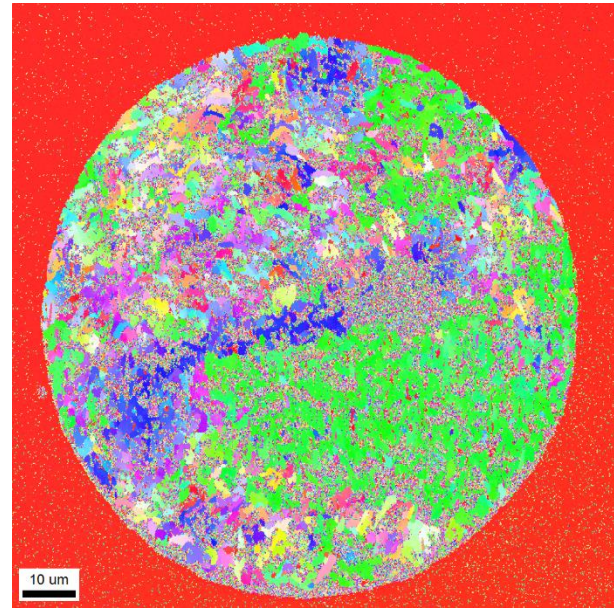
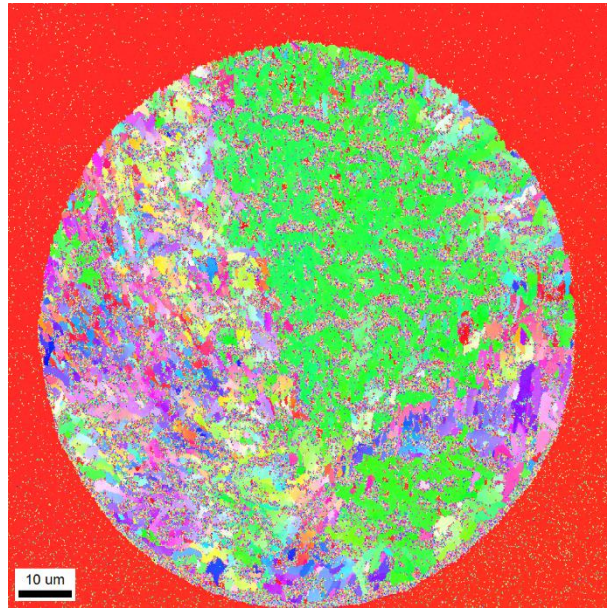
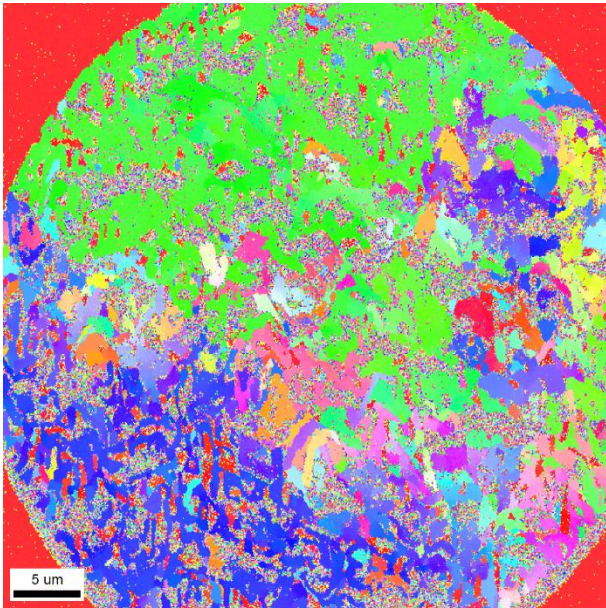
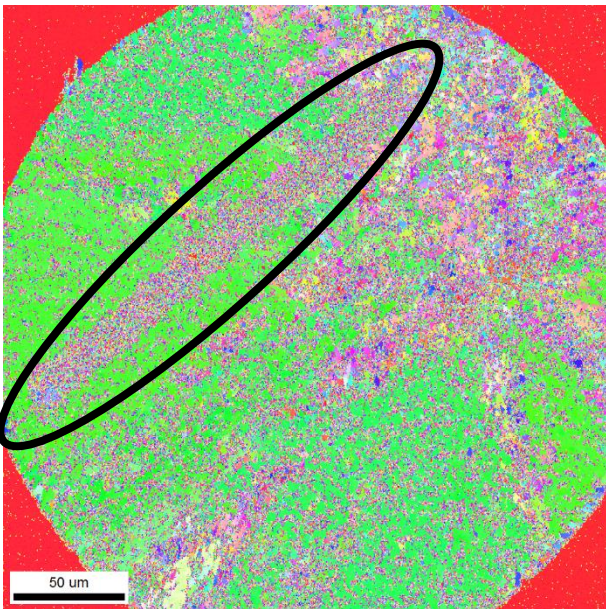


# 300nm Au, 5nm Cr on Ge Rectifying

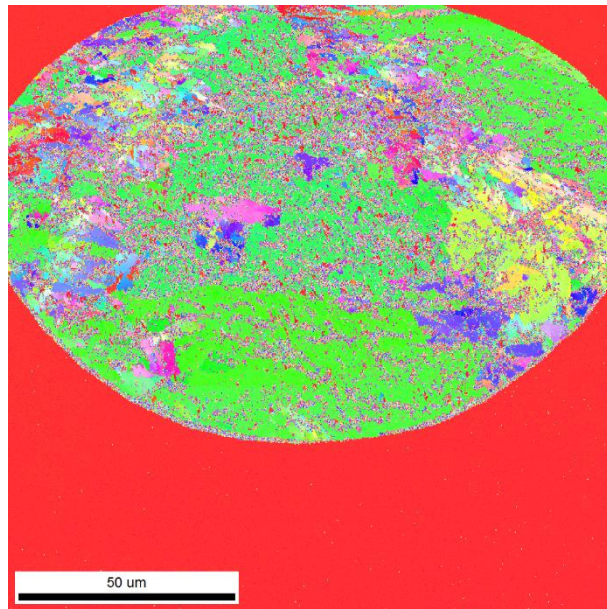
Specimen 050716



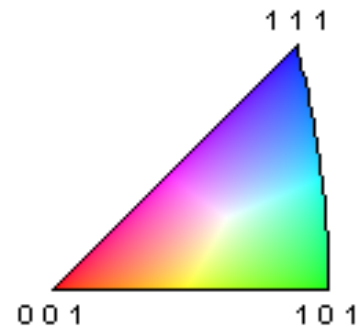
EBSD IPF maps show mixed textures,  $[110]$  (green) and blue  $[111]$ .



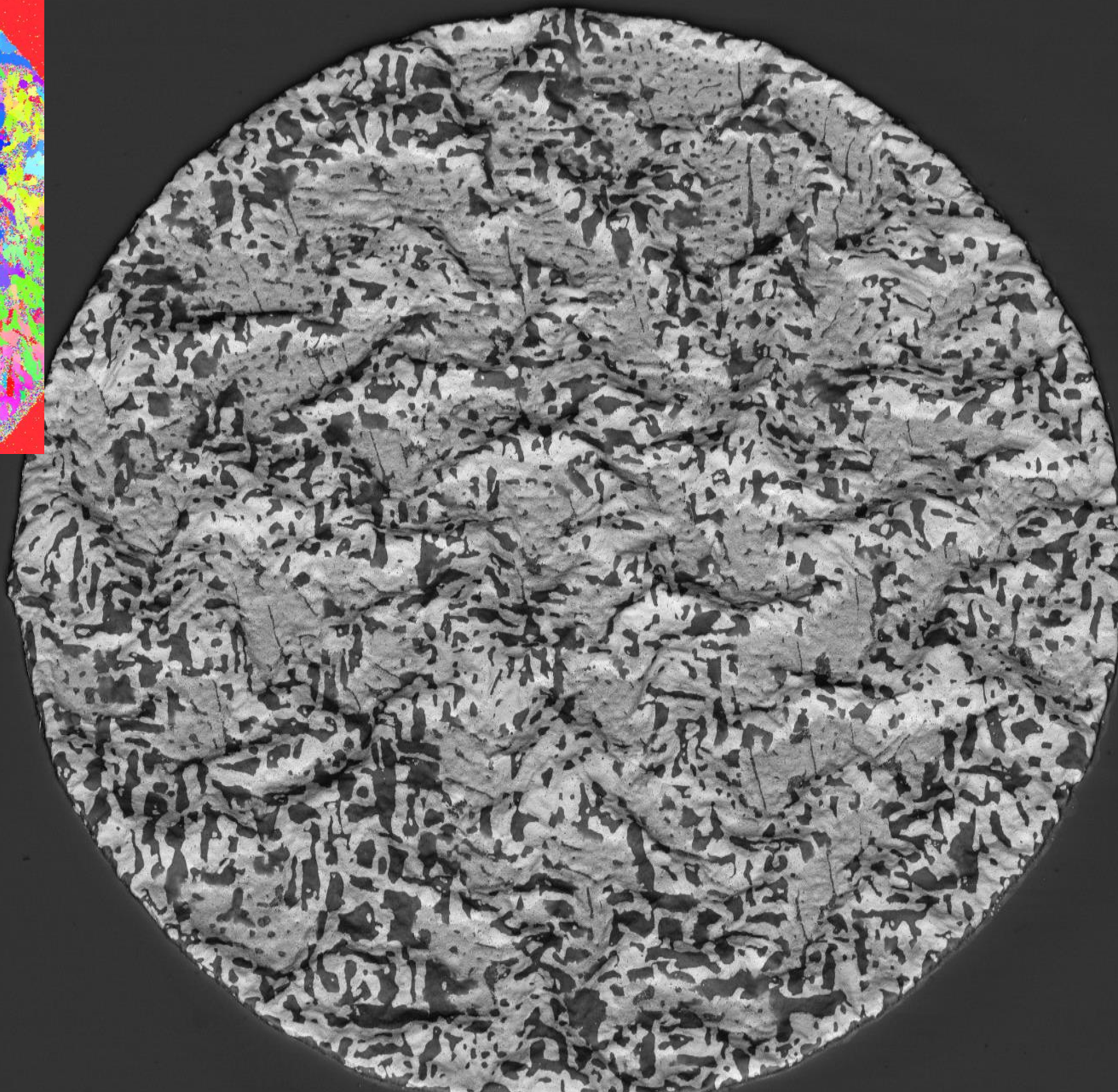
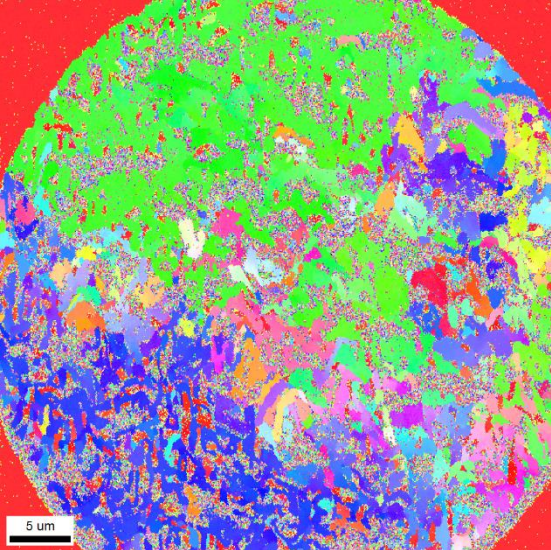
Scratch encircled



Loss of circularity caused by sample drift

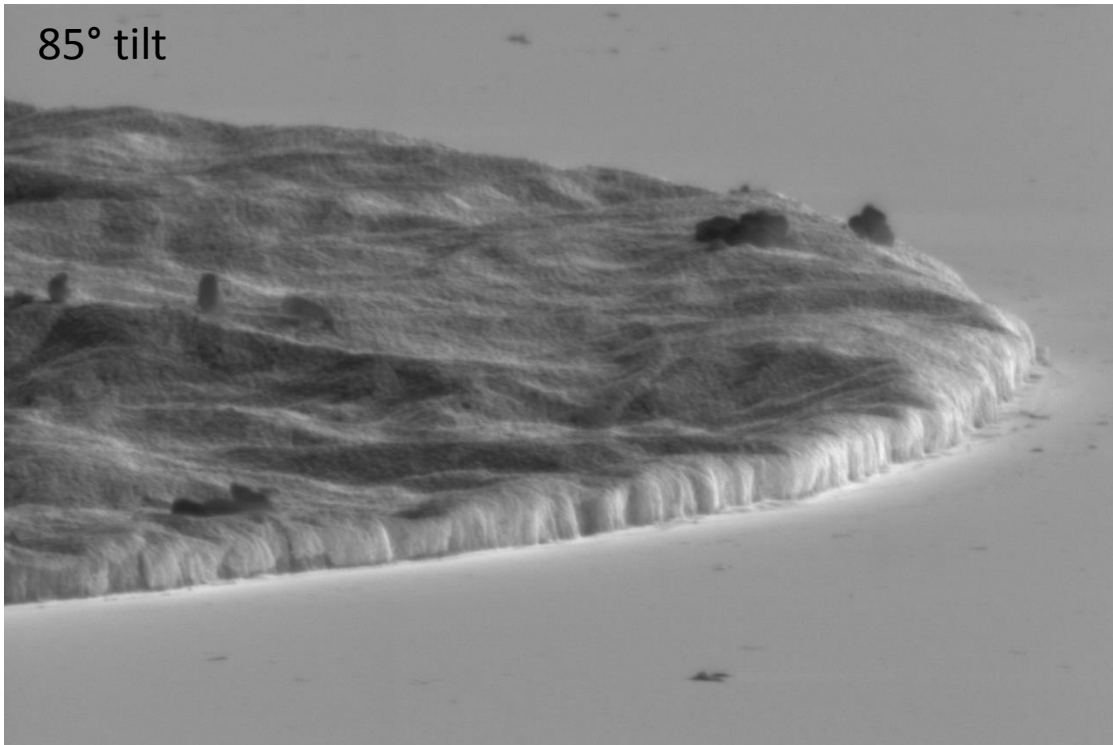






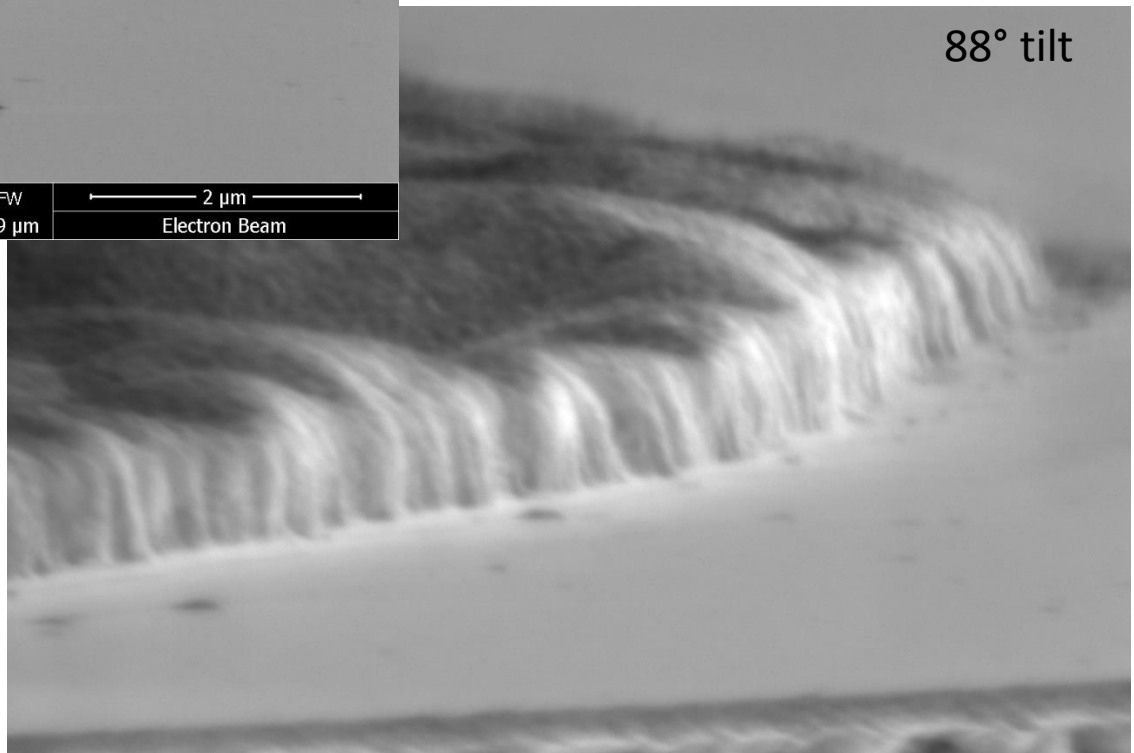
	HV	curr	WD	det	mag	tilt	dwell	mode	HFW	10 μm	
	5.00 kV	1.4 nA	6.2 mm	CBS	3 500 x	0 °	30 μs	A+B+C+D	59.2 μm	Electron Beam	

85° tilt



	HV	curr	WD	det	mag		tilt	dwell	mode	HFW	<div><div></div><div>2 μm</div><div></div></div>
	5.00 kV	1.4 nA	7.0 mm	ETD	25 000 x		45 °	30 μs	SE	8.29 μm	Electron Beam

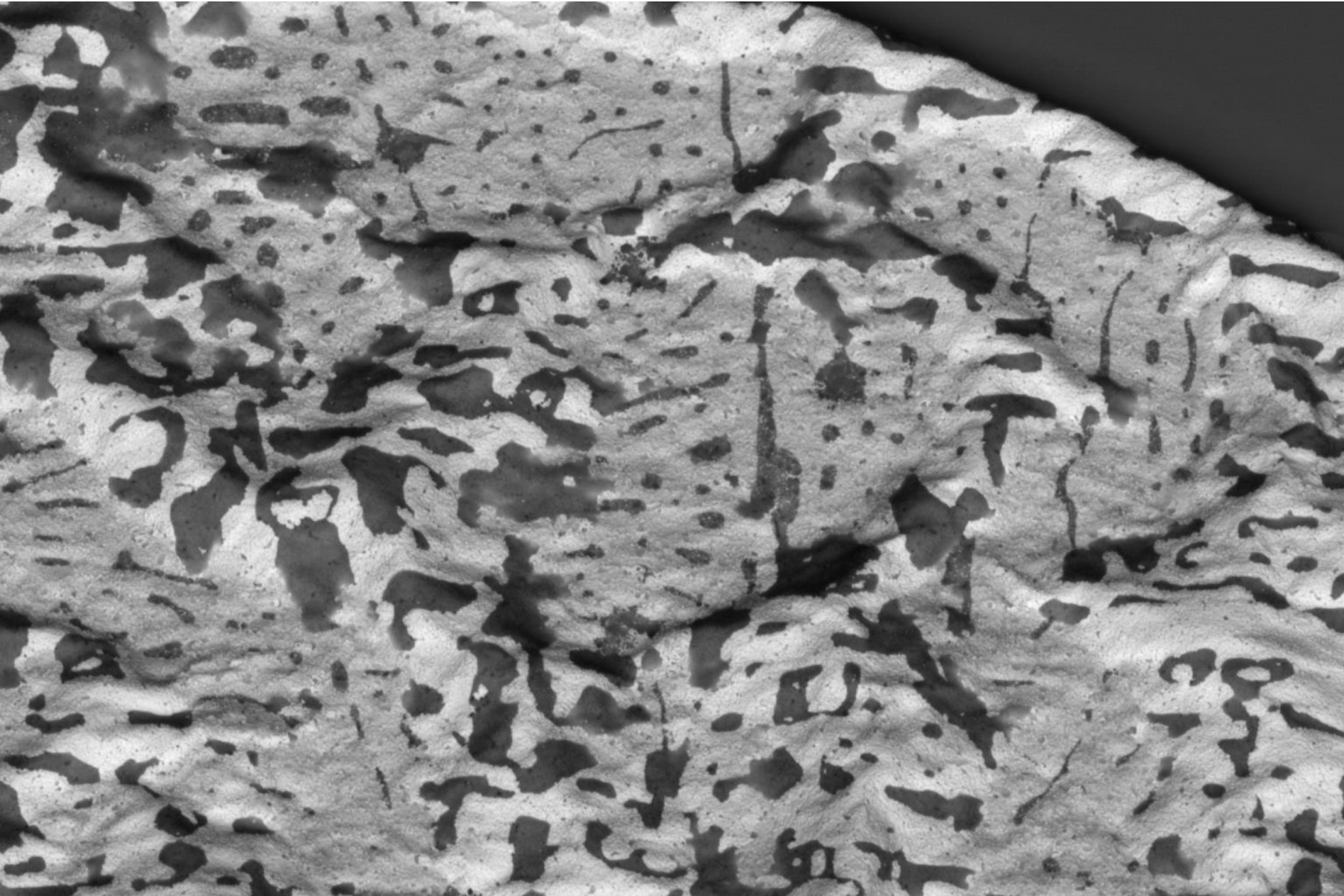
88° tilt



	HV	curr	WD	det	mag		tilt	dwell	mode	HFW	<div><div></div>500 nm<div></div></div>
	5.00 kV	1.4 nA	7.0 mm	ETD	65 000 x		48 °	30 μs	SE	3.19 μm	Electron Beam

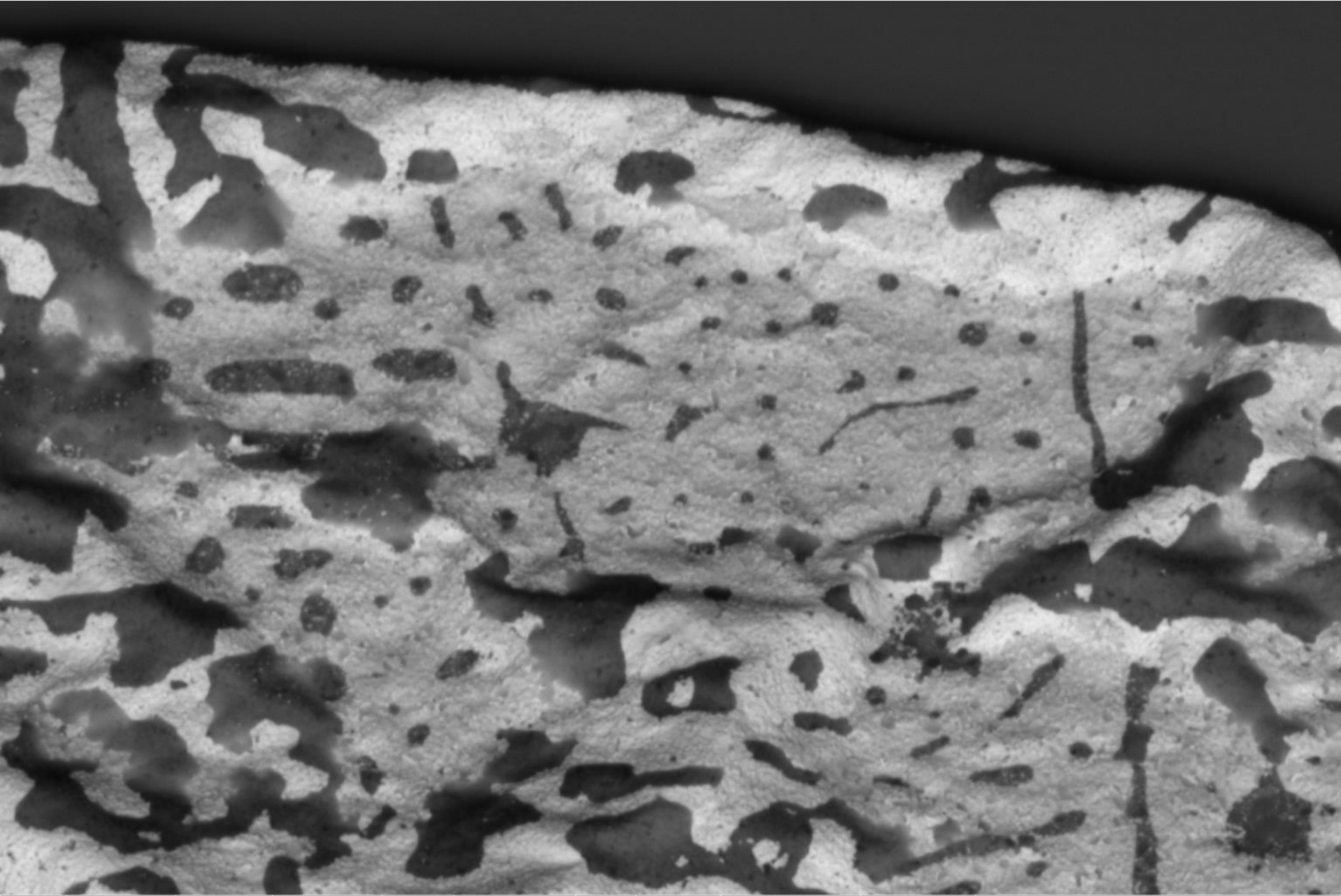


CBS 40° tilt



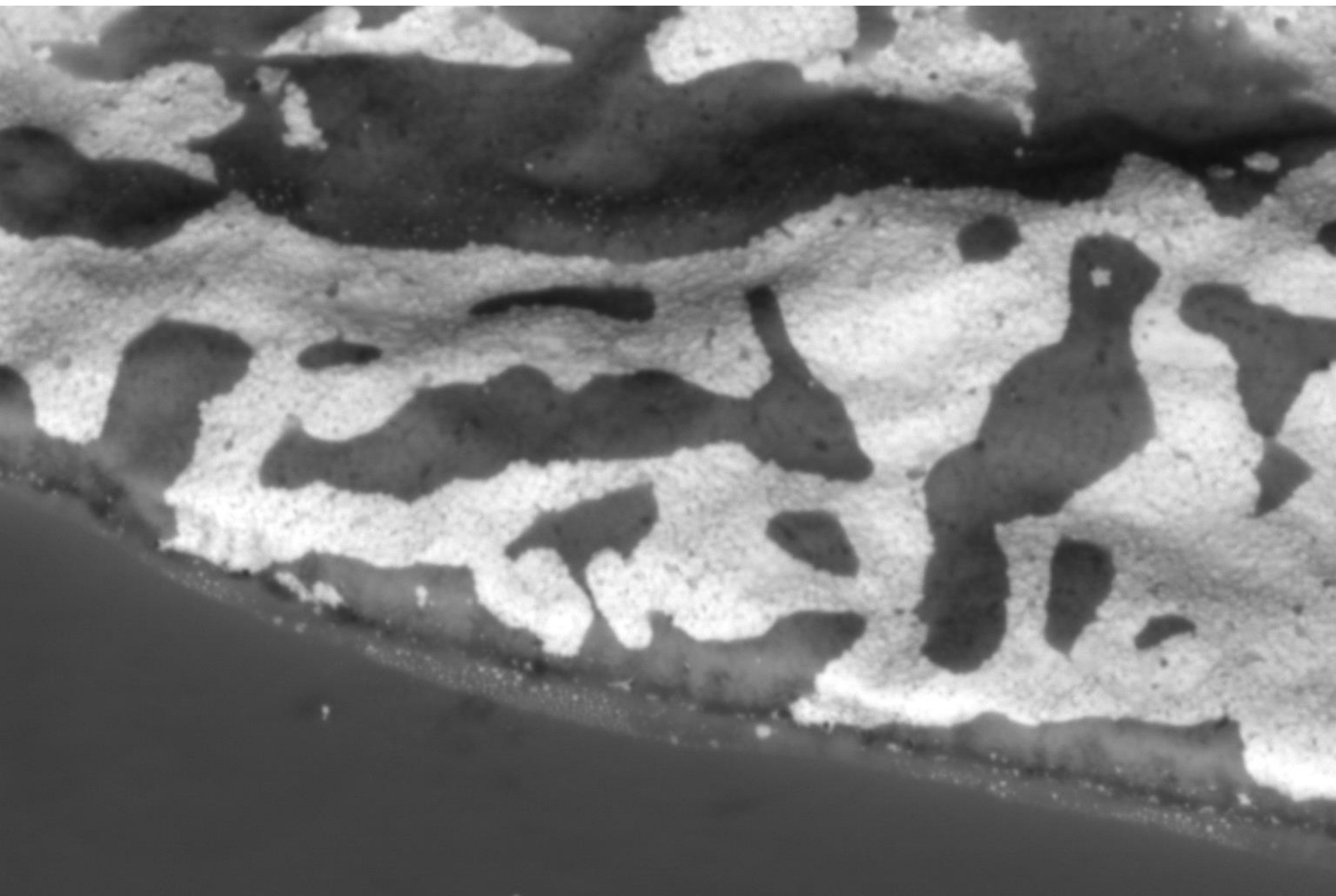
	HV 5.00 kV	curr 1.4 nA	WD 6.2 mm	det CBS	mag  12 000 x	tilt 0 °	dwell 30 µs	mode A+B+C+D	HFW 17.3 µm	 3 µm	
										Electron Beam	

CBS 40° tilt

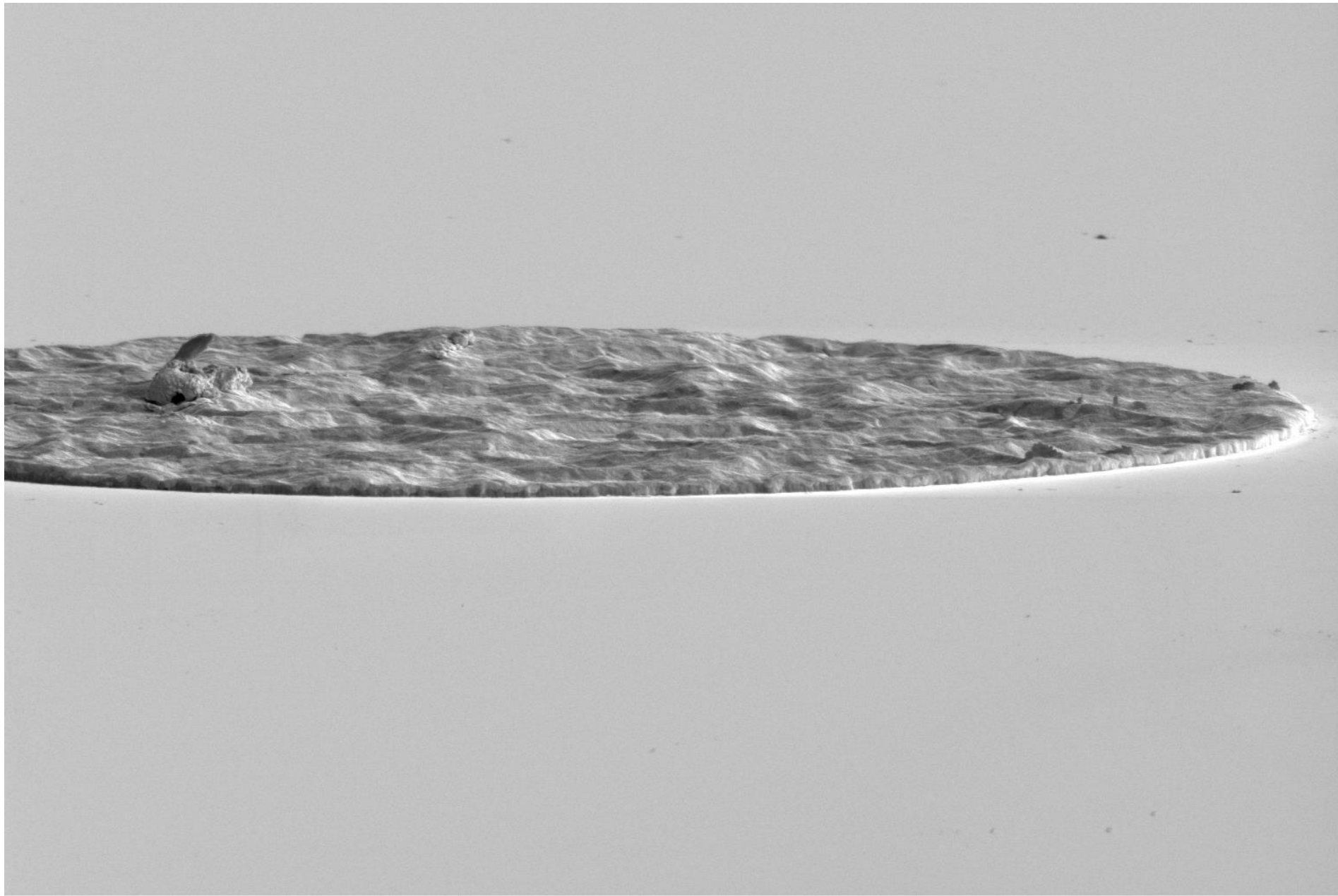


	HV	curr	WD	det	mag 	tilt	dwel	mode	HFW	<div>2 μm</div>
	5.00 kV	1.4 nA	6.2 mm	CBS	20 000 x	0 °	30 μs	A+B+C+D	10.4 μm	Electron Beam

CBS 40° tilt



	HV 5.00 kV	curr 1.4 nA	WD 6.1 mm	det CBS	mag  35 000 x	tilt 0 °	dwell 30 µs	mode A+B+C+D	HFW 5.92 µm	 1 µm	
										Electron Beam	



HV  
5.00 kV

curr  
1.4 nA

WD  
7.0 mm

det  
ETD

mag 田  
5 000 x

tilt  
45 °

dwell  
30 μs

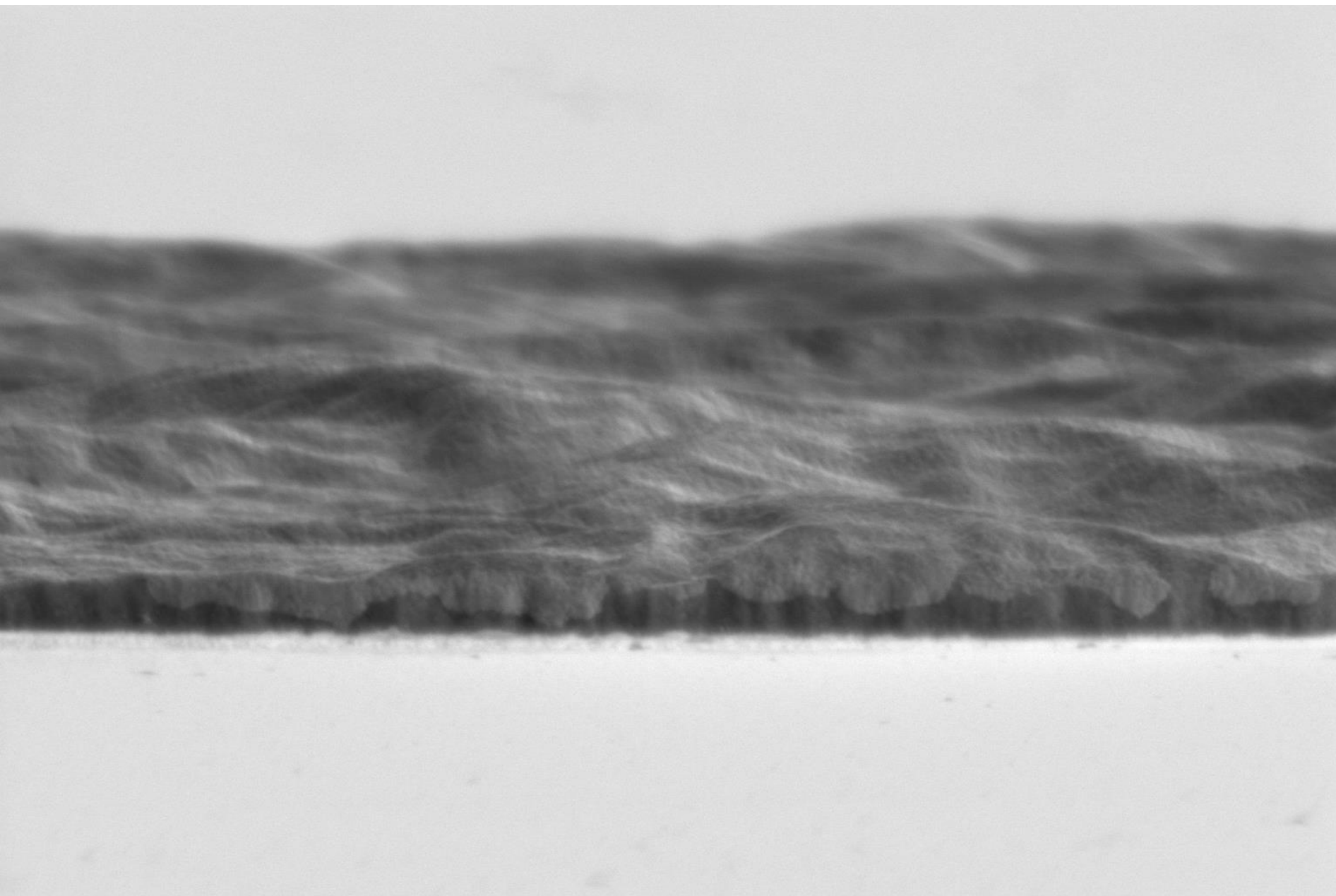
mode  
SE

HFW  
41.4 μm

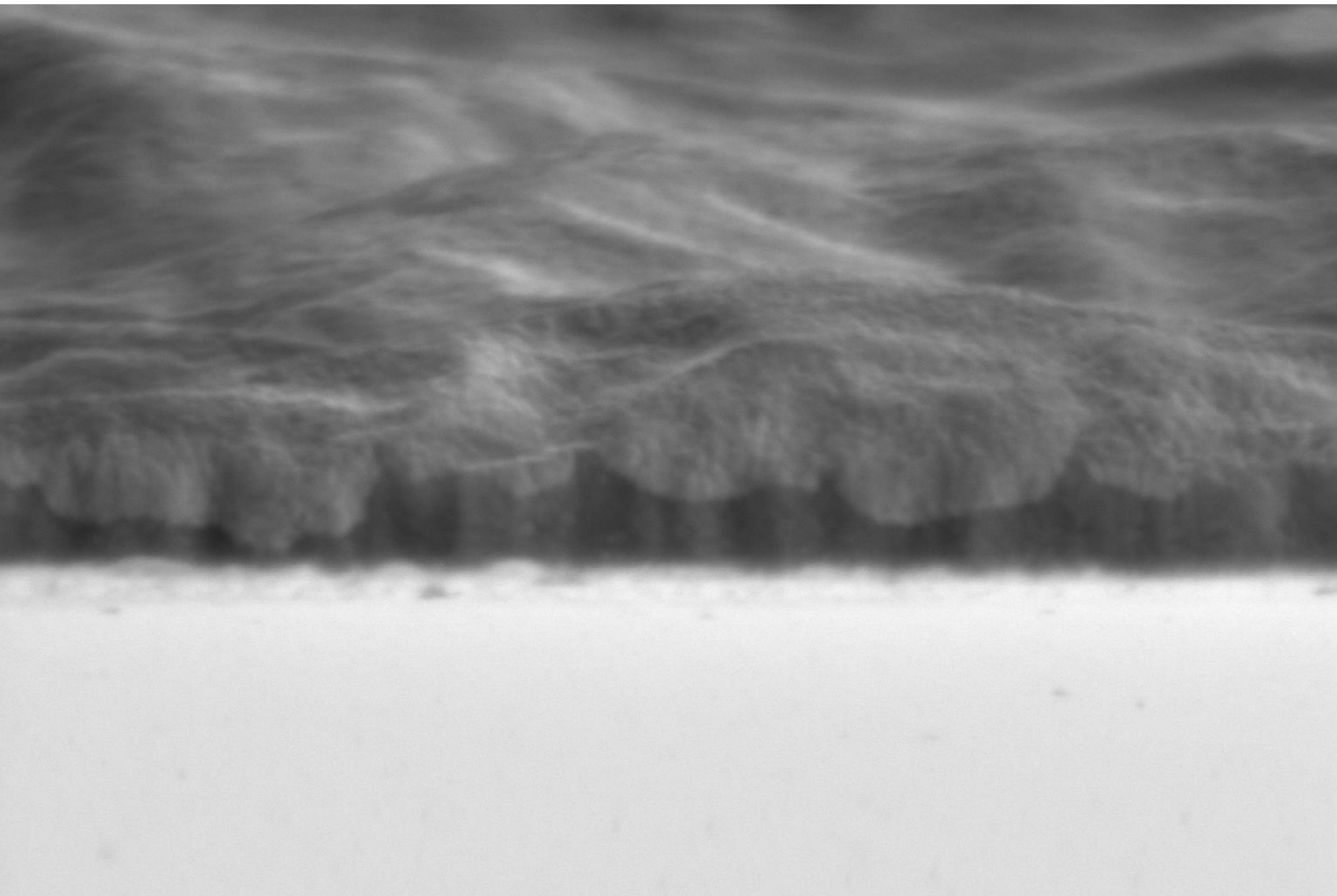
← 10 μm →

Electron Beam

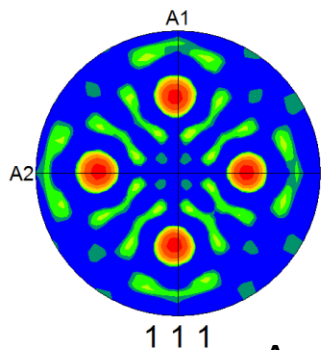
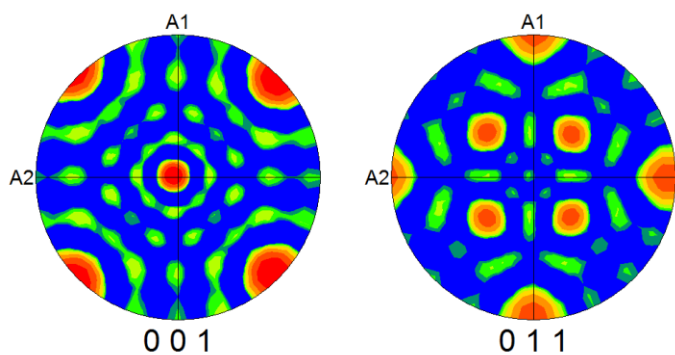




	HV	curr	WD	det	mag	tilt	dwel	mode	HFV	 2 $\mu\text{m}$	
	5.00 kV	1.4 nA	7.2 mm	ETD	25 003 x	48 °	30 $\mu\text{s}$	SE	8.29 $\mu\text{m}$	Electron Beam	

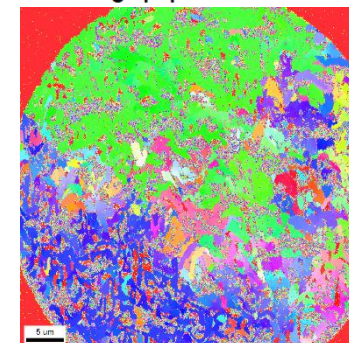
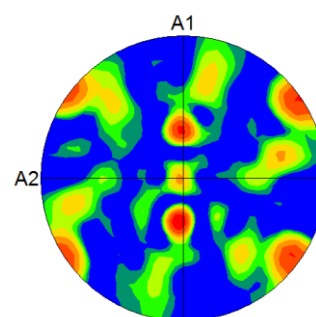
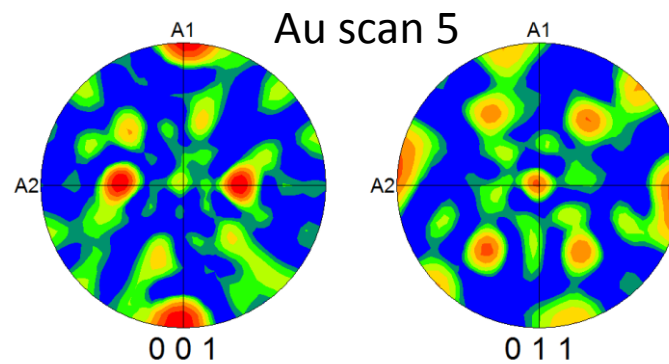
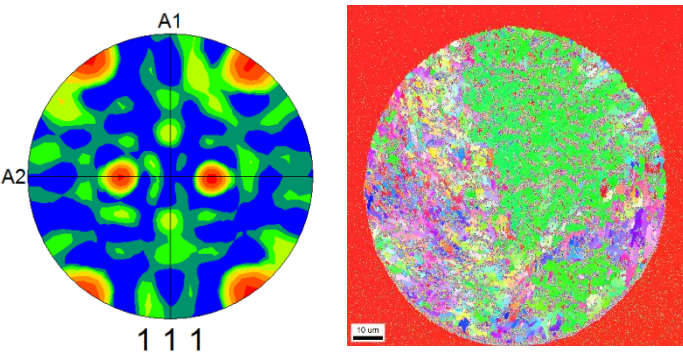
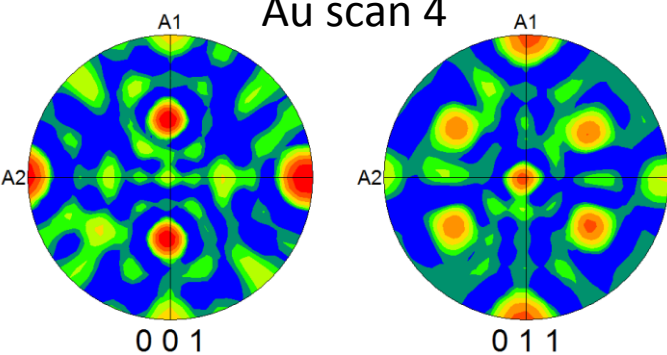


	HV	curr	WD	det	mag		tilt	dwel	mode	HPW	 1 $\mu\text{m}$	
	5.00 kV	1.4 nA	7.1 mm	ETD	50 000 x		48 °	30 $\mu\text{s}$	SE	4.14 $\mu\text{m}$	Electron Beam	

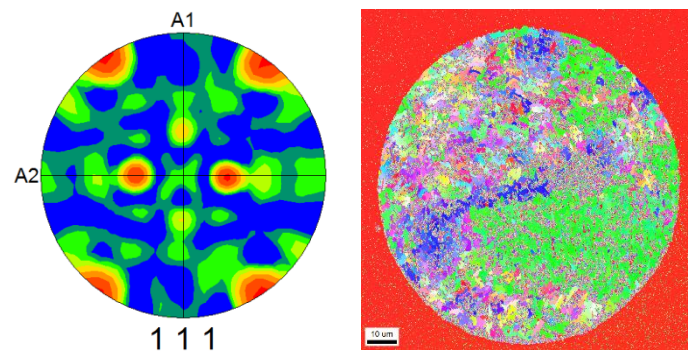
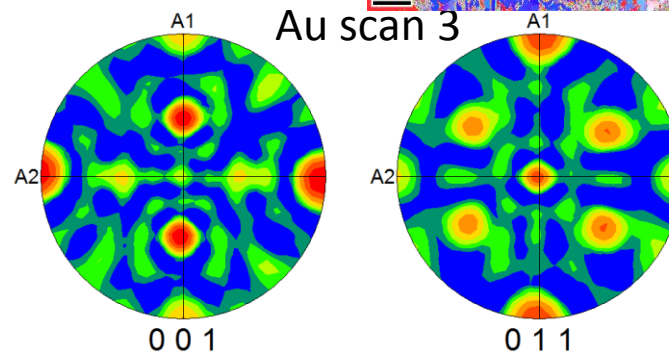


Germanium  
Reference texture

Au scan 4

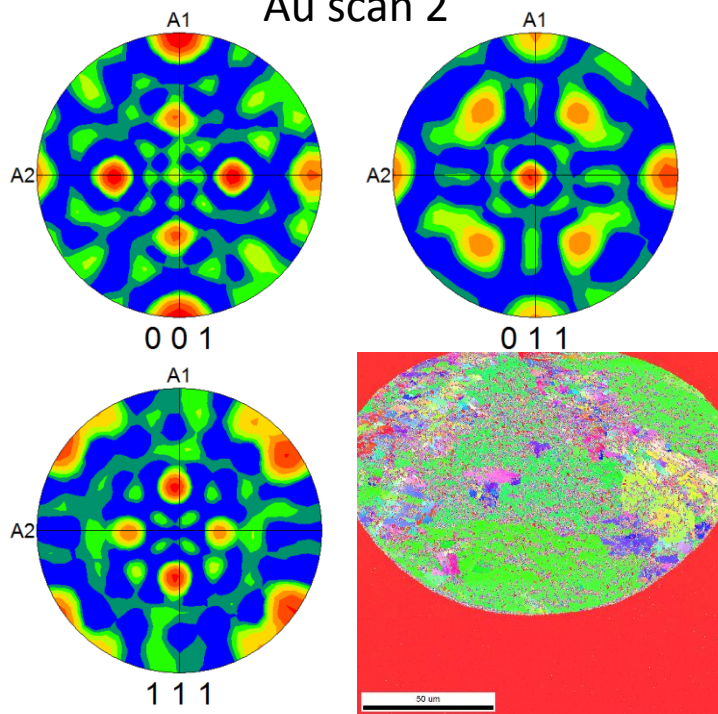


Au scan 3

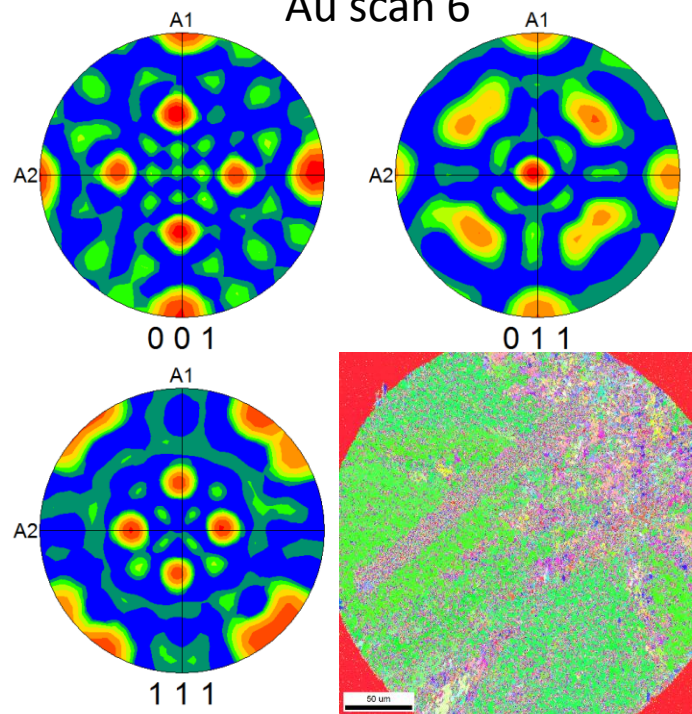




Au scan 2



Au scan 6



FIB x-section location

31.19  $\mu\text{m}$



HV  
5.00 kV

curr  
1.4 nA

WD  
4.1 mm

det  
CBS

mag   
5 000 x

tilt  
0 °

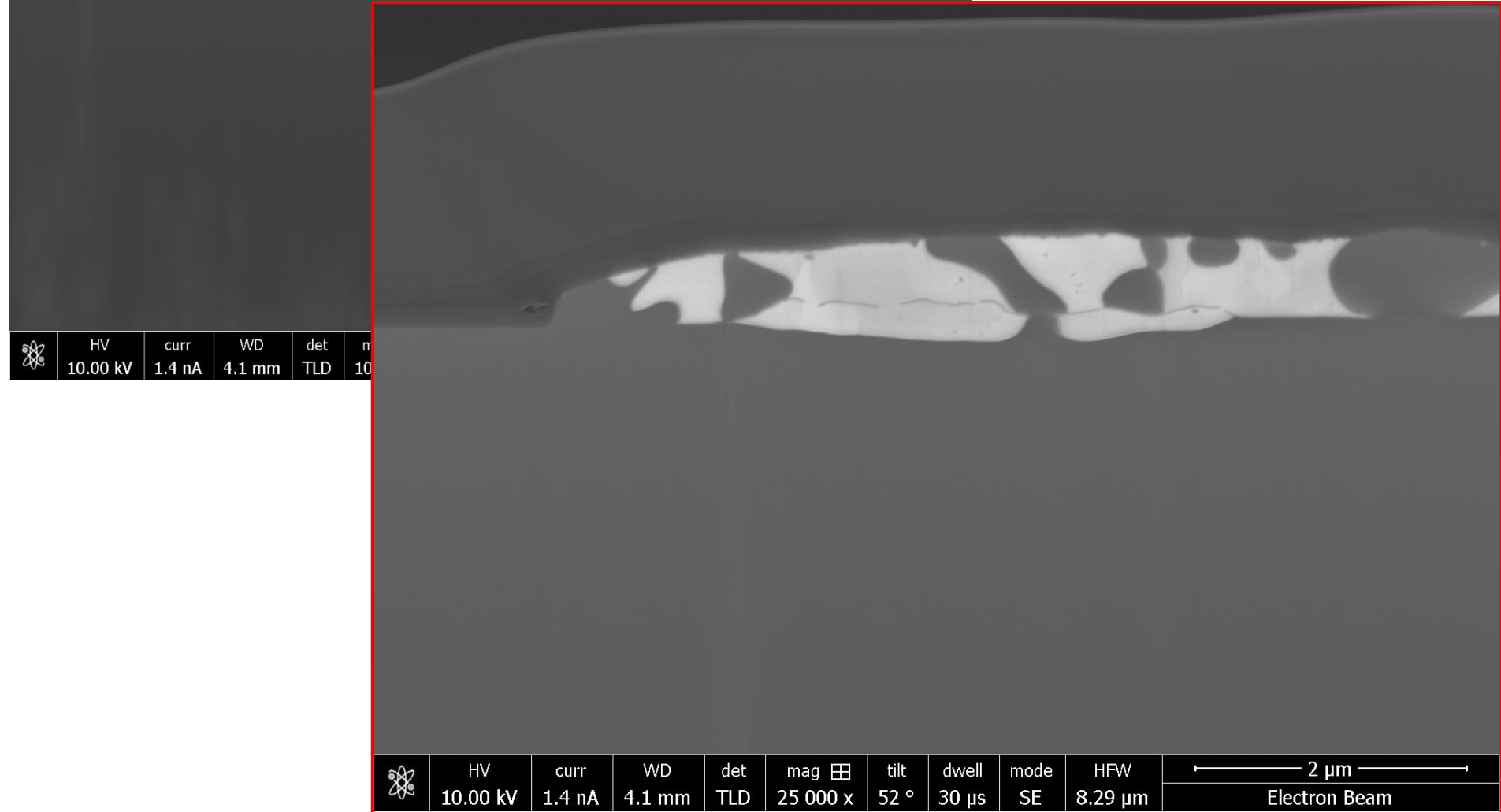
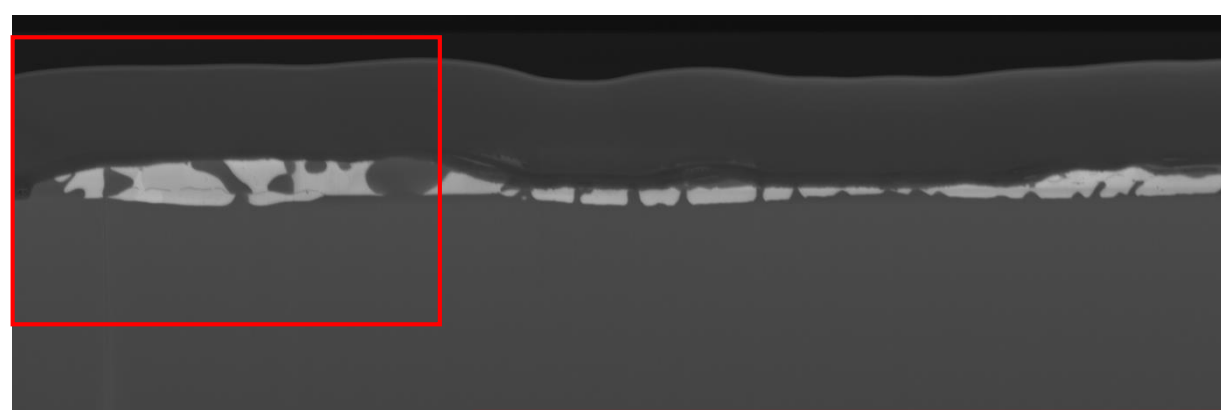
dwell  
10  $\mu\text{s}$

mode  
A+B+C+D

HFV  
41.4  $\mu\text{m}$

— 5  $\mu\text{m}$  —  
Electron Beam

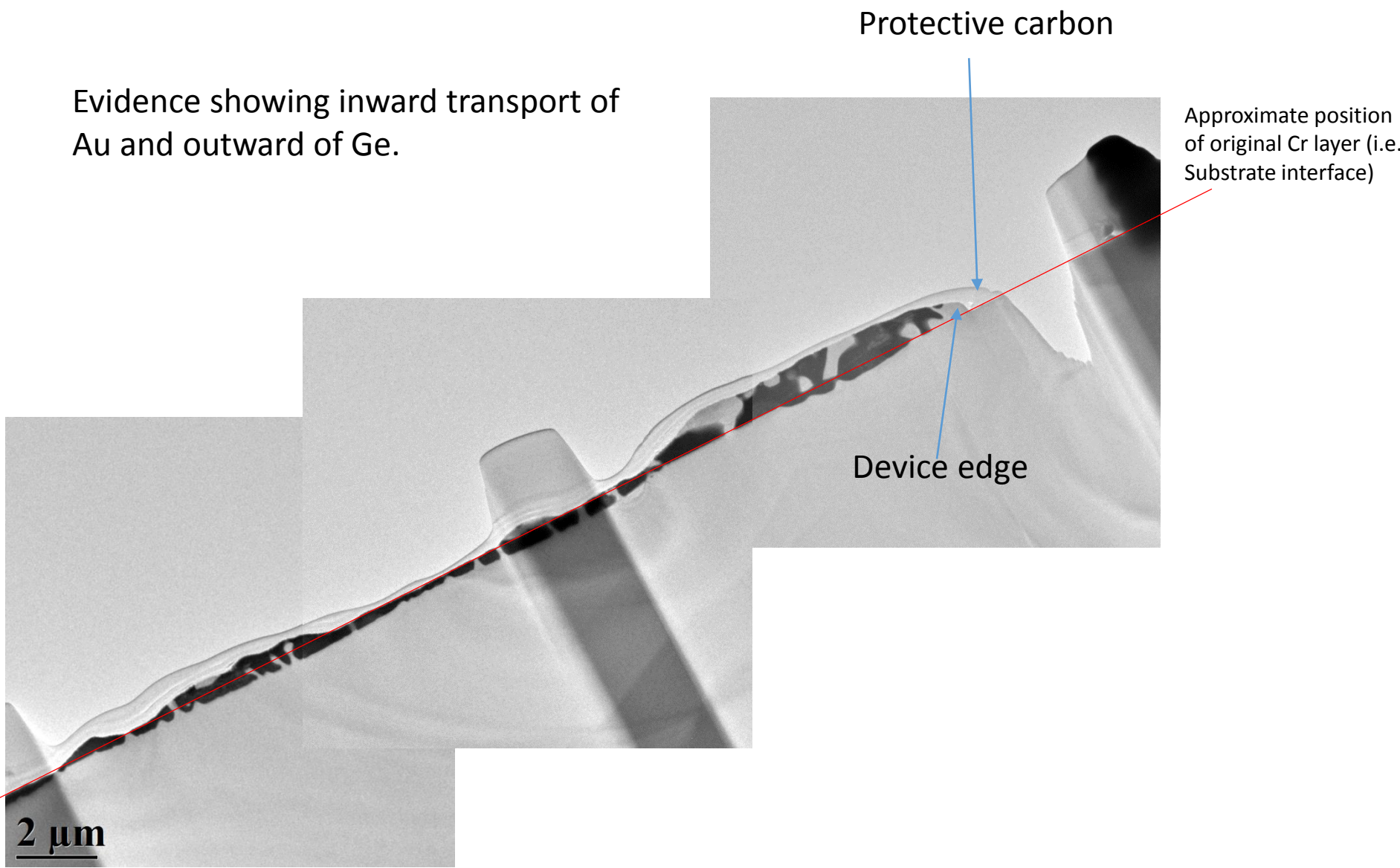
Sample edge, tilt correction (52°) required for thickness measurements.



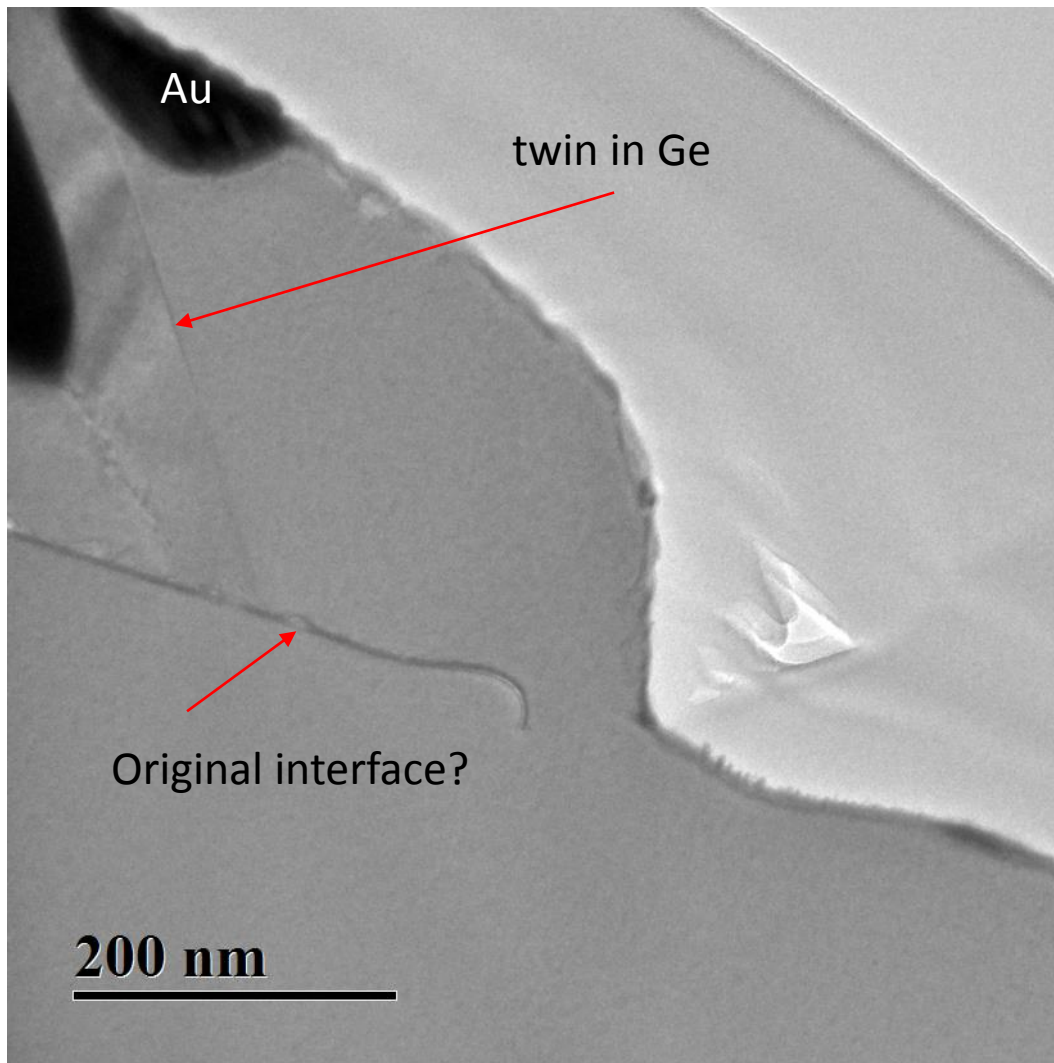


# TEM and EFTEM Investigation

Evidence showing inward transport of Au and outward of Ge.

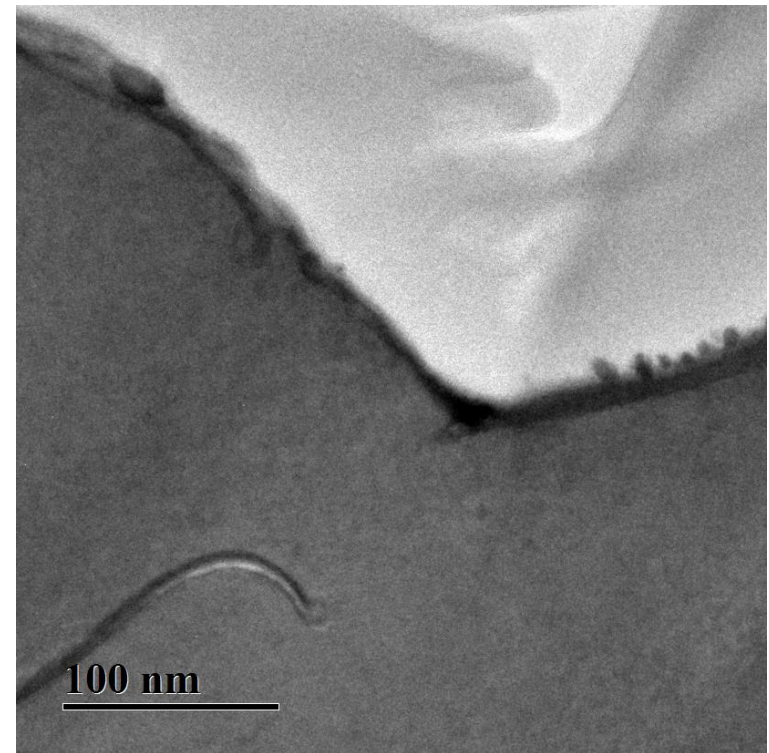


2 μm



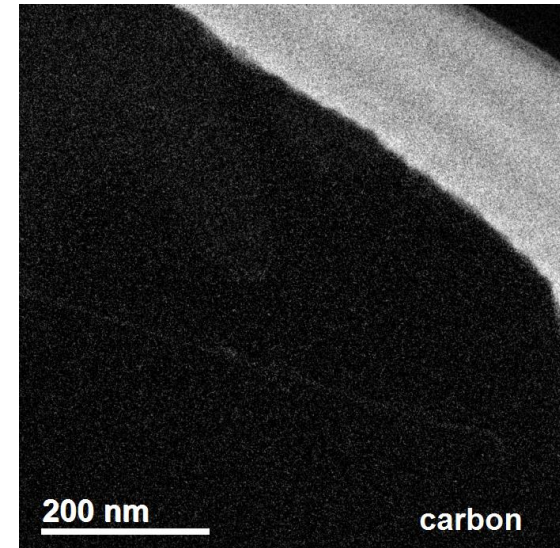
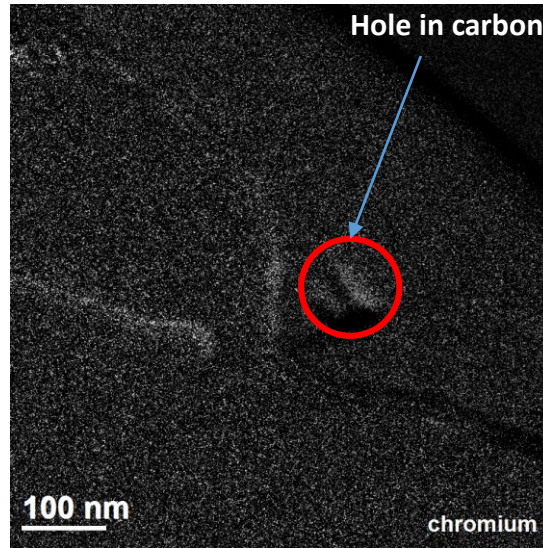
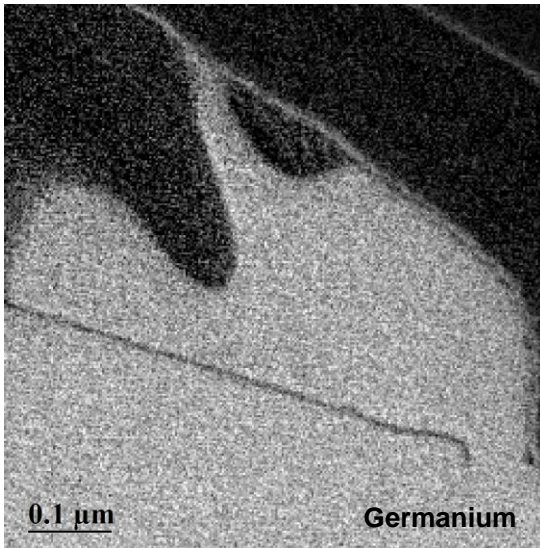
Twins were relatively common in the Ge islands, I count eleven in the thin regions. That equates to approx. 1 every  $2\mu\text{m}$  but this will vary depending on the number of Ge islands formed.

Where do we expect the Cr layer to extend to?  
 I can't quite work out the process route used to manufacture the devices. Do you first deposit Cr over the entire Ge surface prior to deposition of patterned Au pads and then Hf etch away the Cr that extends beyond the Au contact?

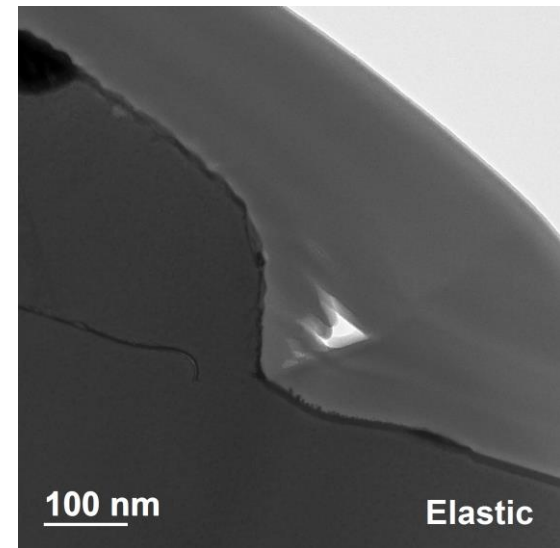




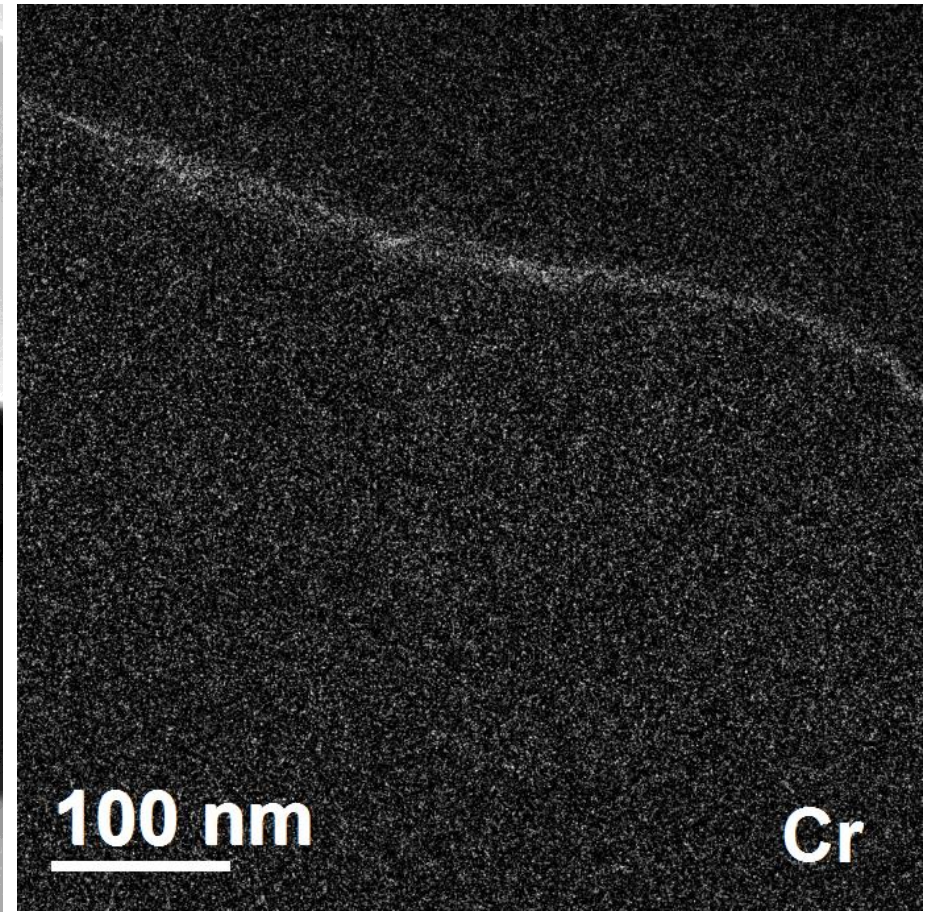
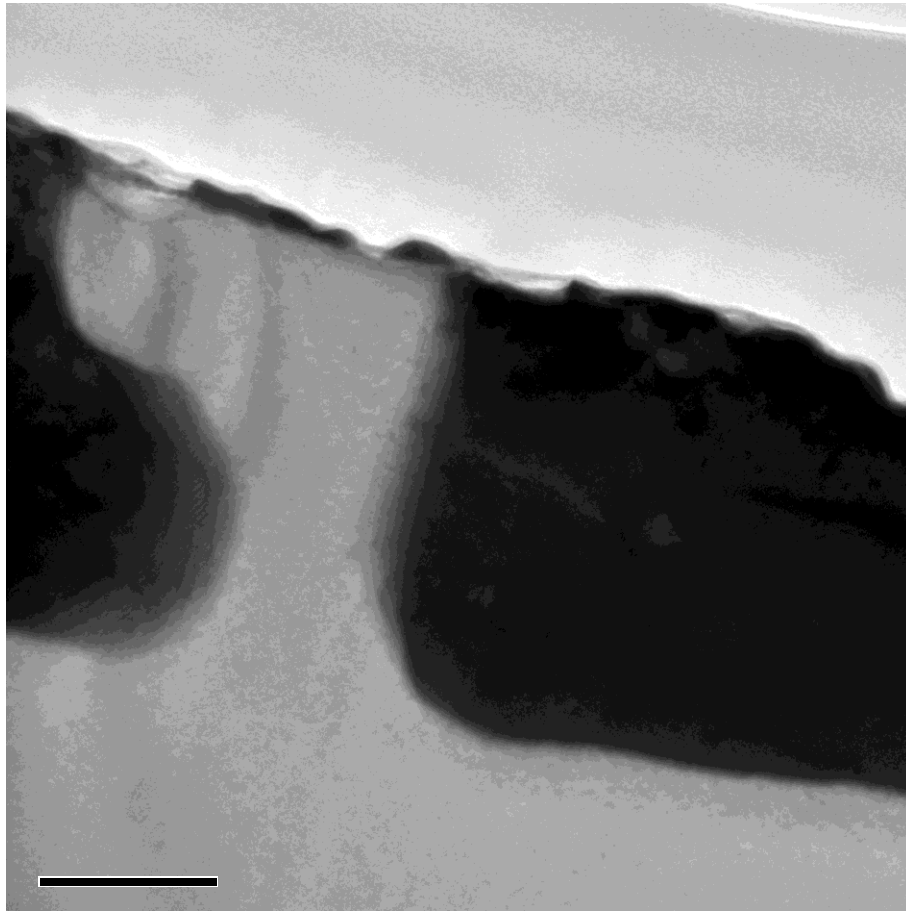
# Sample Edge



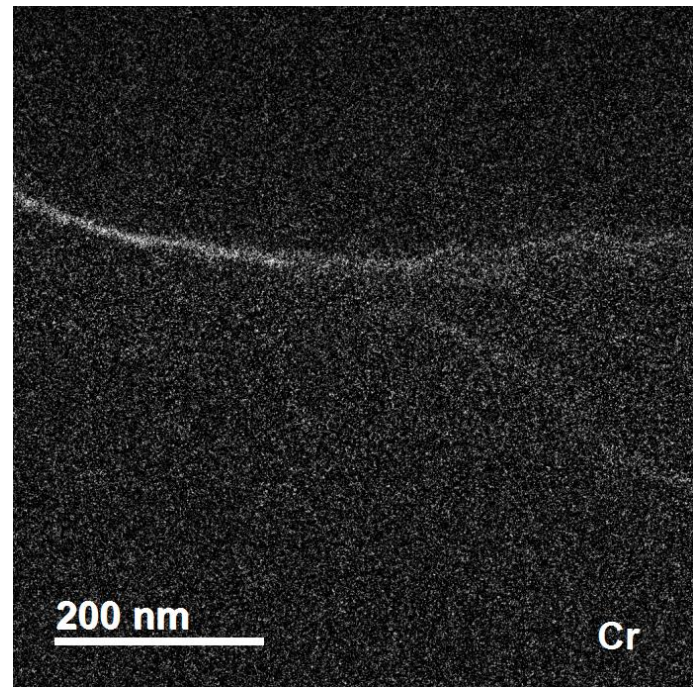
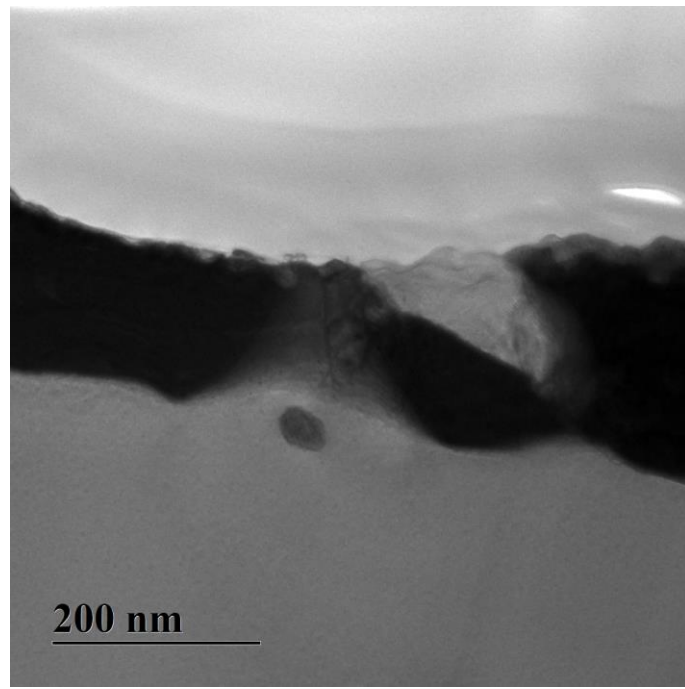
Sample was moved slightly between map collections.  
I struggle to get a signal for Au using EFTEM.  
No convincing evidence of oxygen.



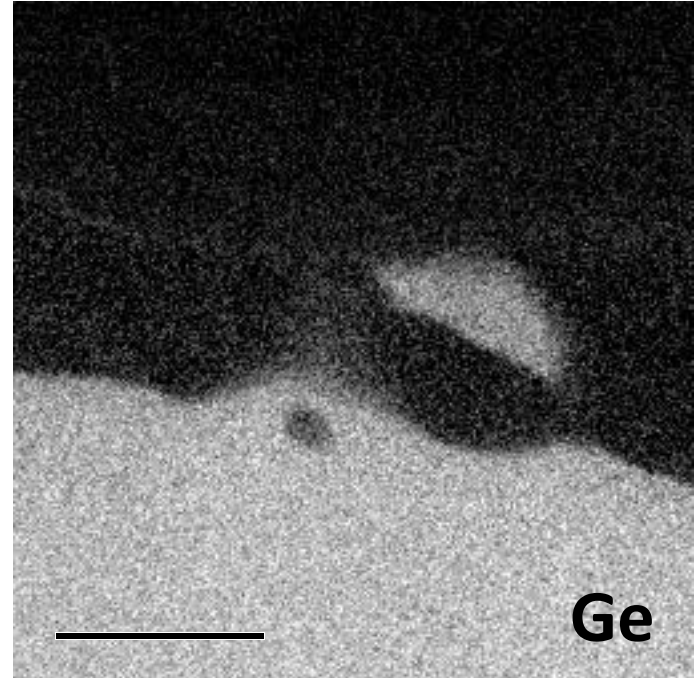




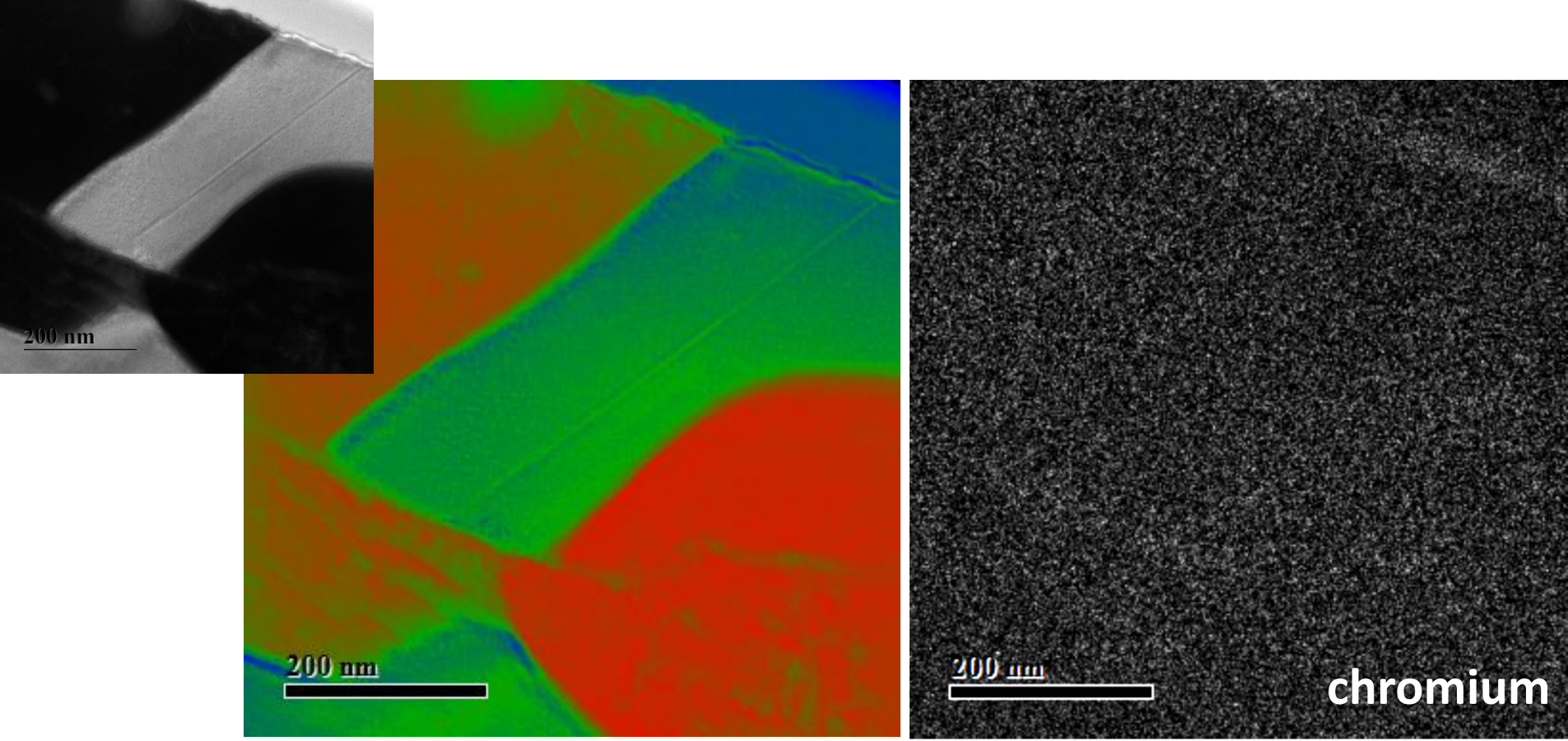
Chromium on upper surface but this would have been very close to the original interface position.



The Ge island is above the height of the original interface. Hence Cr also appears to have migrated outwards, to the surface of the device.







Sample a little too thick for EFTEM. Mean free path (relative thickness) map, blue is ideal, we can sometimes cope with green but red is a non-starter.

I can try to re-thin the specimen but I don't imagine I will preserve a damage free top edge.