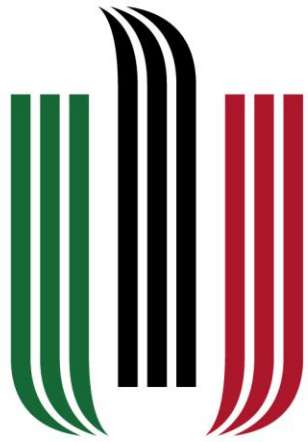


CORNET 35



AGH



Novel Thermal Barrier Coatings with Polymer-Derived Ceramic interlayers for jet engine critical components

2nd Project meeting, Kaniów Śląski, 17.10.24 (PDC-TBC)

Scope



1) Welcome

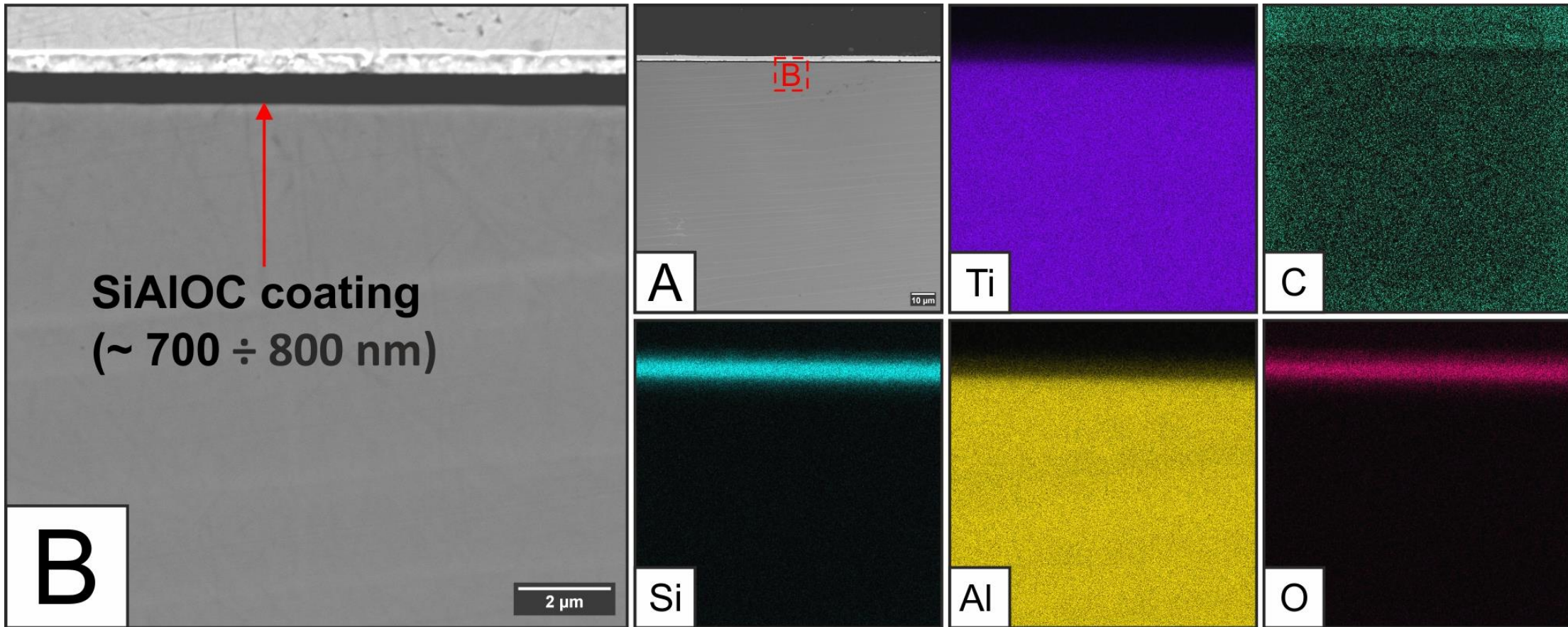
2) WP1

- Sol-gel synthesis of coating material
- Formation of dip-coated samples
- First spray-coated samples

3) WP2

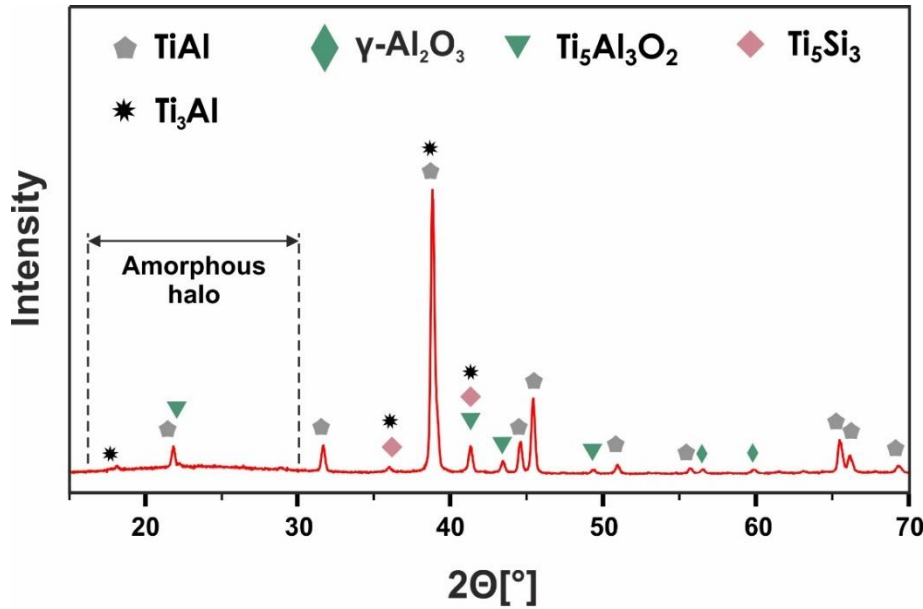
- First ever try (1050°C) – characterization and problems
- Solutions and further plans

SiAlIOC coatings (1)

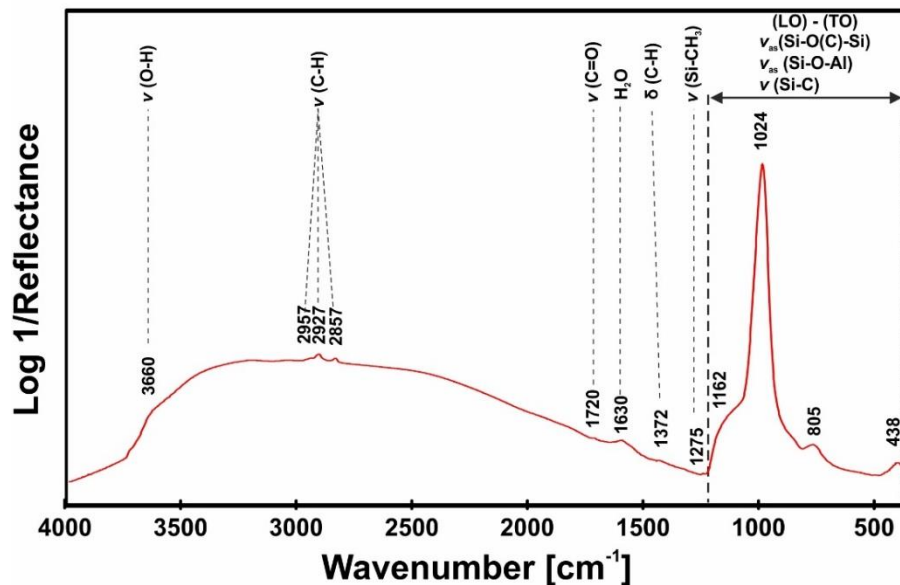




SiAlOC coatings (2)



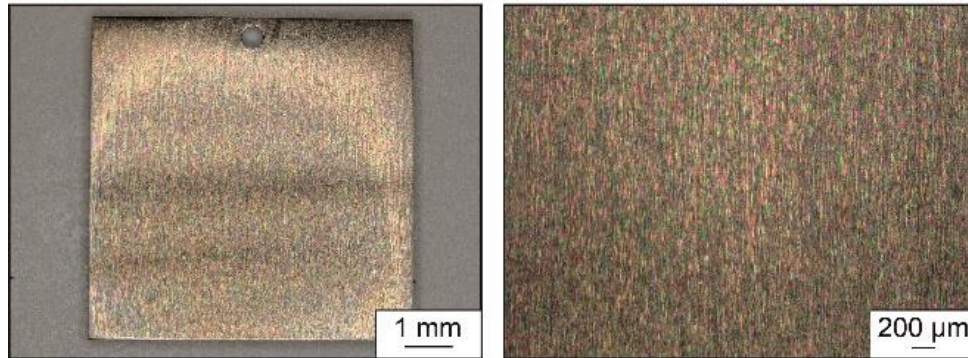
**Well established,
repeatable
structure and
microstructure for
dip-coated
specimens !!!**



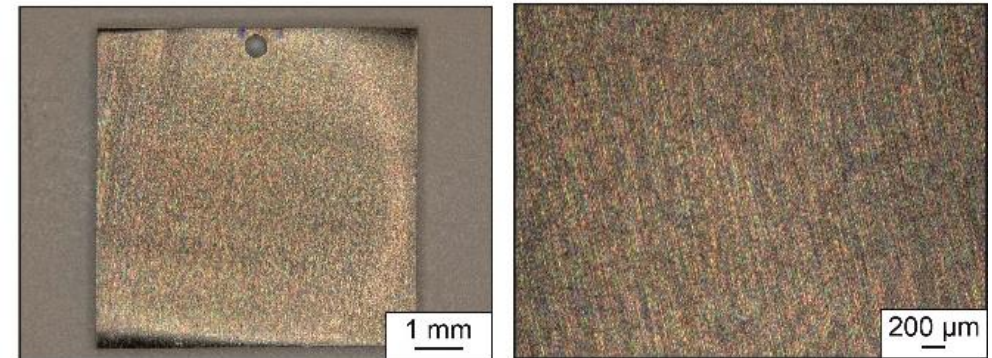
SiAlOC – spray coating



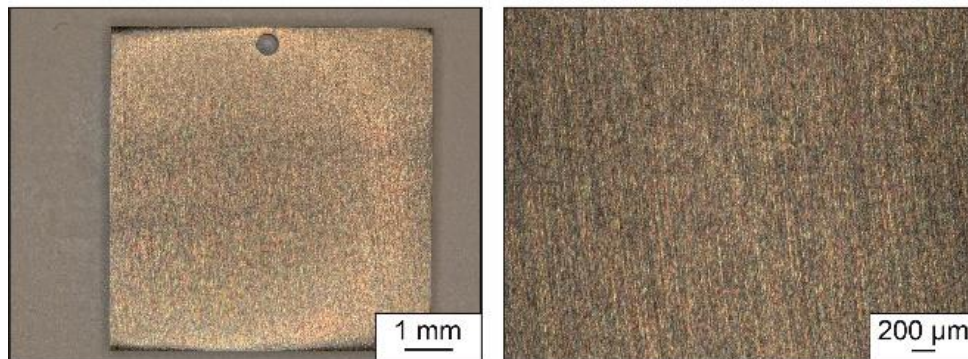
1



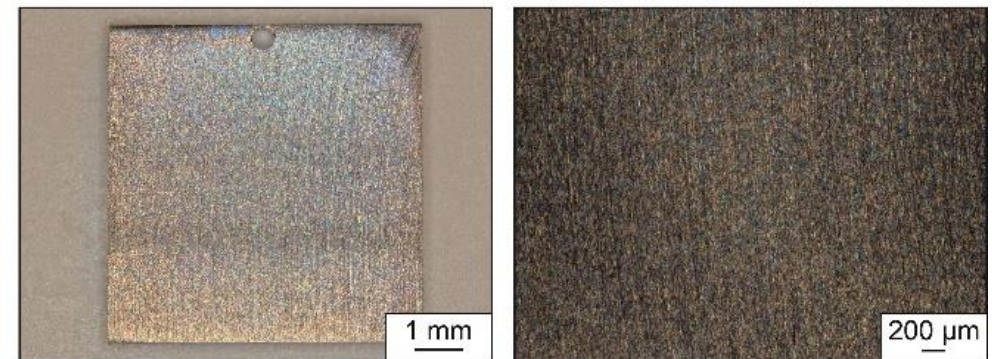
3/4



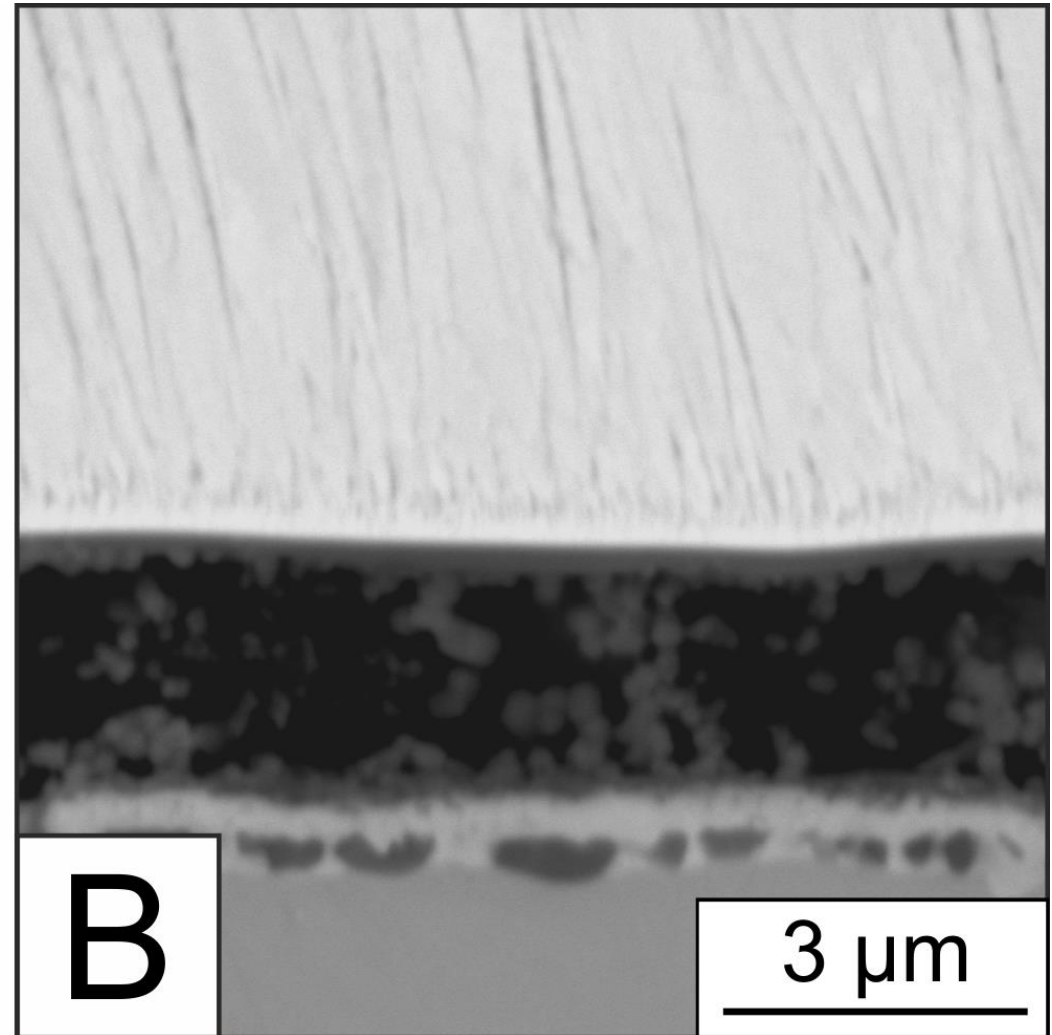
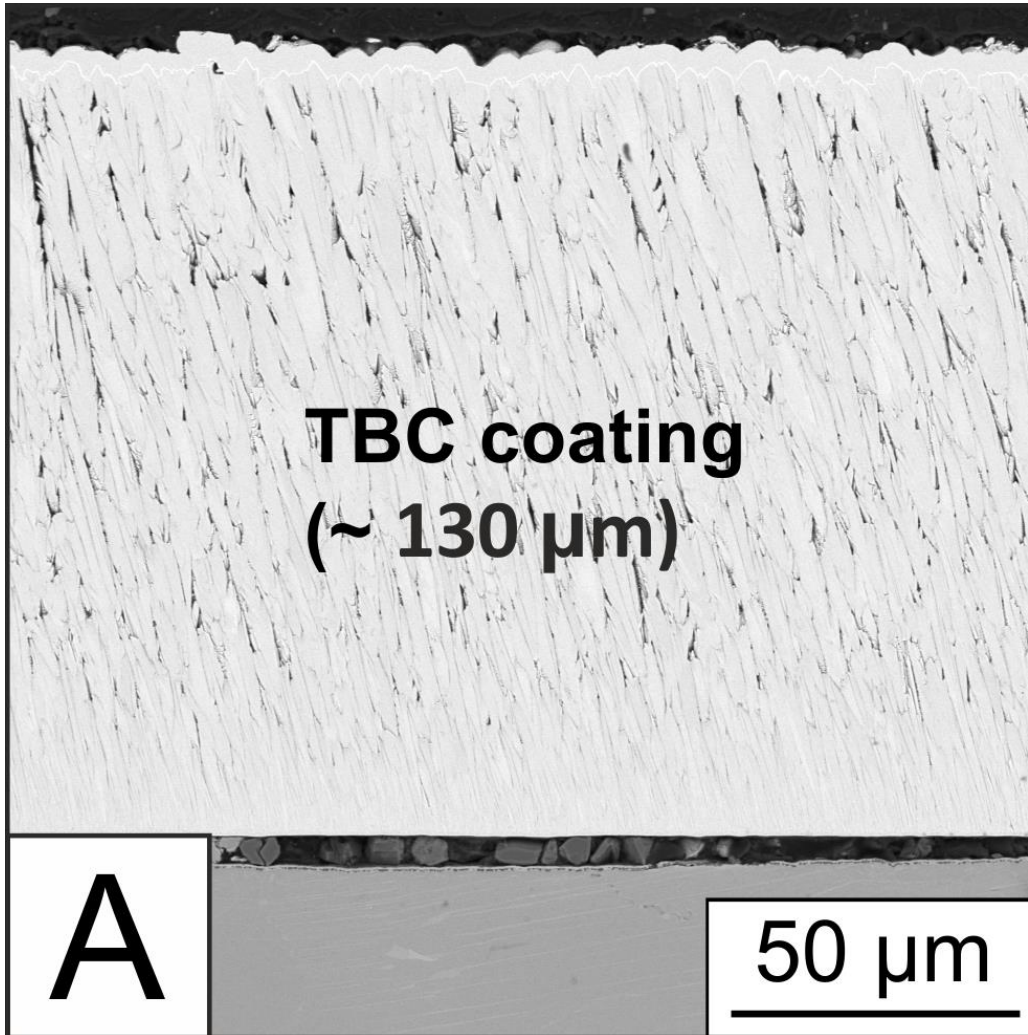
1/2



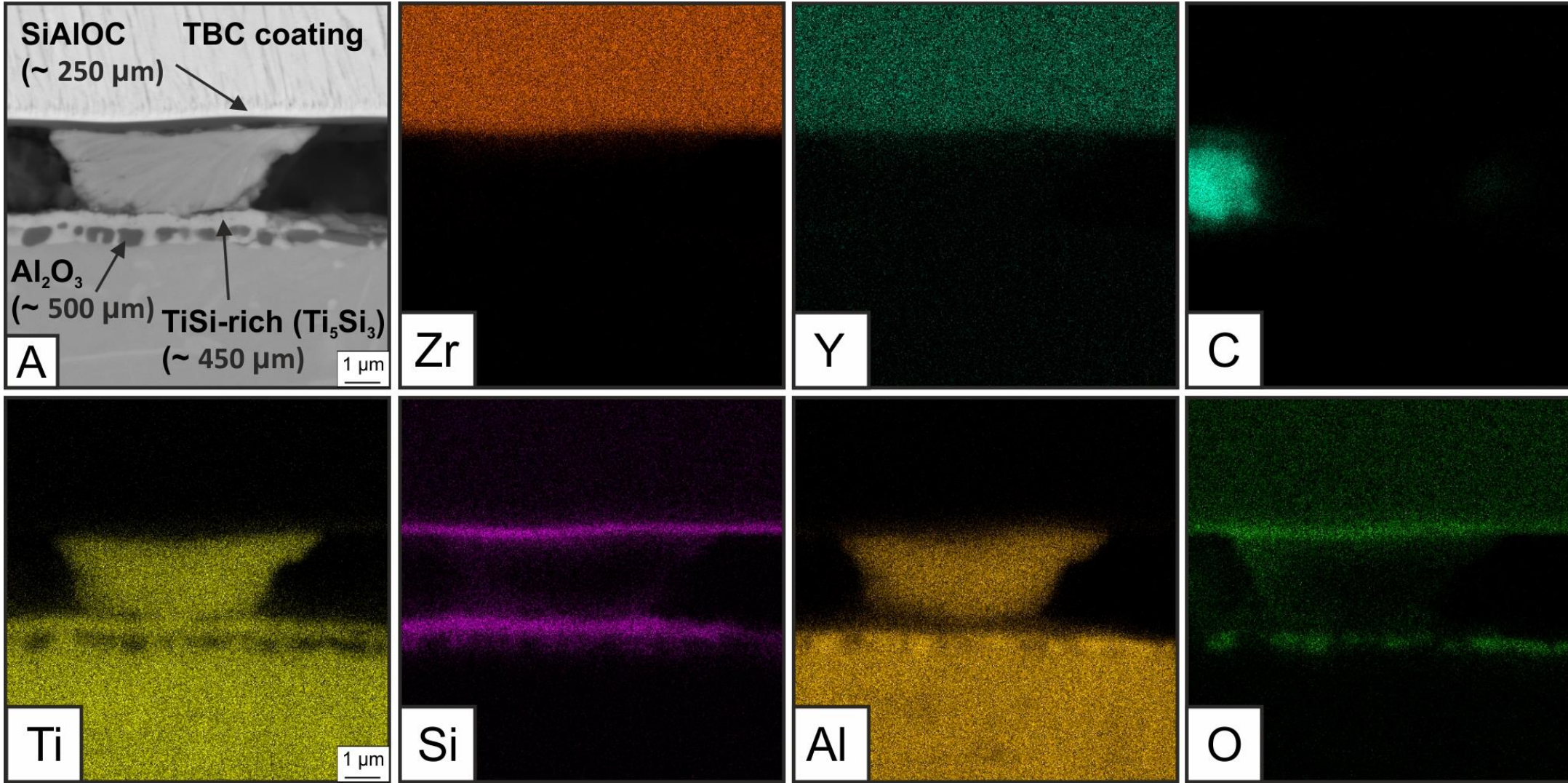
1/4



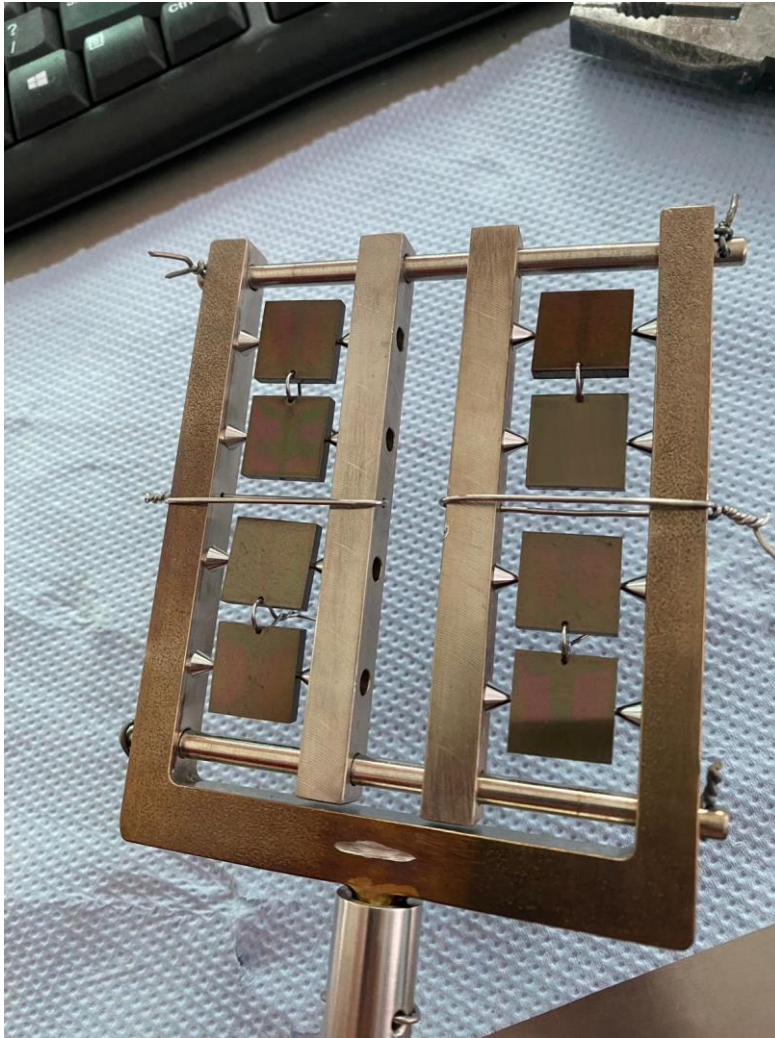
TBC/SiAlOC coating – first ever try



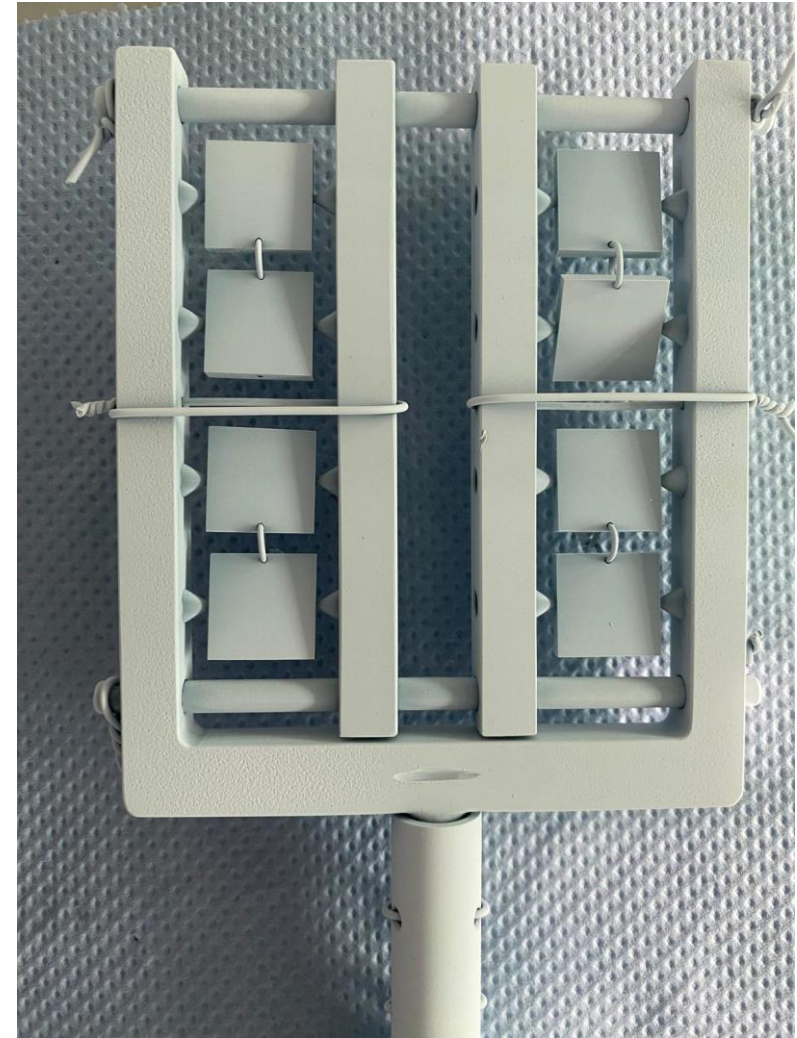
TBC/SiAlOC coating – first ever try (2)



WP2 – lower processing temperature



850÷950°C
→
EB-PVD





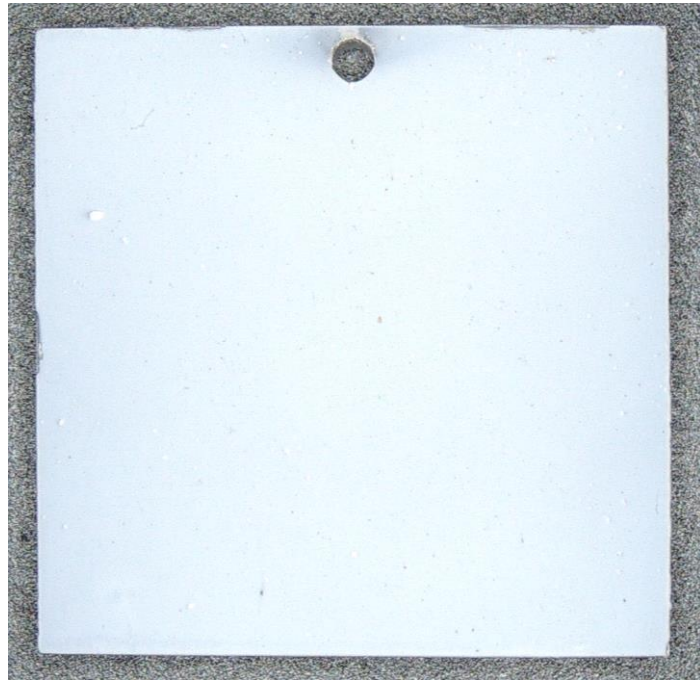
850÷950°C
→
EB-PVD



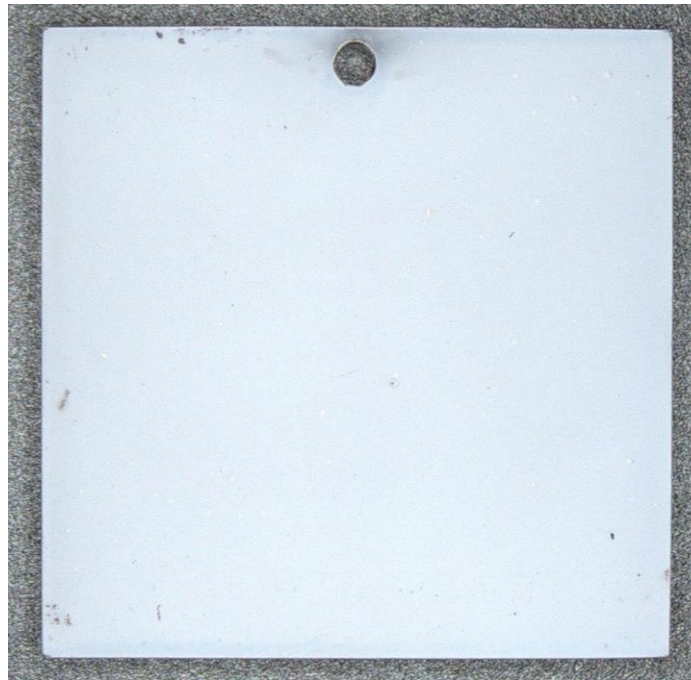
Optical images



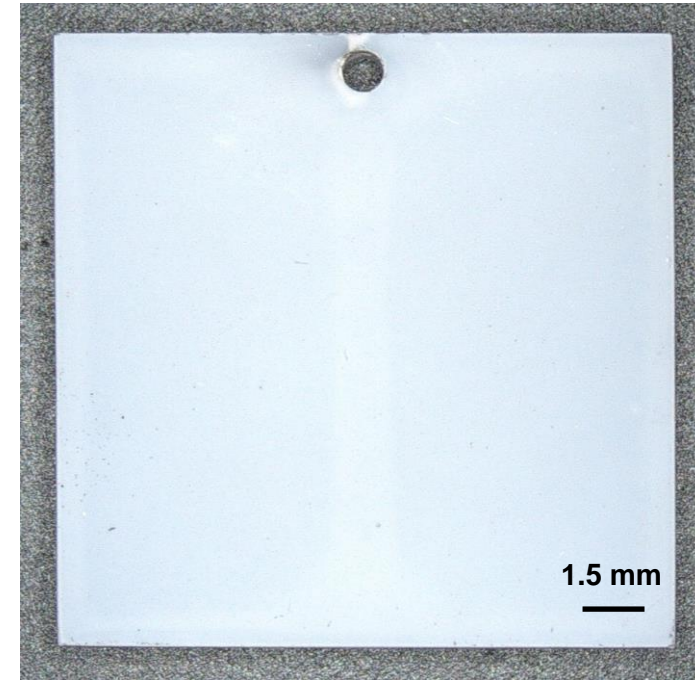
850°C



900 °C



950 °C



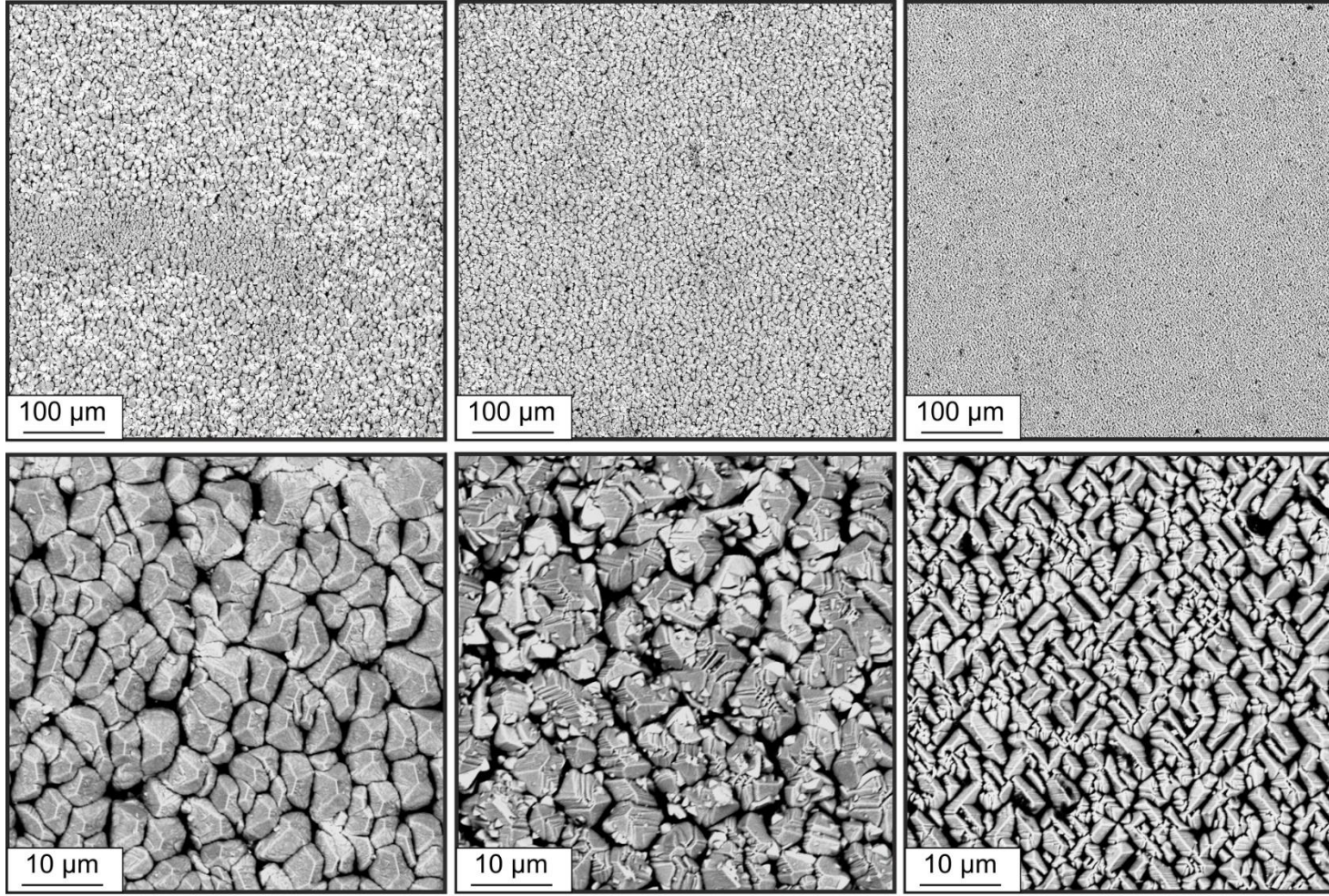
Surface microstructure



850°C

900°C

950°C



Quantitative EDS analysis [% at. ± 0.5%]

	Y	Zr	O
850°C	4.9	31.9	63.2
900°C	4.5	32.4	63.1
950°C	5.6	34.4	60.0

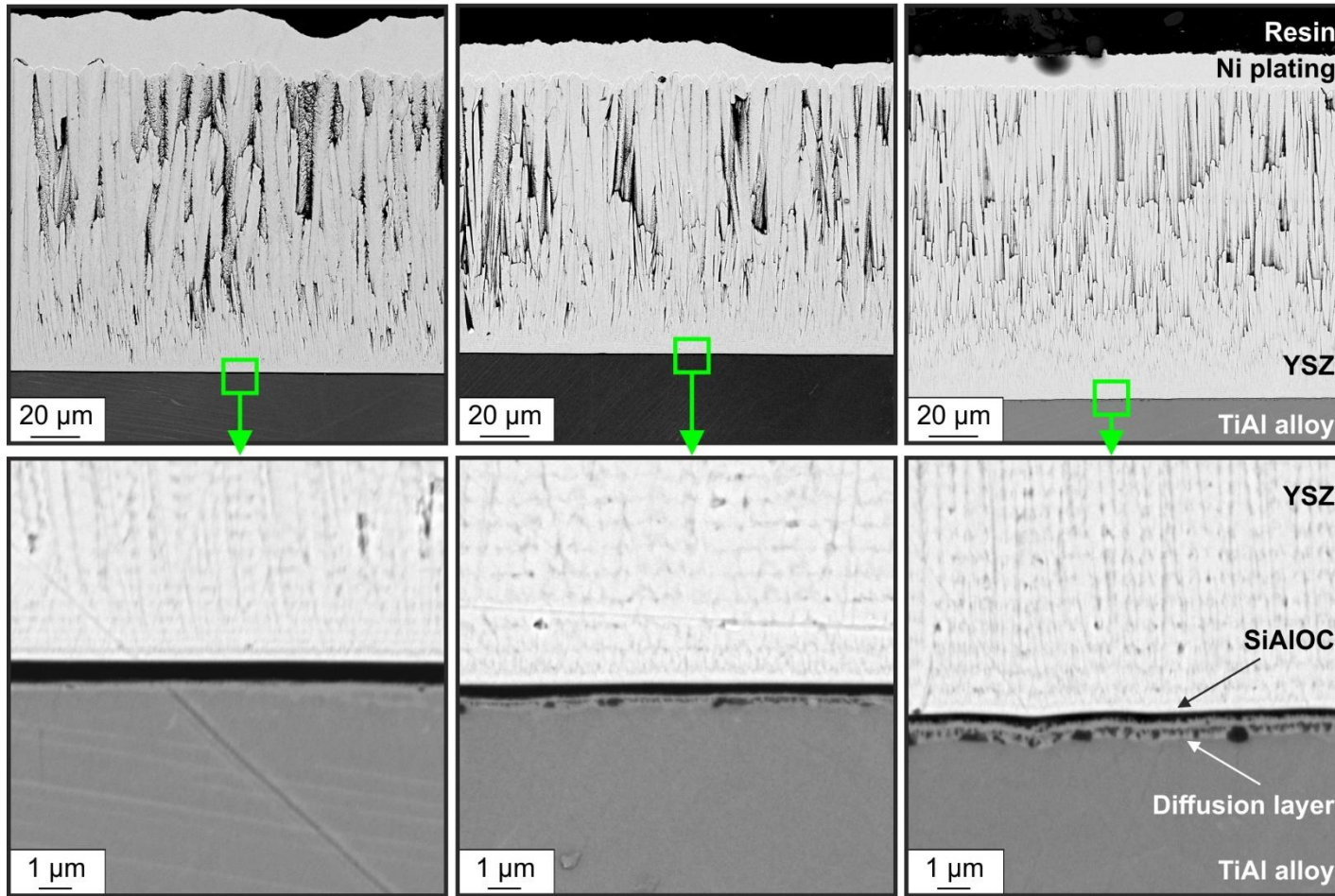
Cross-section microstructure



850°C

900°C

950°C



Layers' thickness

	YSZ [μm]	SiAlOC [nm]	Inner layer [nm]
850°C	$\sim 120 \div 123$	$\sim 590 \div 619$	$\sim 236 \div 269$
900°C	$\sim 108 \div 112$	$\sim 369 \div 421$	$\sim 399 \div 429$
950°C	$\sim 126 \div 127$	$\sim 243 \div 309$	$\sim 512 \div 679$
1050°C	$\sim 130 \div 131$	$\sim 223 \div 276$	$\sim 891 \div 903$

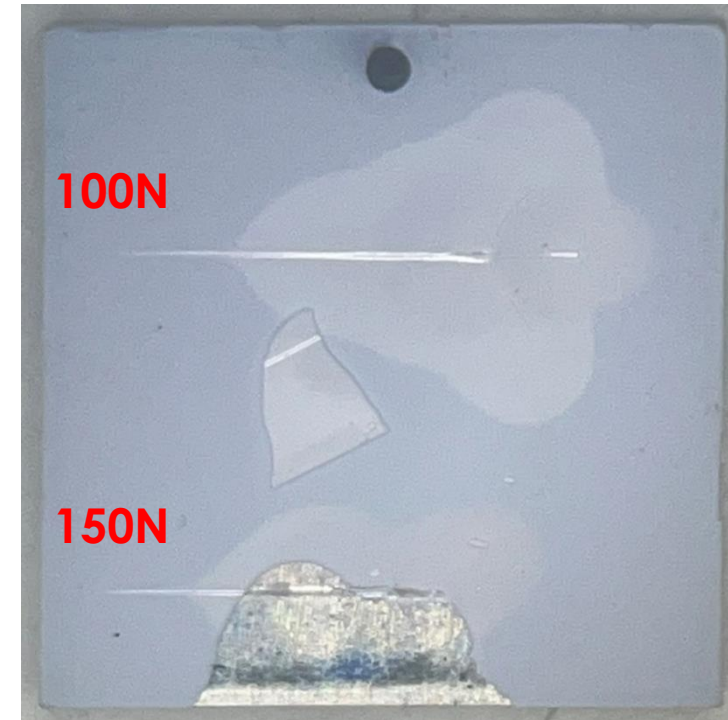
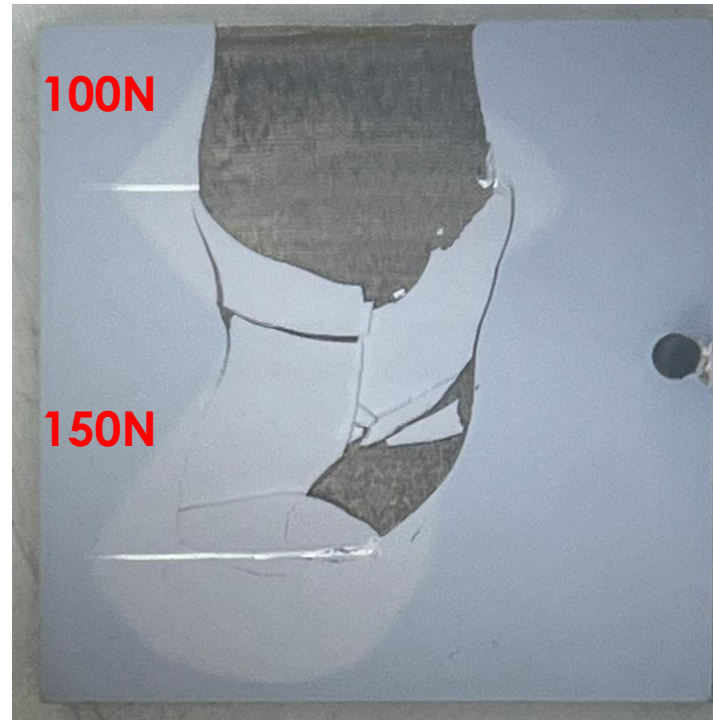
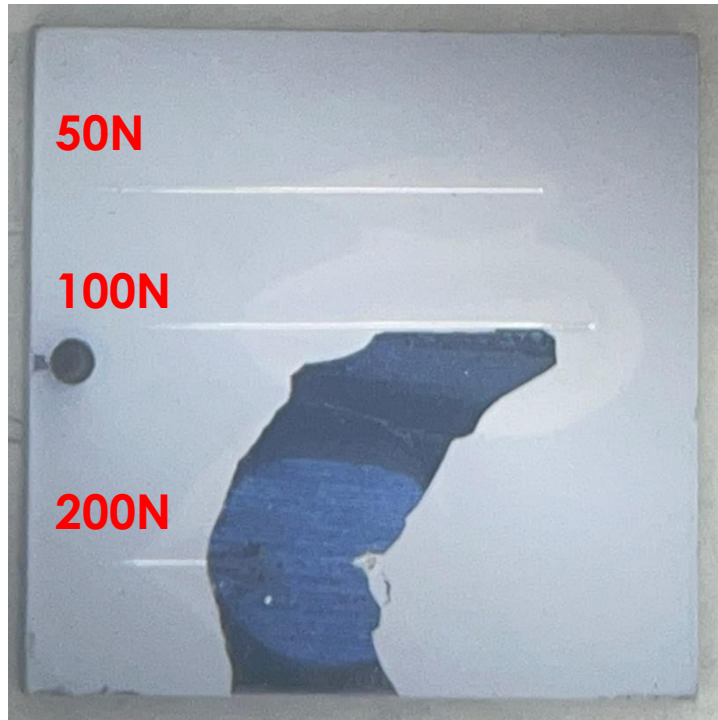
WP4 - Scratch resistance



850°C

900 °C

950 °C



Temp. [°C]	850	900	950	YSZ/MCrAlY
Load at which spallation began [N]	± 82	± 80	± 70	> 200



Thank You for your attention !!!