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Hybrid sintering – The beneficial combination of sintering principles

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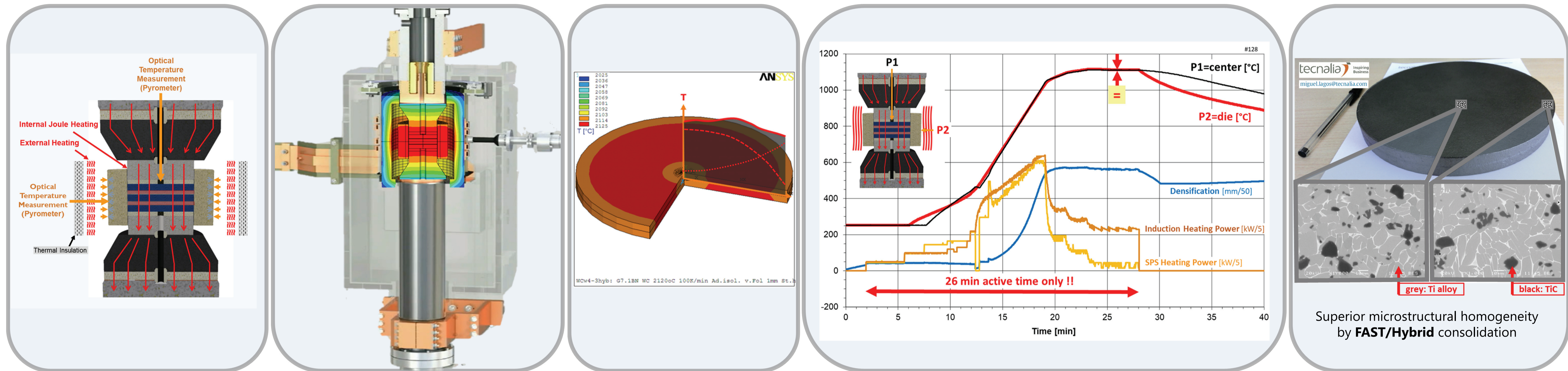
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The Beneficial Combination of Sintering Principles

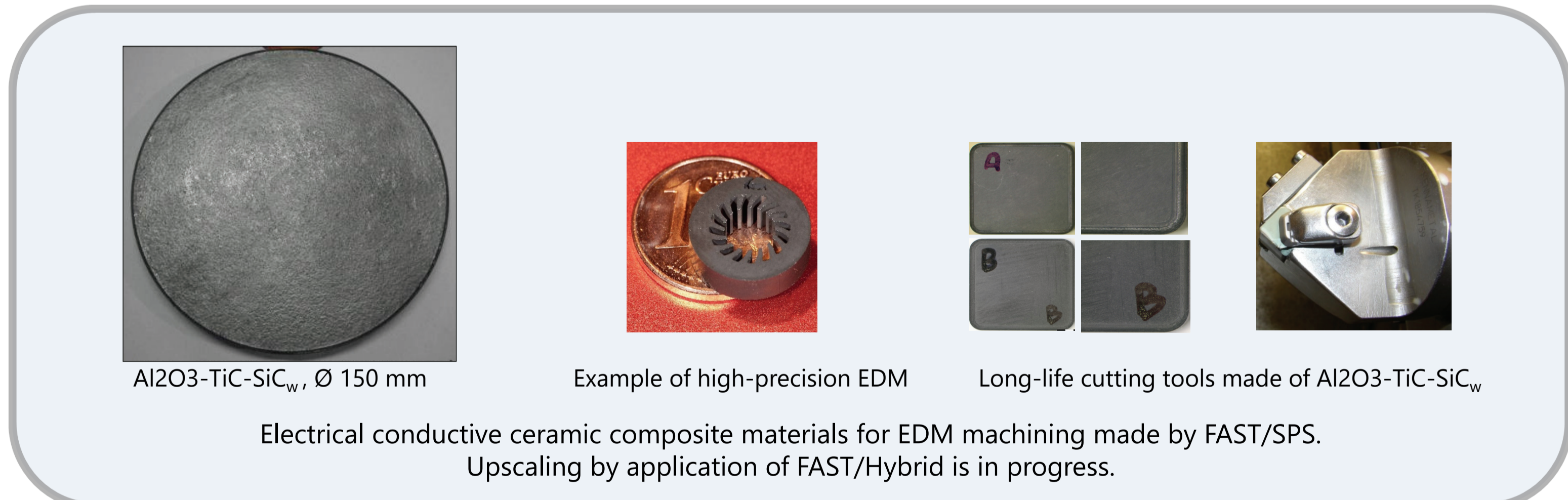
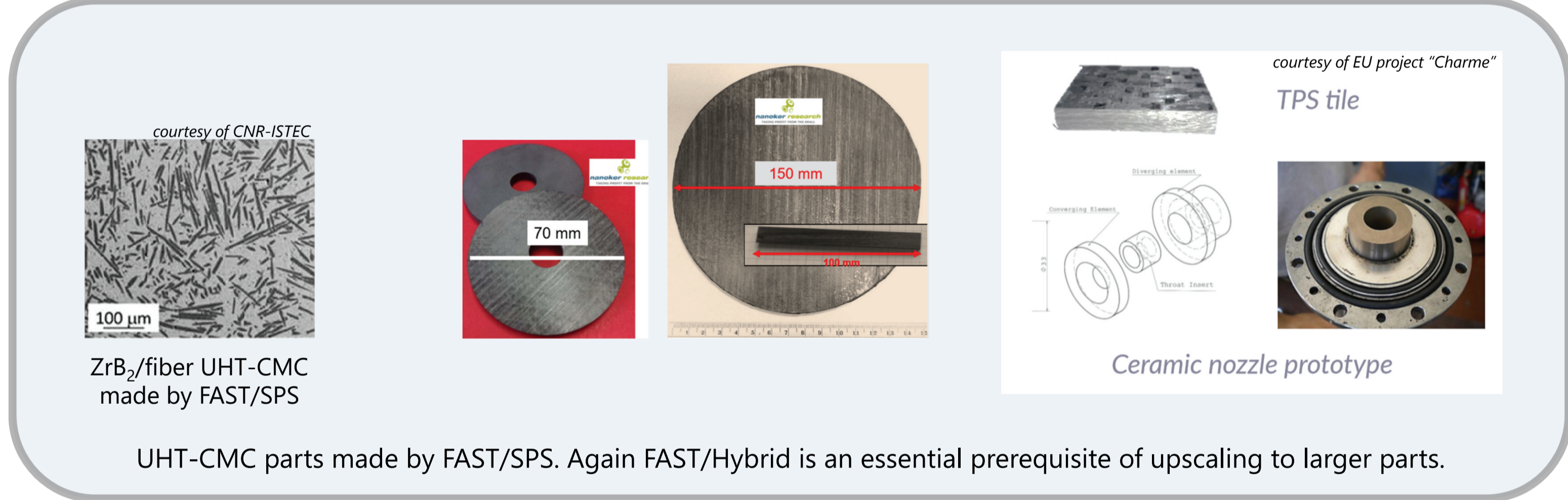
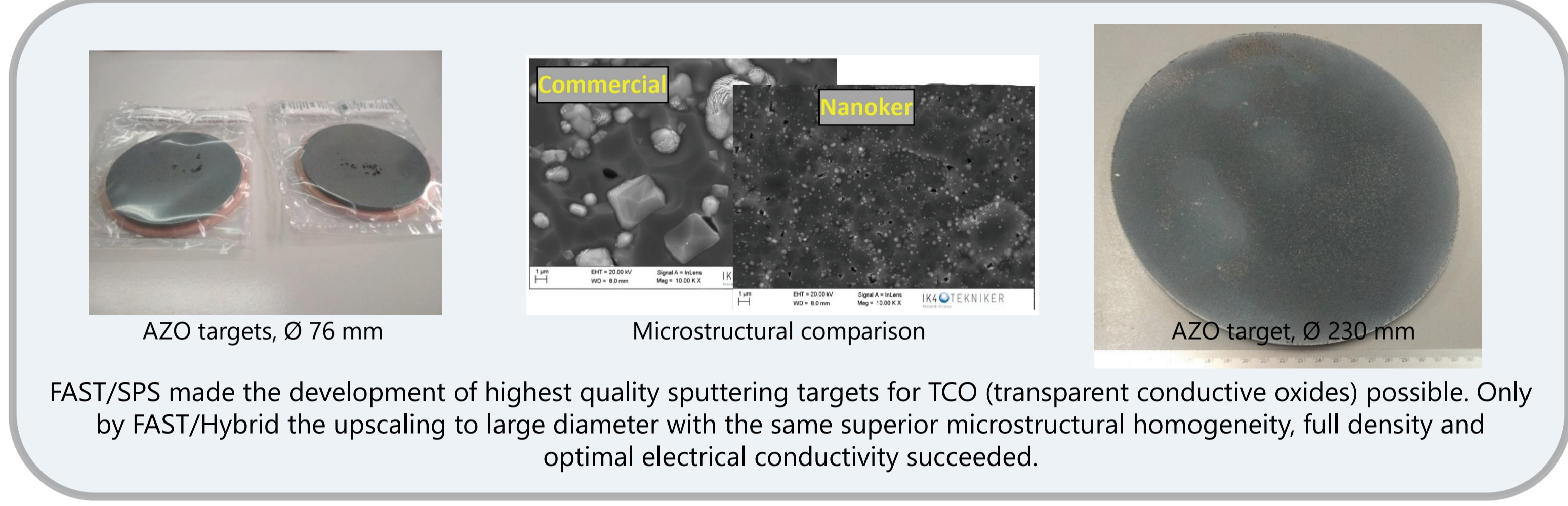
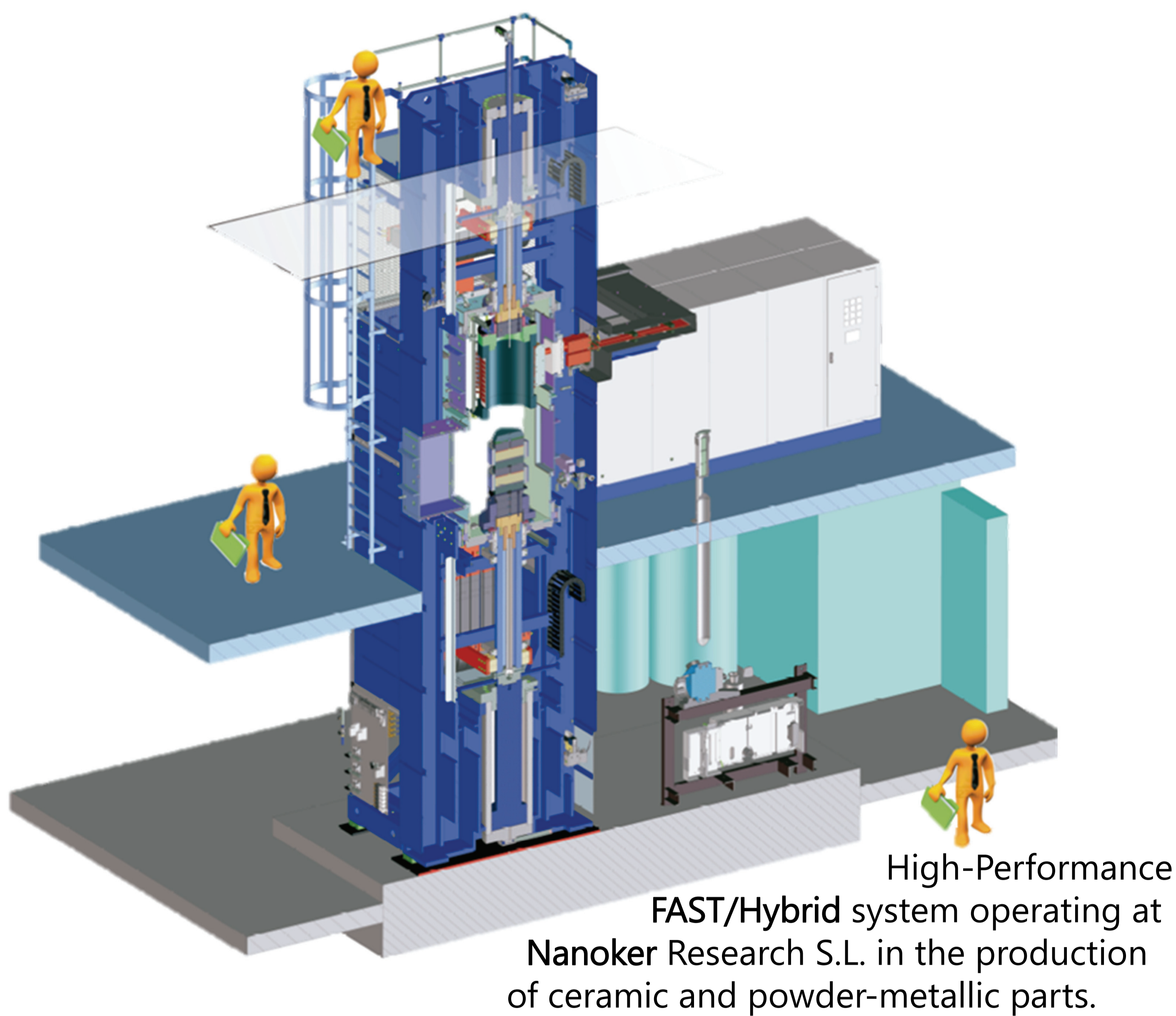
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“FAST/Hybrid” is the trendsetter in hybrid sintering, complementing the conventional hot pressing (“HP”) by an additional pulsed current direct heating of the powder compact (“FAST/SPS”). This combination allows a further improvement of heating rates and thermal homogeneity compared to conventional hot pressing, but even superior to the characteristic advantages of the FAST/SPS technique. A high-voltage supply combined with a special pressing tool configuration makes flash sintering (“FAST/Flash”) possible, too.



Principle of **FAST/Hybrid**, combining Internal + External Heating. Perfect temperature balance by independent temperature controls.

FAST/Hybrid consolidation of Ø 200 mm Titanium MMC disc to full density.



Early demonstration of the system performance: Pure Tungsten Carbide disc Ø 400 mm consolidated at 2100°C to full density



A further example of „Hybrid Sintering“ is this combination of gas pressure sintering (“GPS” – “Sinter-HIP”) and hot pressing (“HP”). Optionally flash sintering (“FAST/Flash”) can be implemented.

Thinking „Hybrid Sintering“ in a more general way

„Hybrid Sintering“ is a beneficial combination of different sintering principles, e.g.

- direct + indirect heating,
- uniaxial + gas pressure,
- high + low electric fields.

Hybrid sintering systems enable the development and production of all new materials.

FCT Sintering Technology	ACTIVE SINTERING PRINCIPLES			
	HEAT	GAS PRESSURE	MECH. PRESSURE	ELECTR. FIELD
PRESSURELESS	●			
GAS PRESSURE (SINTER) - HIP	●	●		
HOT PRESSING	●		●	
FAST/SPS	●		●	●
FAST/Hybrid (FAST/Flash)	●		●	●
Hybrid Sintering	●	●	●	●