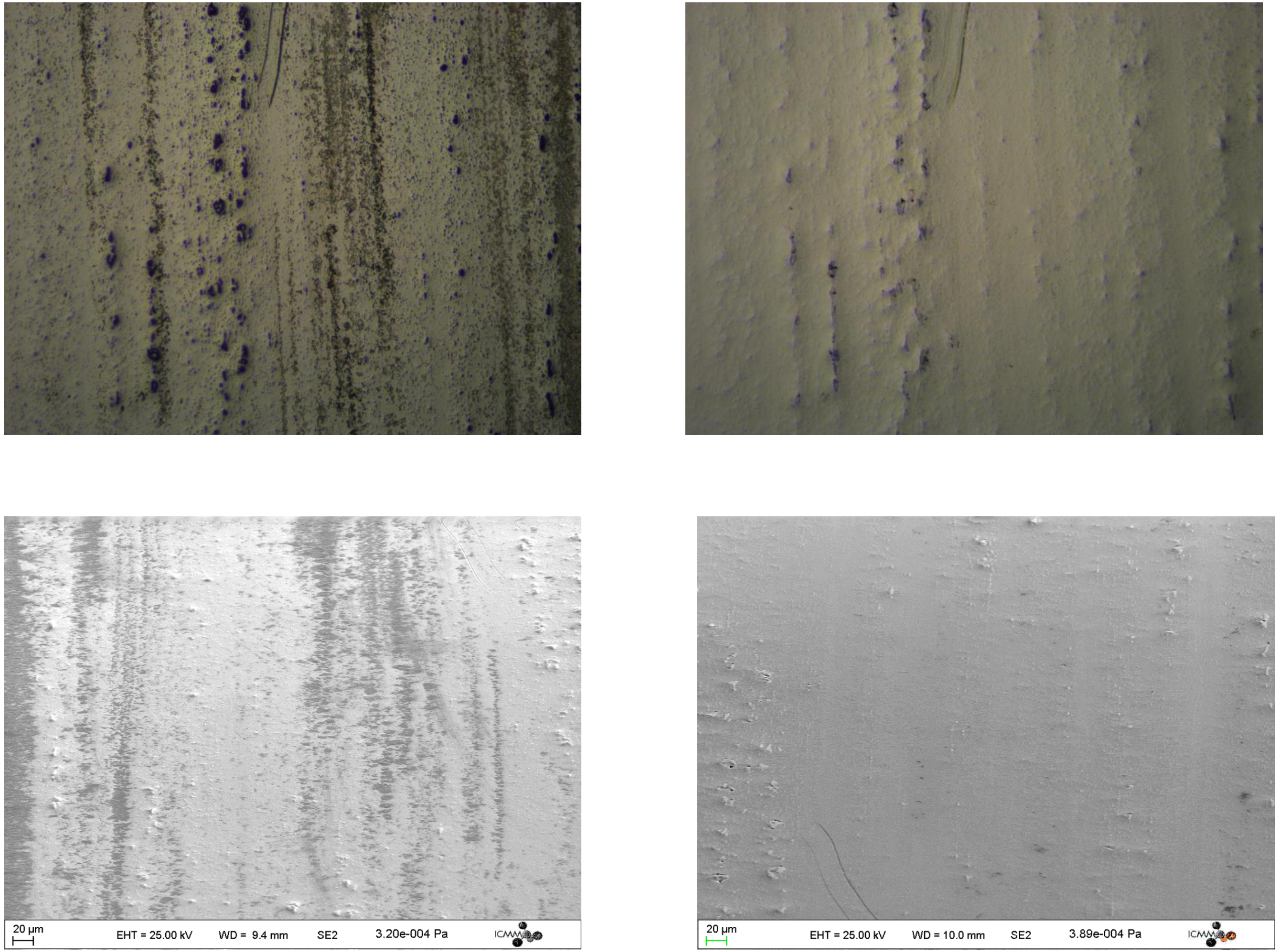


Polissage ionique
(PECS 2)



Confidential

Alliage aluminium: polissage OPS versus PECS II



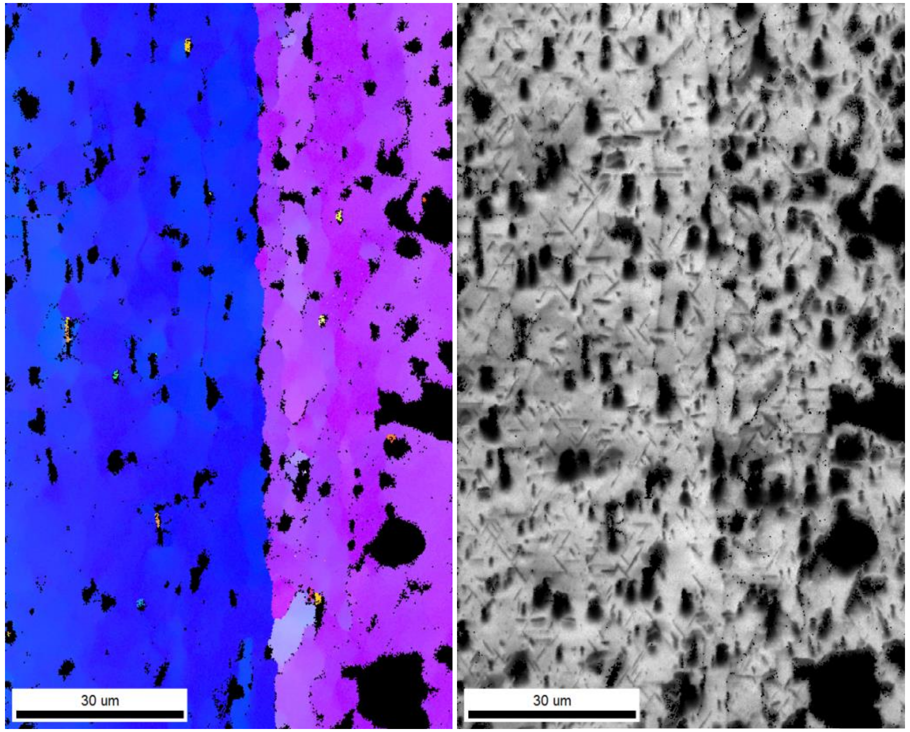
Optical microscope (Ilion2)

MEB Zeiss Supra 55

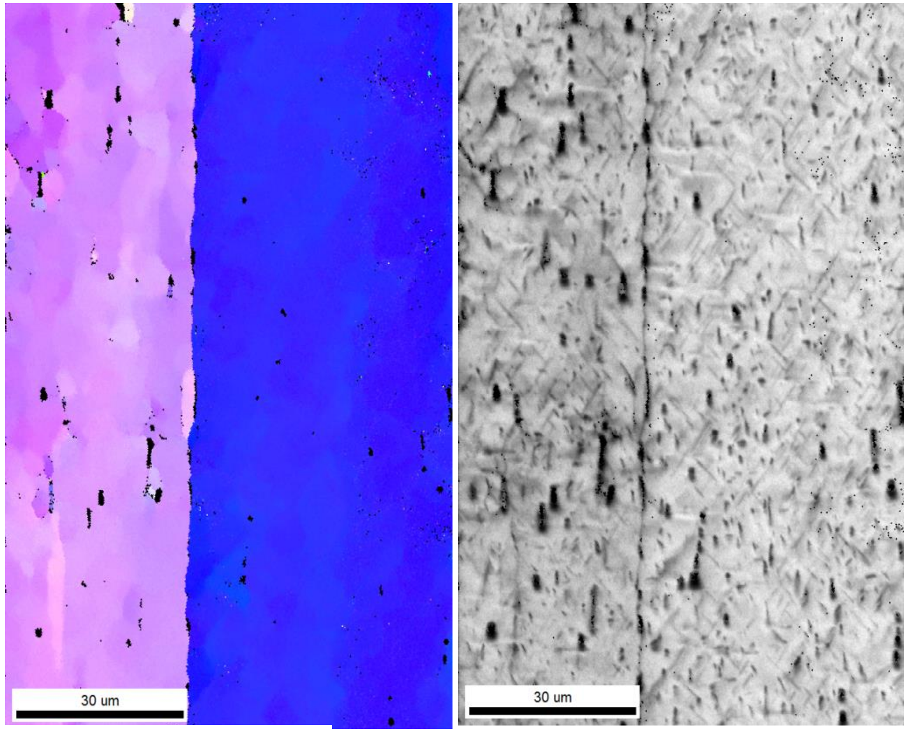
Finition silice colloidale

Reprise PECS 2

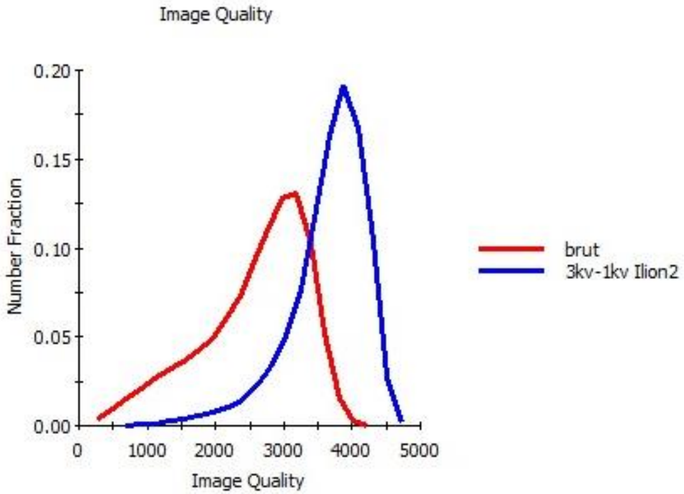
Alliage aluminium

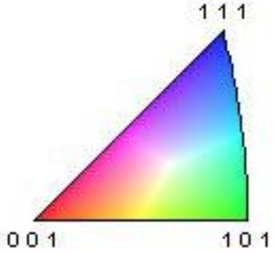


IPF map (suppression des points avec indice de confiance < 0.1)

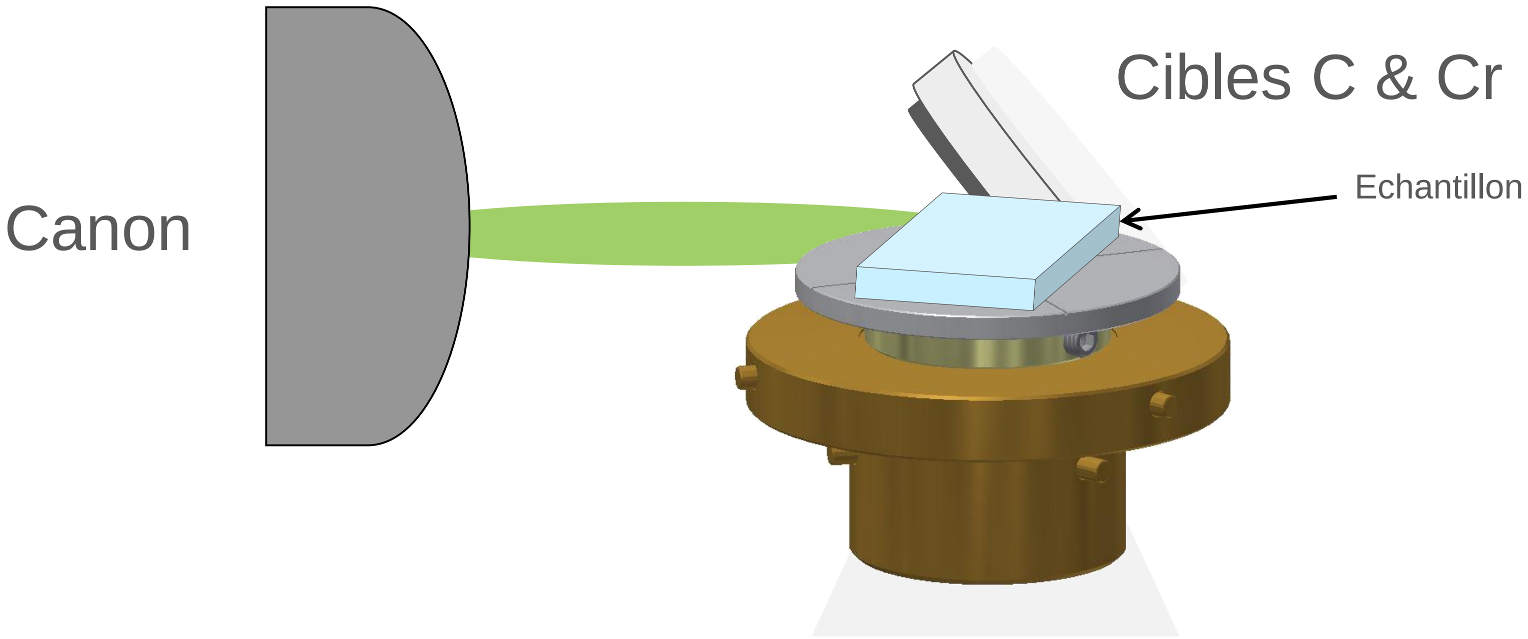


Quality map

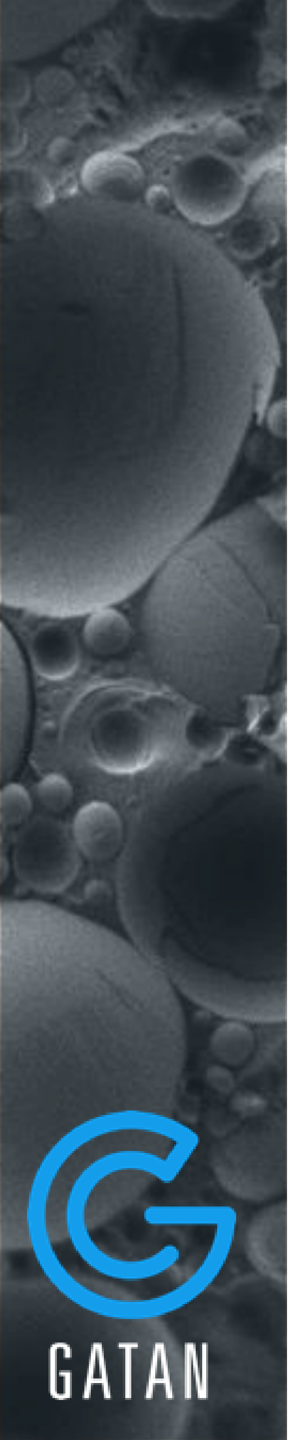




Métallisation In Situ



Cibles disponibles: C, Cr, Au, Pt, Ir, PD-Au, Si, Al2O3 …



Conclusion

- Les systèmes Gatan permettent le polissage et la découpe par faisceaux d'ions tout en préservant la surface de l'échantillon.
- Les spécificités des systèmes Gatan sont :
  - Montage des échantillons en dehors de la chambre de préparation
  - SAS offre la possibilité de transférer et reprendre l'échantillon rapidement
  - Microscope optique pour l'observation en cours de polissage
  - Platine froide pour les échantillons sensibles
  - Coupe transverse (>2mm)
  - Polissage plan (>10 mm^2)
  - Métallisation In-Situ
  - Transfert sous vide ou atmosphère de l'échantillon
- La préparation ionique est une technique de choix pour les analyses suivantes : CL, EDS, EBSD, WDS.