

**Group for Surface Engineering
Thermal Spray Technologies and Applications**

**Gabiria 82-84 20305 IRUN
Mikeletegi 2, 20009 DONOSTIA**



- Research and Development projects
- Technical assistance to industry
- Prototypes and small production tests
- Testing, evaluation and certification



- Development of **applications and solutions** to industrial problems
- Development of **coatings and procedures**
- Development of **equipment for thermal spraying**
- Development of equipment and procedures for **testing and evaluation**

- Spin-off generation:

IONTECH

AEROSTAR COATINGS

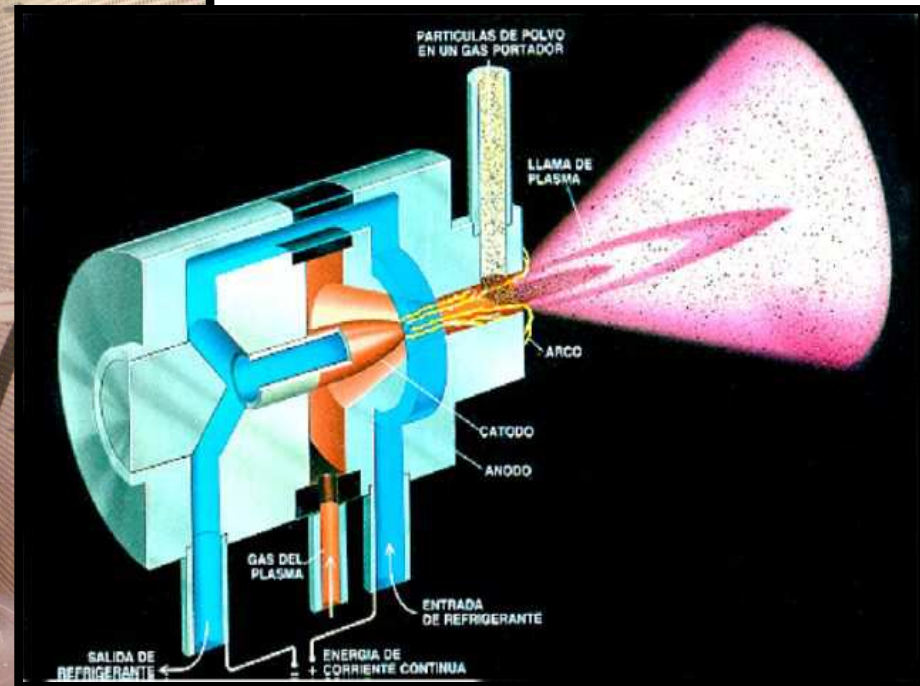
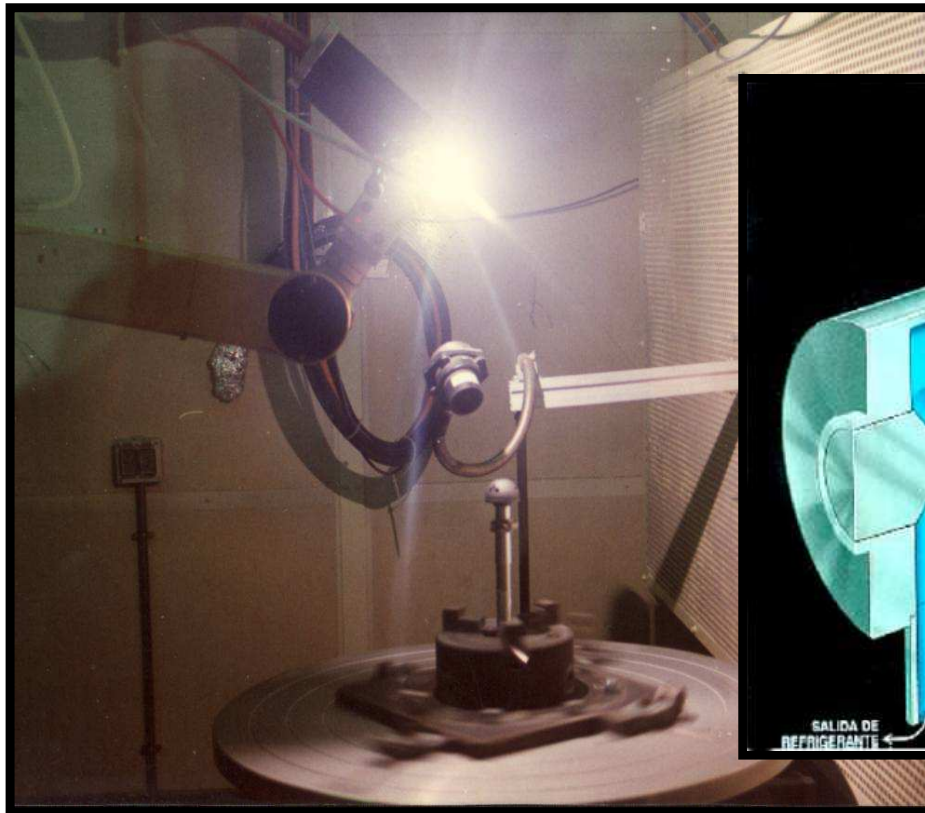
TURBODETCO



- Dissemination and courses about thermal spraying for industry

- Atmospheric and Gas Shrouded plasma spraying **APS F4**
- High velocity oxyfuel spraying **HVOF**
- Detonation spraying **HFPD**

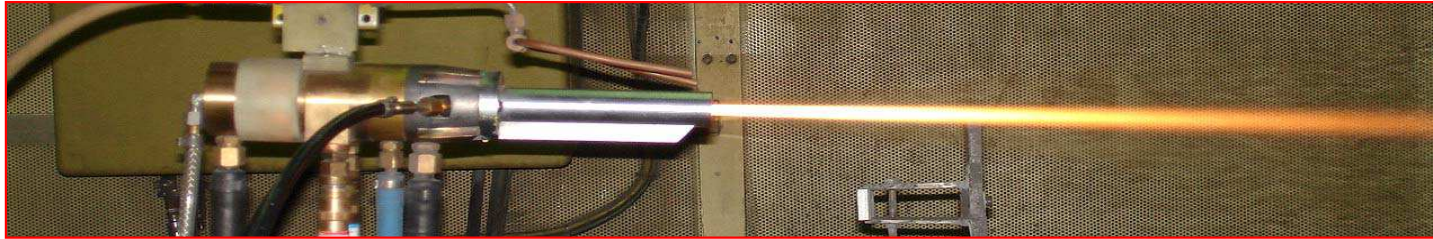
- Flame spraying, wire spraying, microplasma and arc spray equipments available.



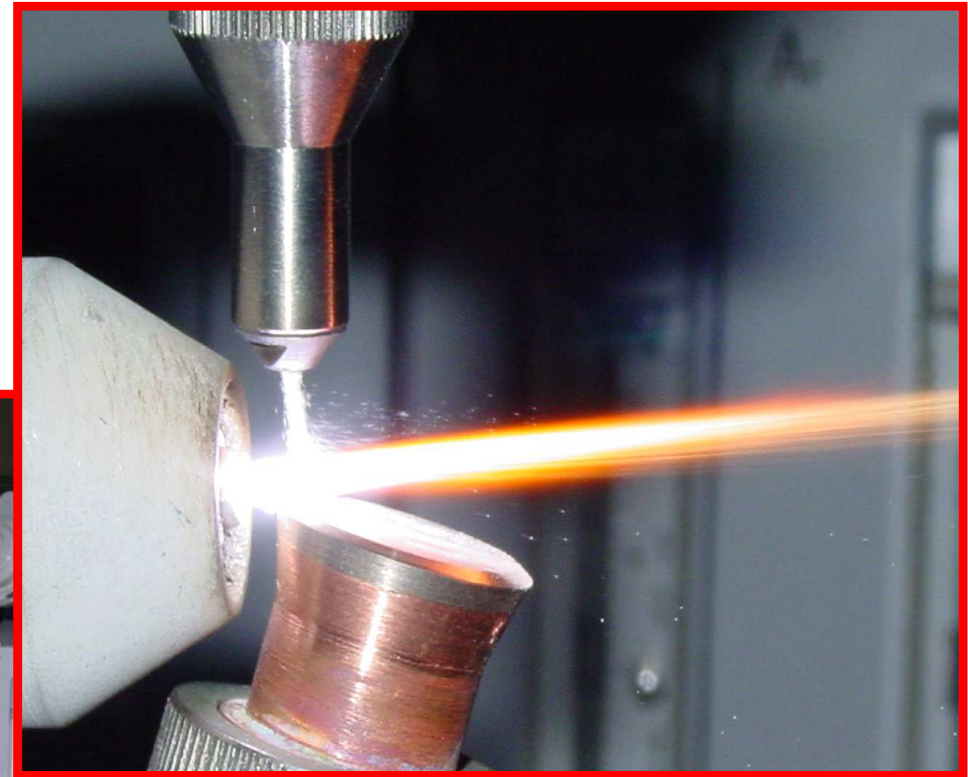
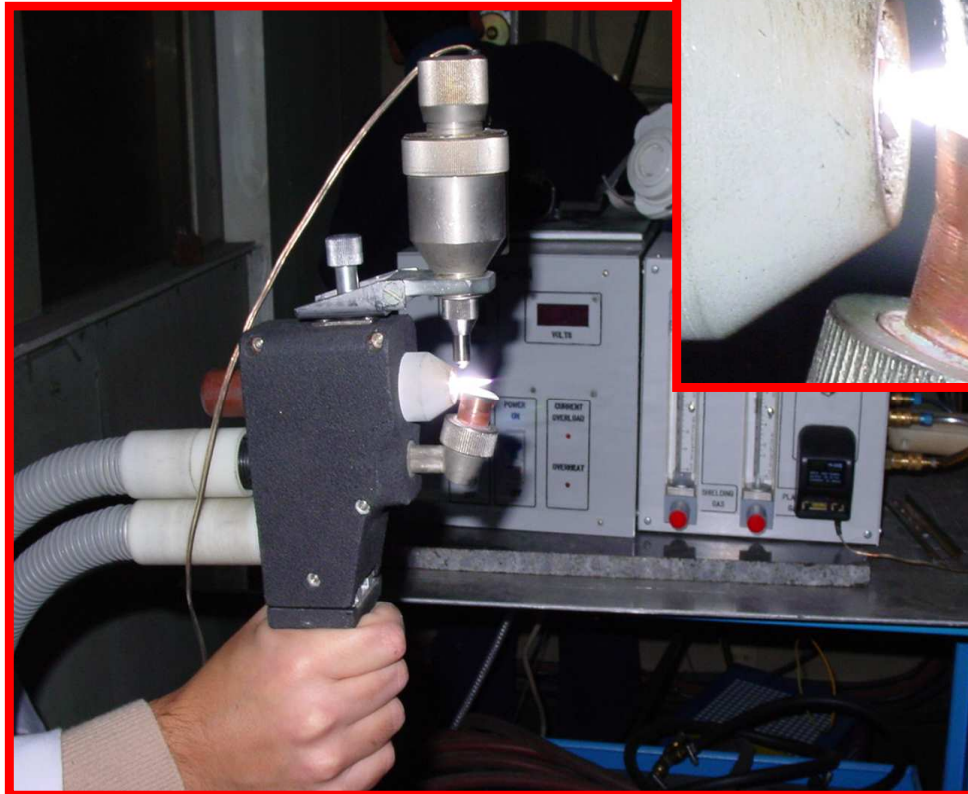
•APS F4 (Sulzer-Metco)

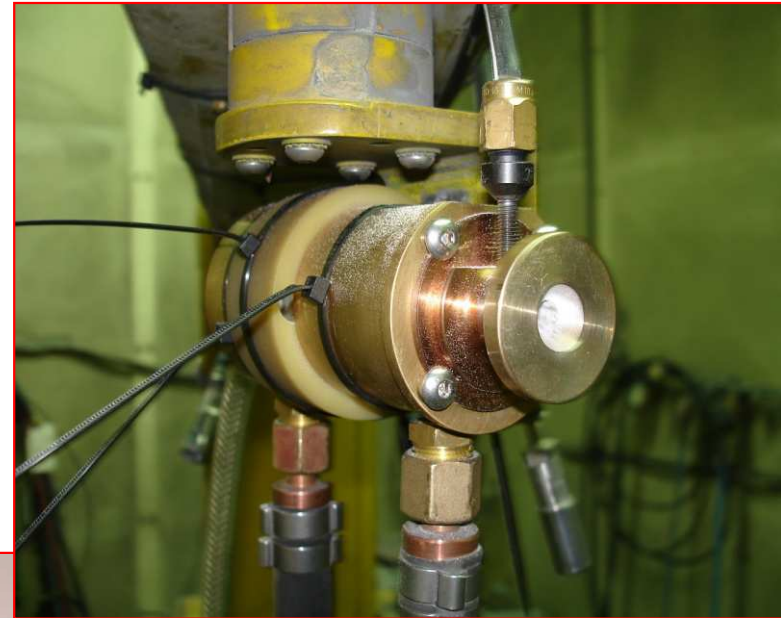
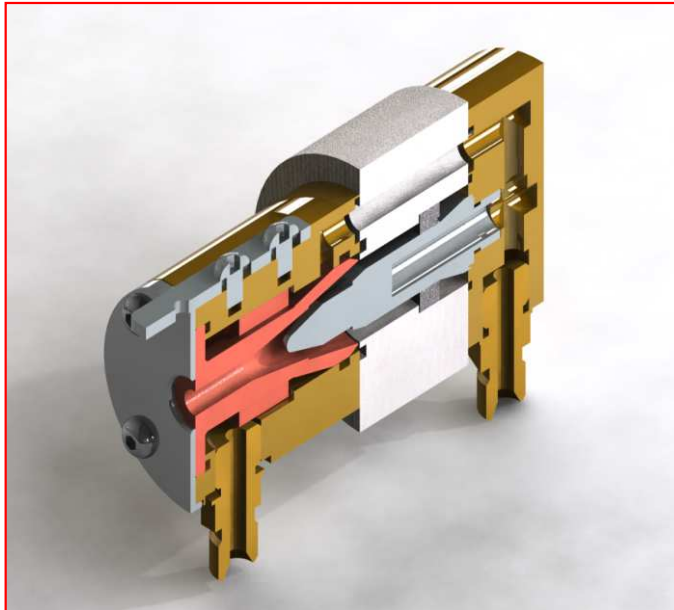


- Thermal spray by HFPD PK-201



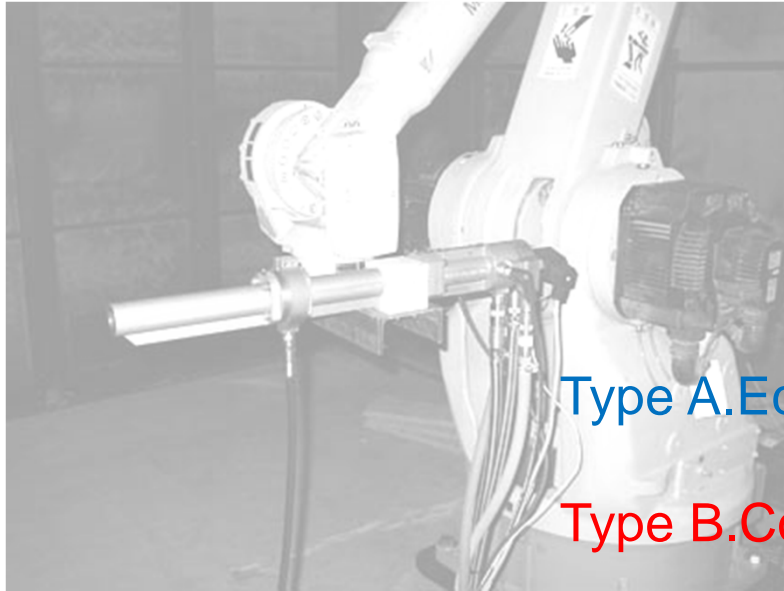






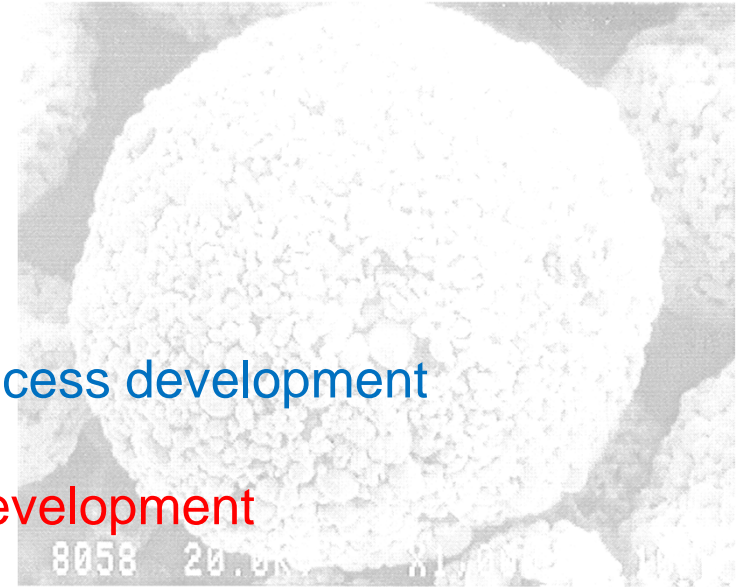


- Thermal spray chamber 3x4x3 m.
- Robot Kuka 300 6 axis
- Tourntable KT
- Exhaust & Filter
- Gas supply system
- Roll pieces to 1800x150 mm
- Flat pieces to 1800x1500 mm



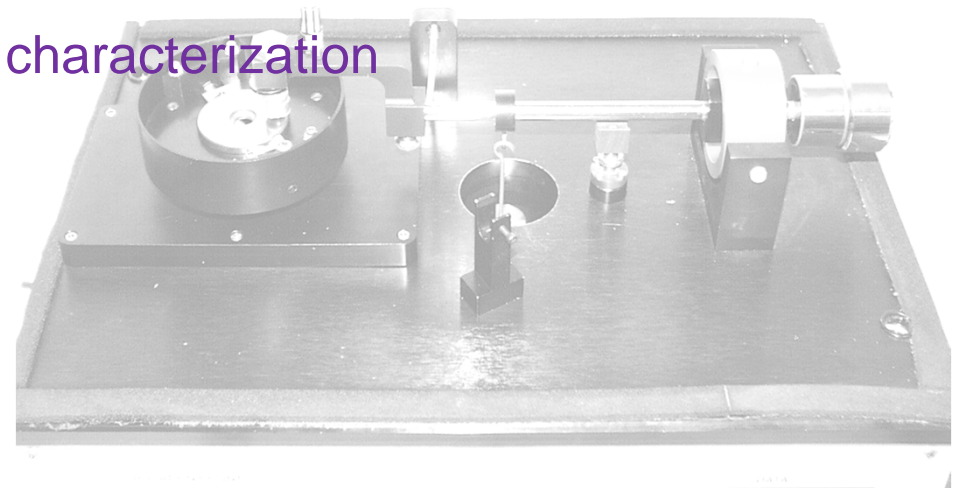
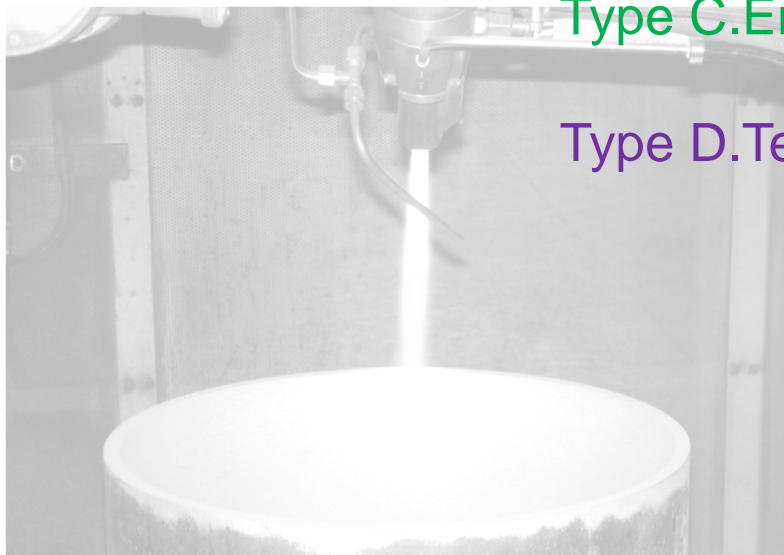
Type A. Equipment and Process development

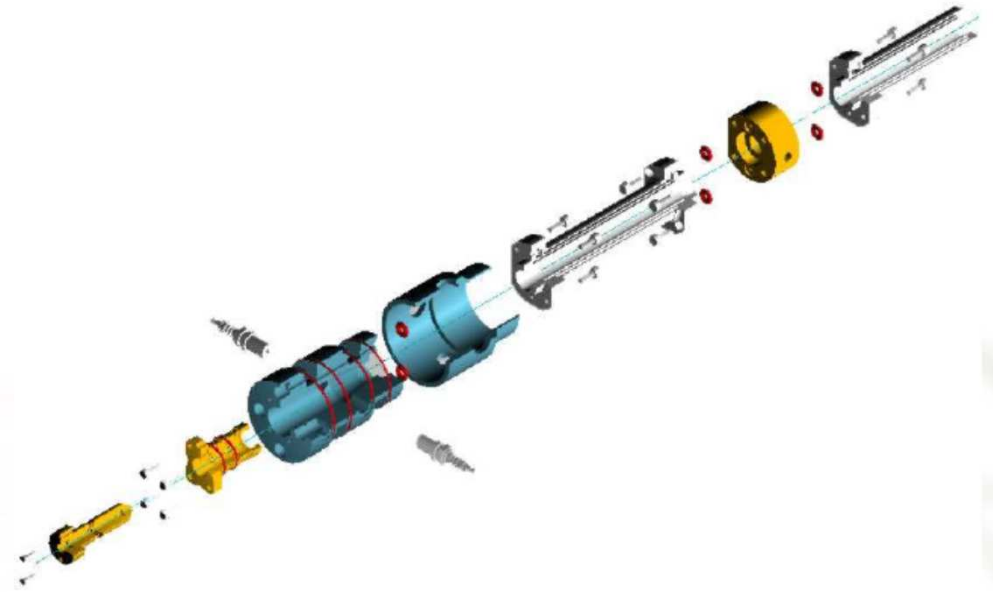
Type B. Coating material development

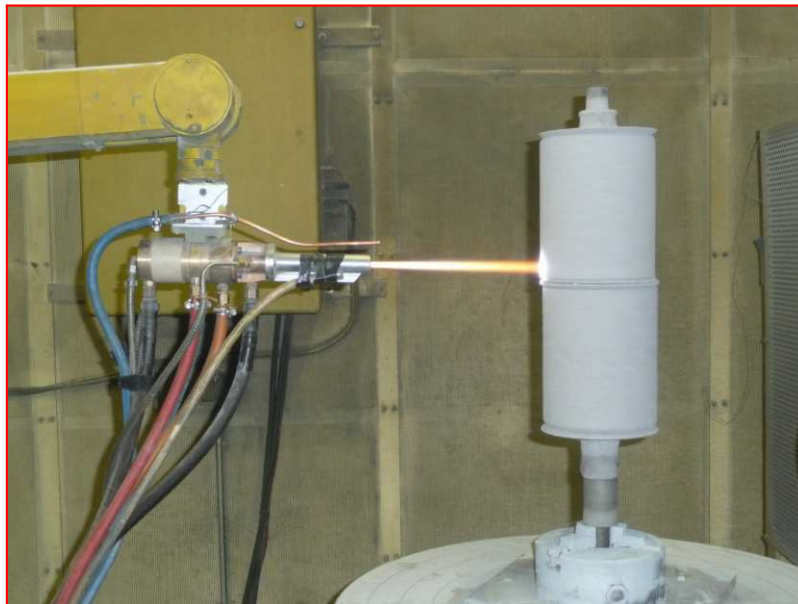
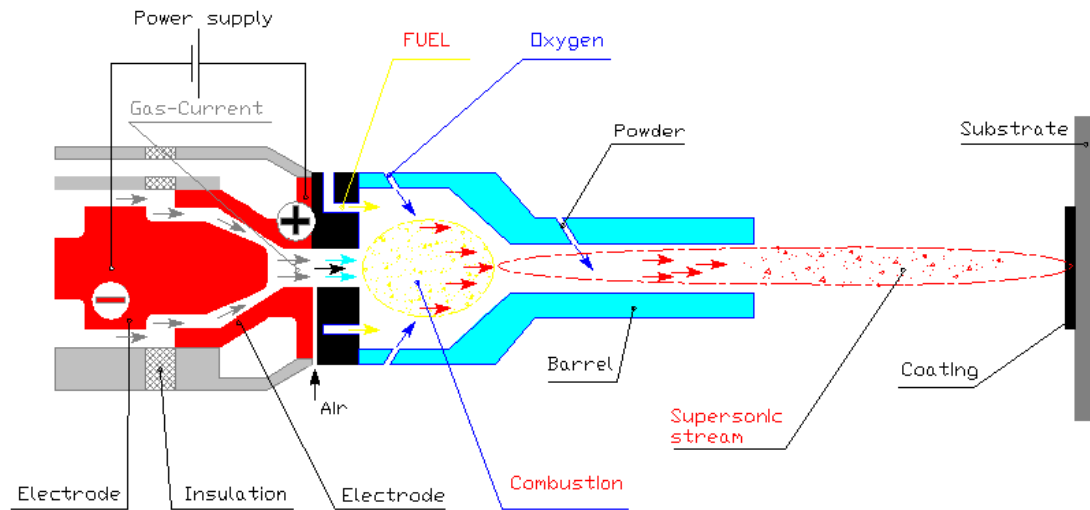


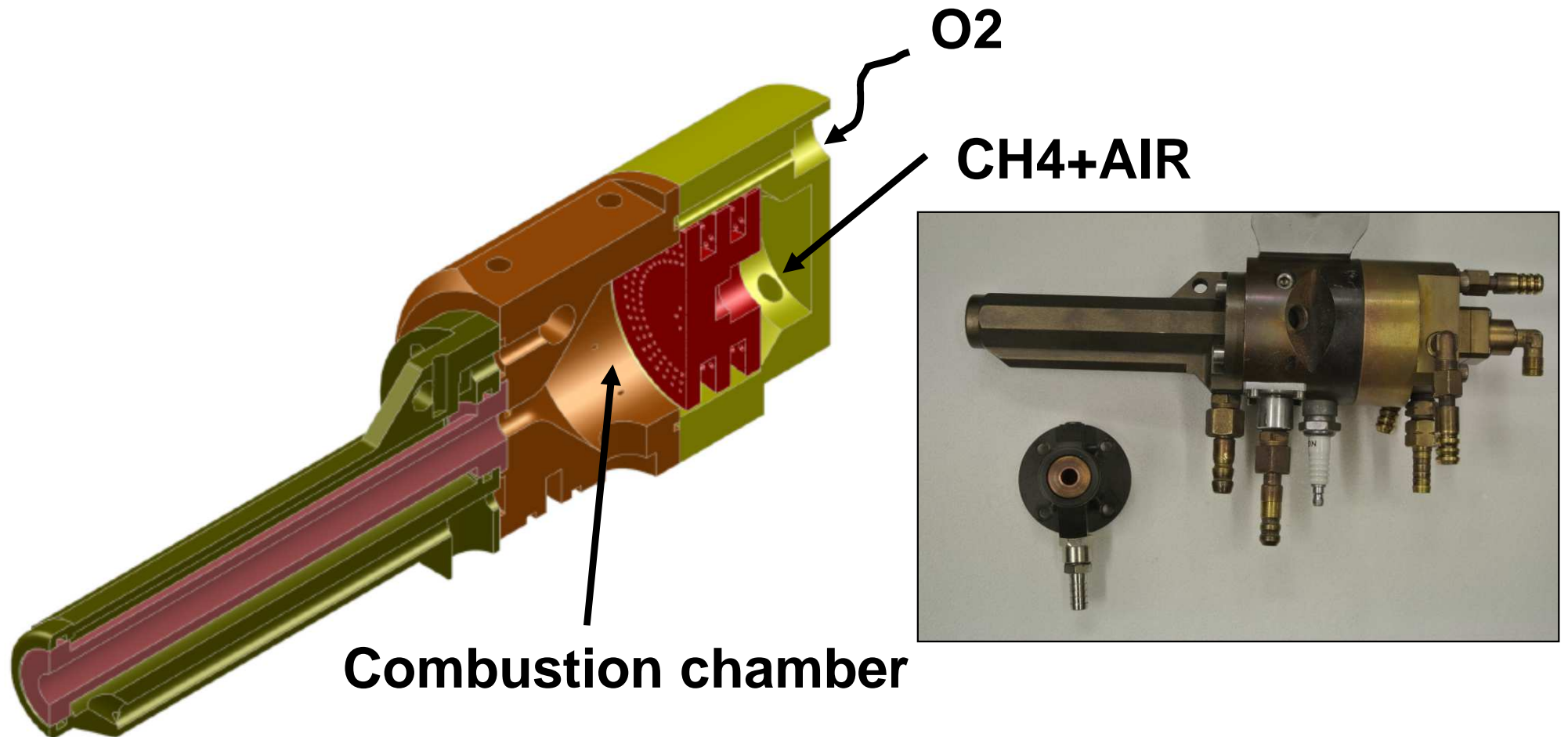
Type C. Engineering industrial applications

Type D. Testing and characterization









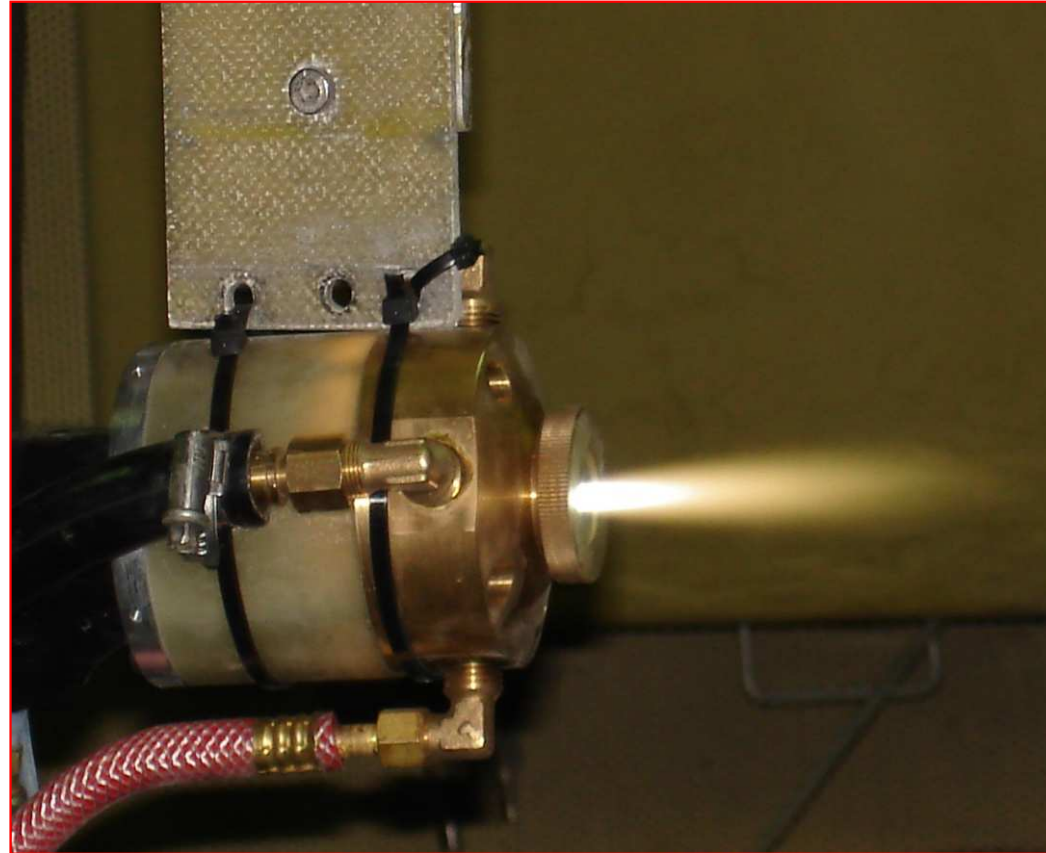
Controlled temperature HVOF

Specific HVOF design

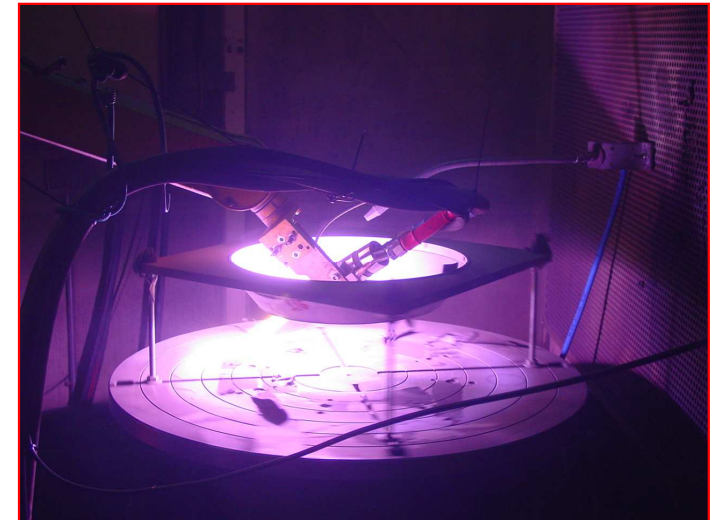
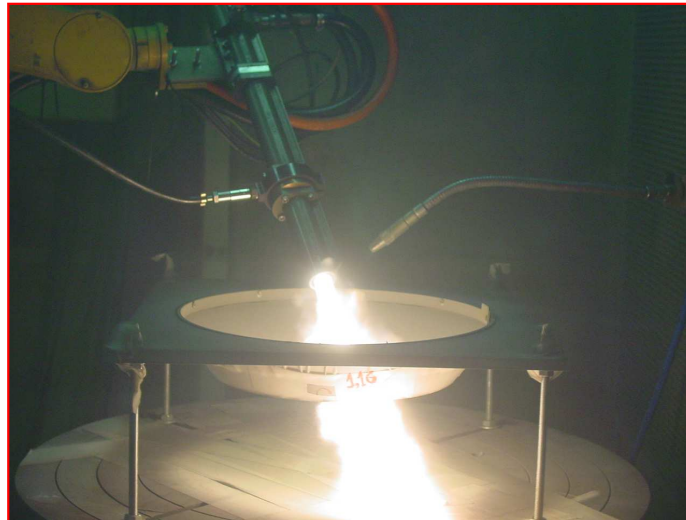
Range of flows

Spray system (NG booster / air compressor)

Solid state deposition



ESPOSA Project

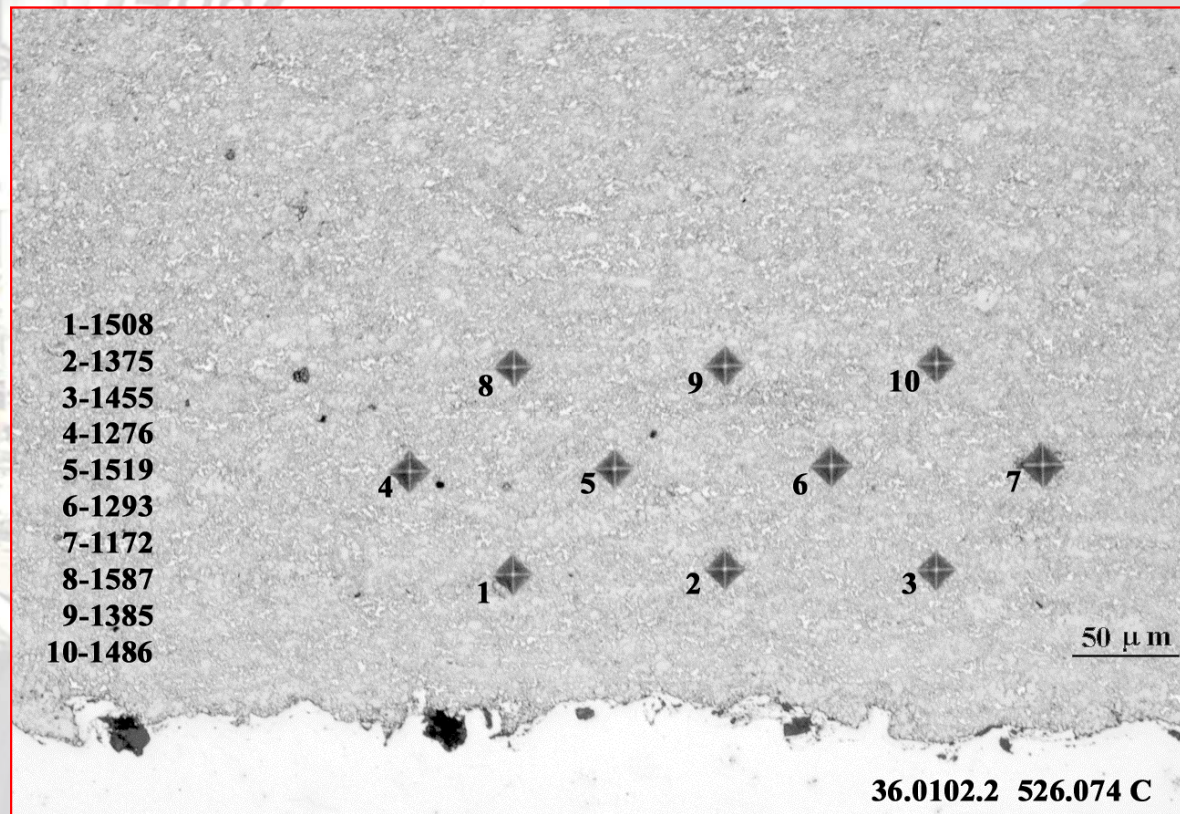
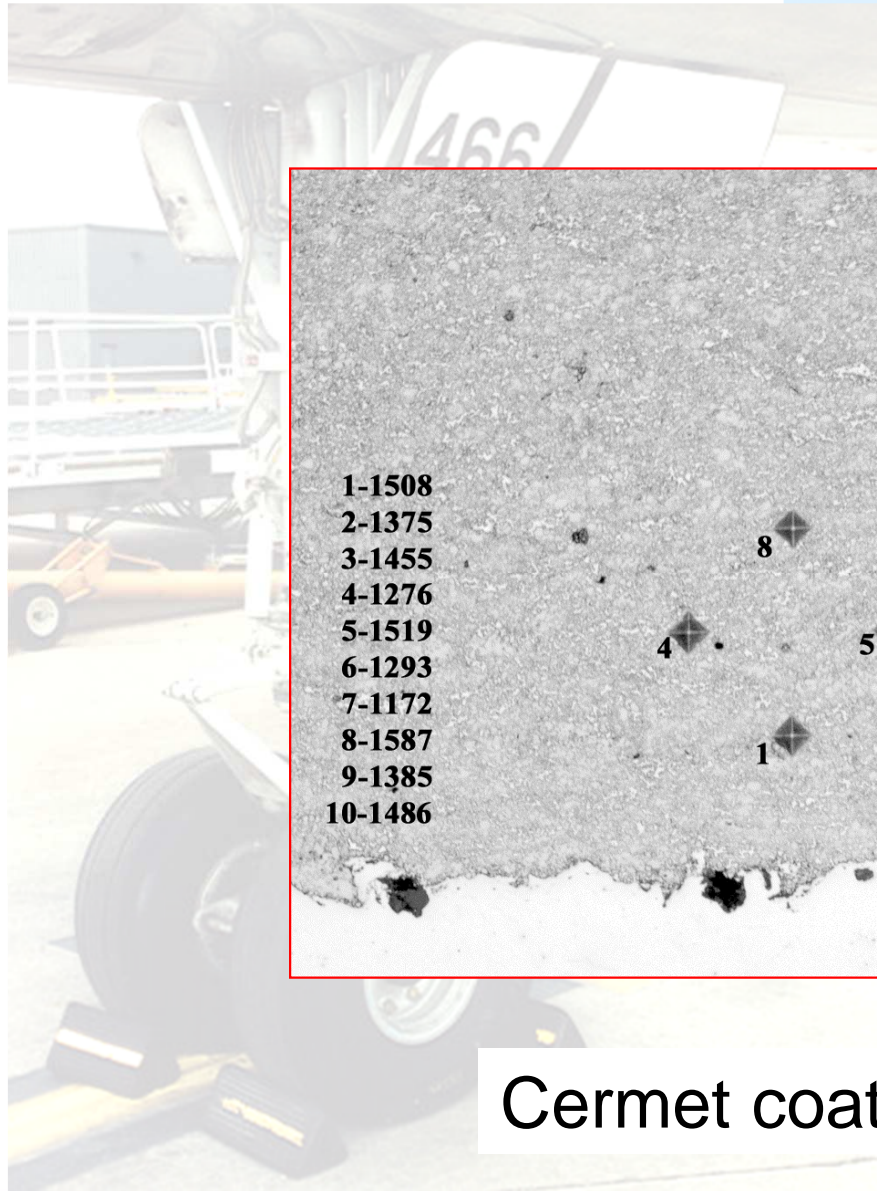




Abradable coatings for aircraft engines

TiAlBLADE Project

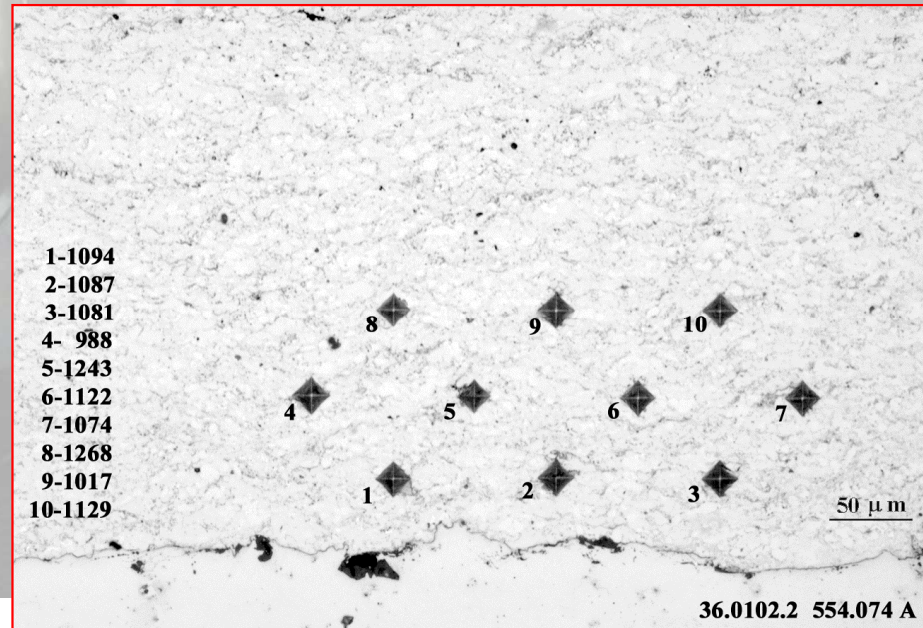
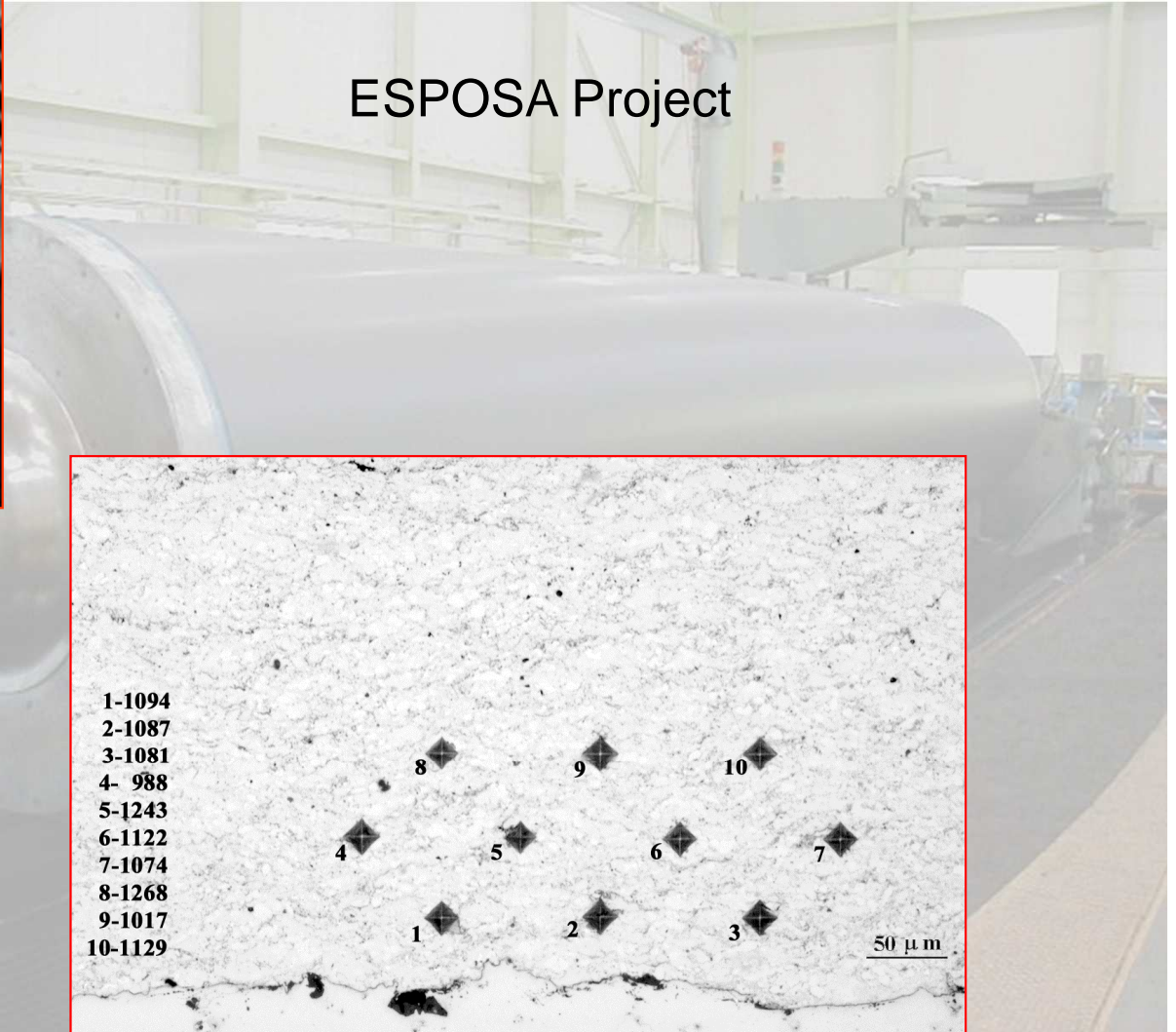




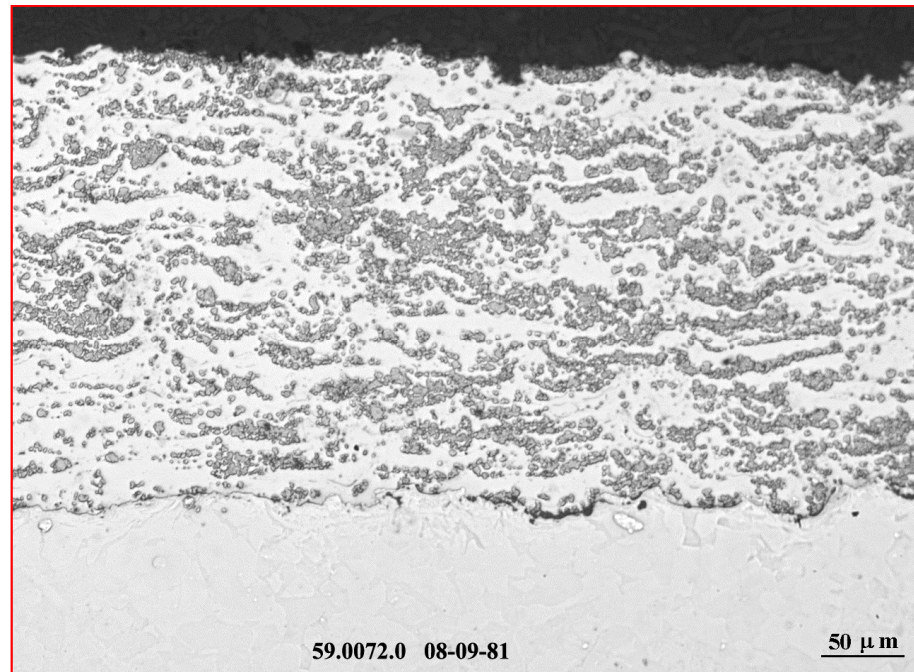
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- 2-1375
- 3-1455
- 4-1276
- 5-1519
- 6-1293
- 7-1172
- 8-1587
- 9-1385
- 10-1486

Cermet coatings WC-Co





Cr₃C₂-NiCr cermet coating



Nanostructured steel reinforced with carbides

002525.2 12.03.23.08

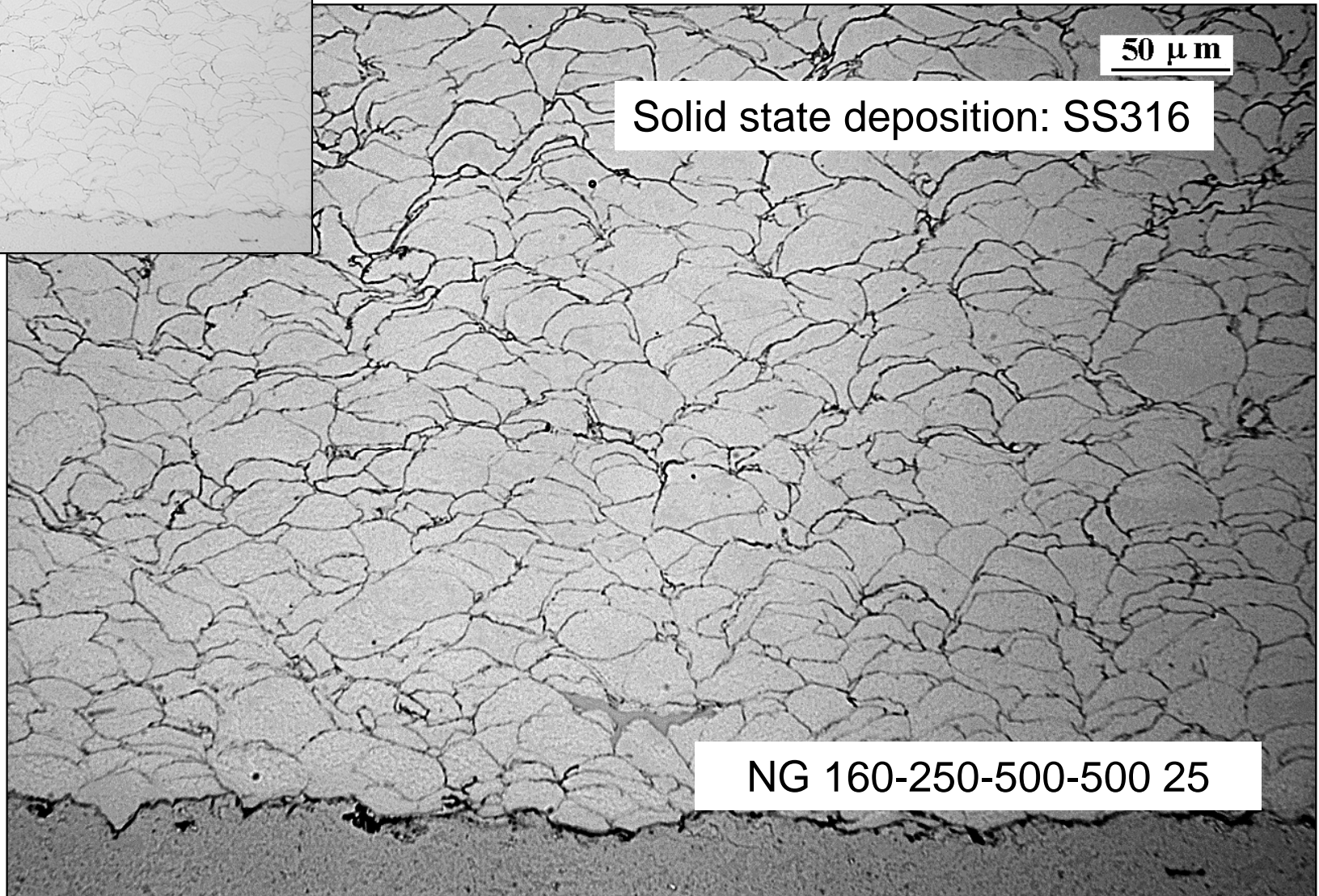
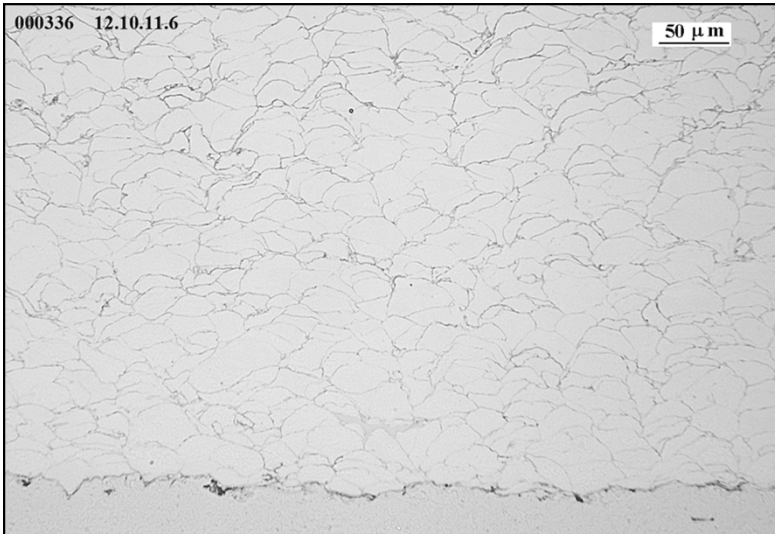
Solid state deposition: CoNiCrAlY

50 μ m

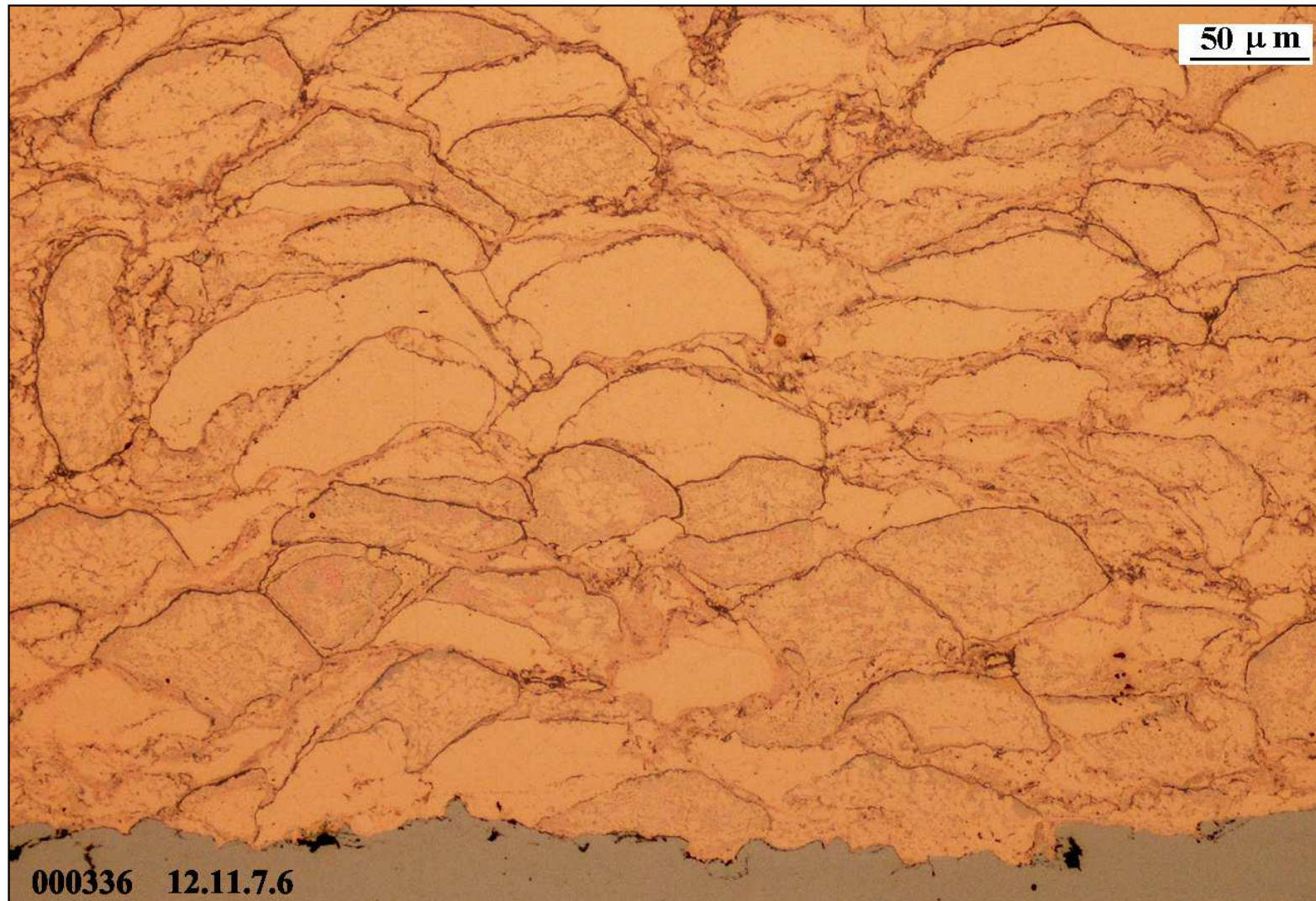
002525.2 12.04.10.08 A

50 μ m

Dense CoNiCrAlY coating on not grit blasted surface

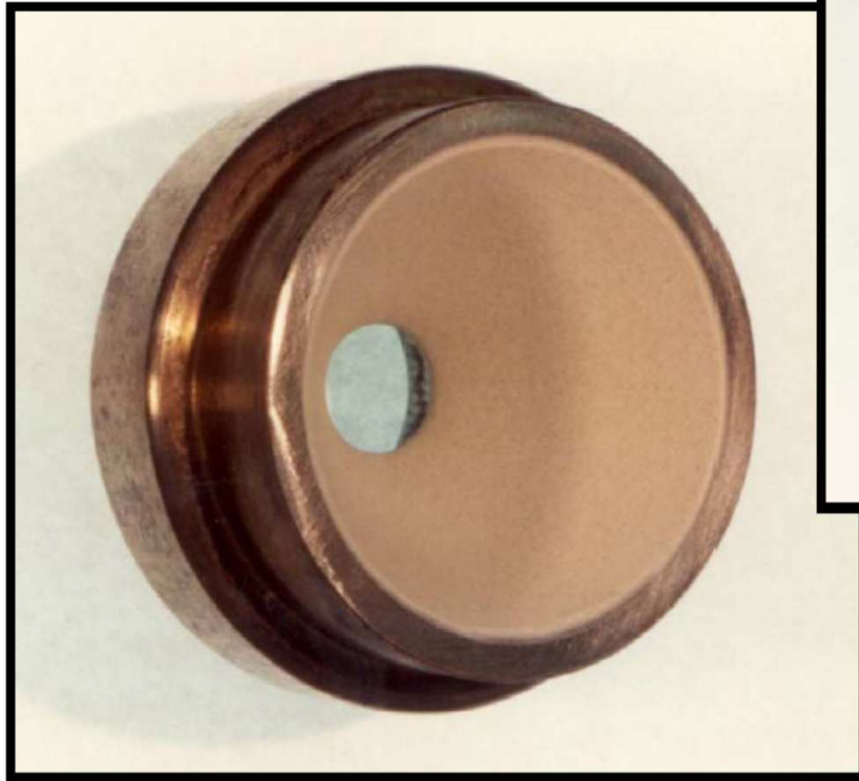


Microstructure: Solid state deposition of Cu

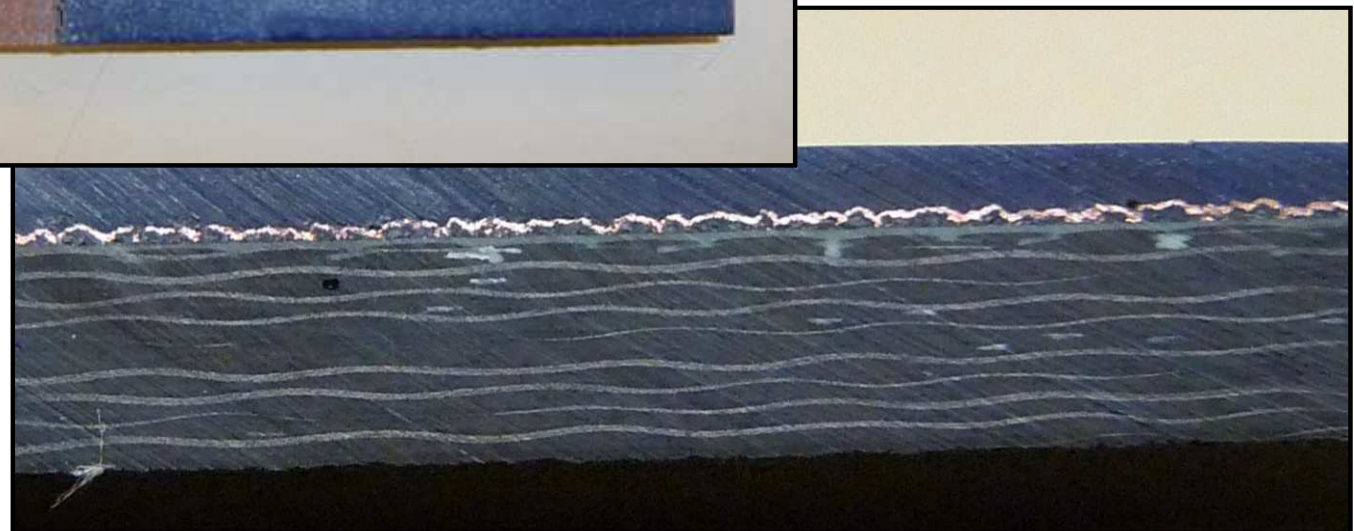
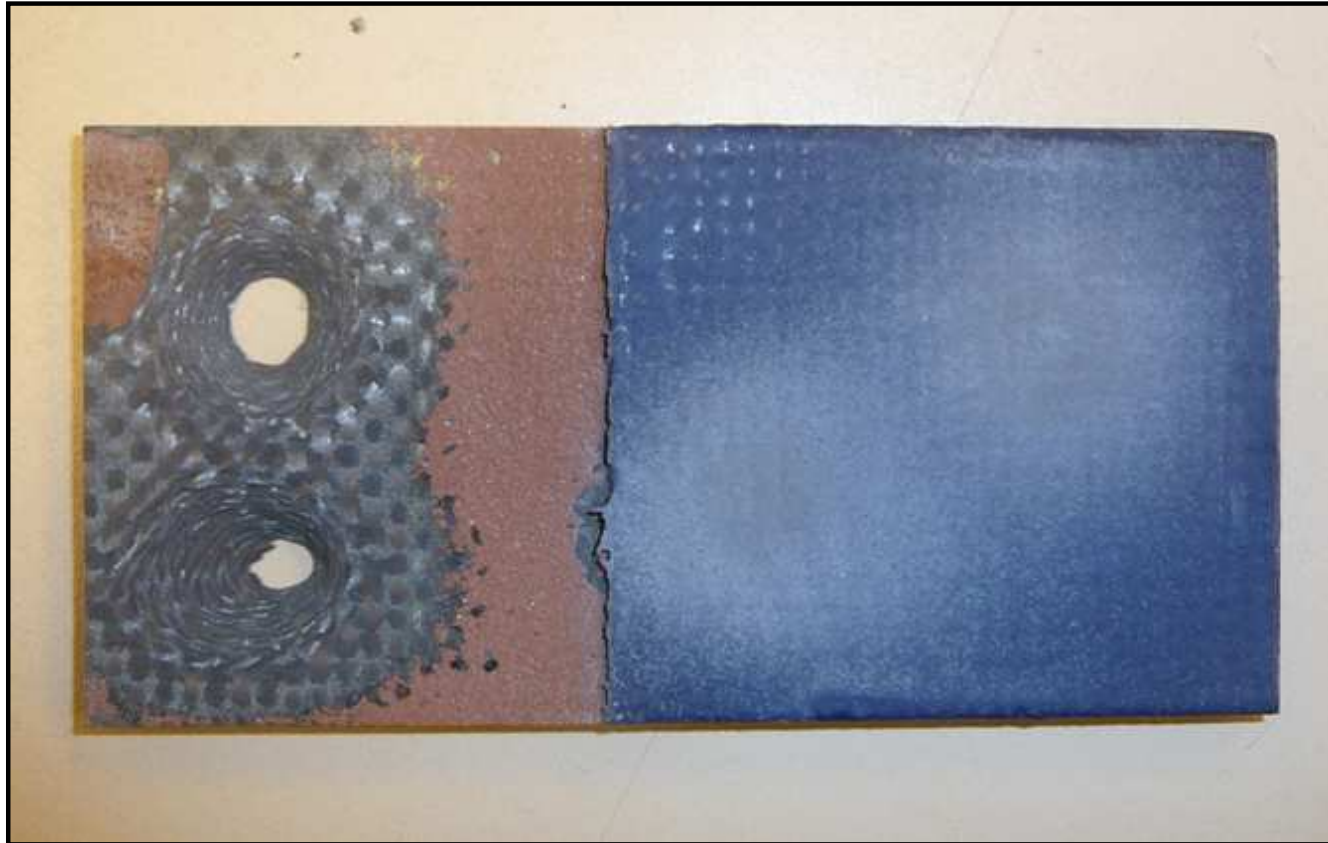


AZIMUT project

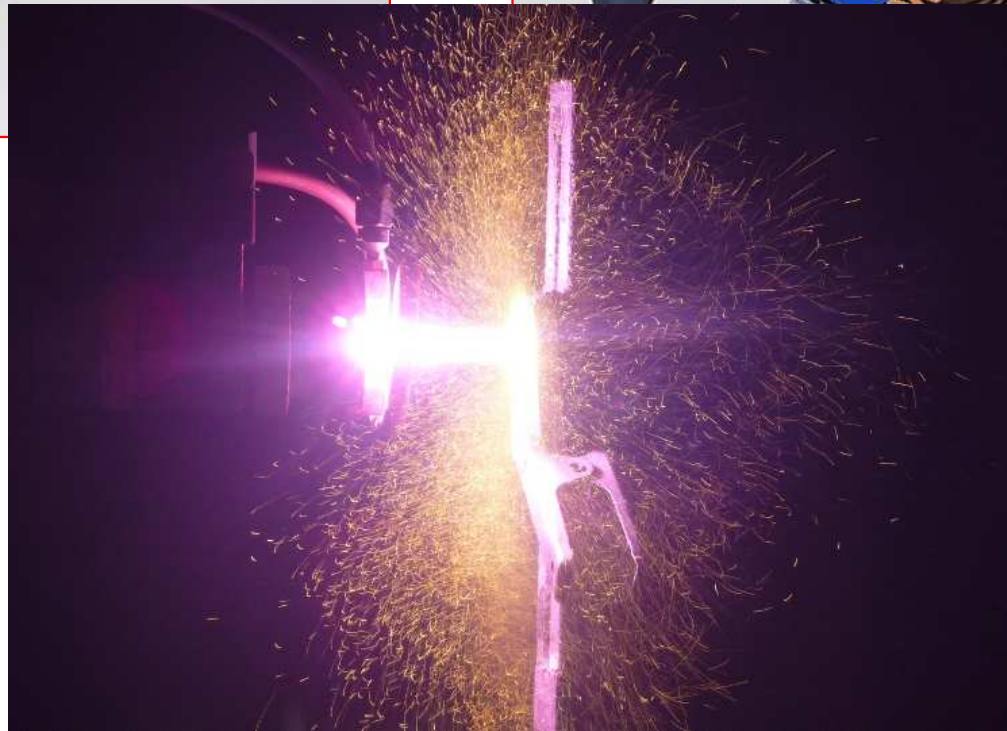




ICARO project



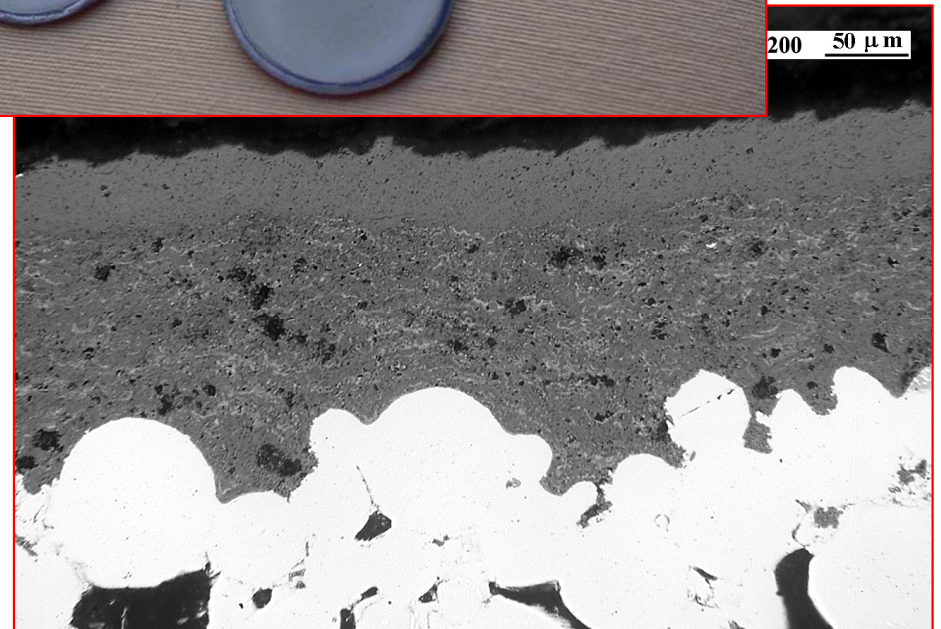
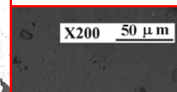
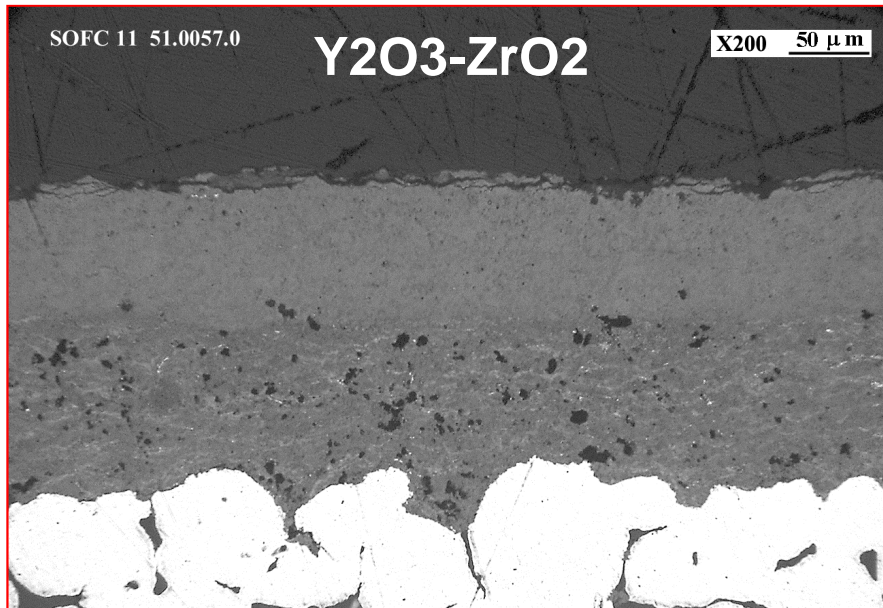




POWER

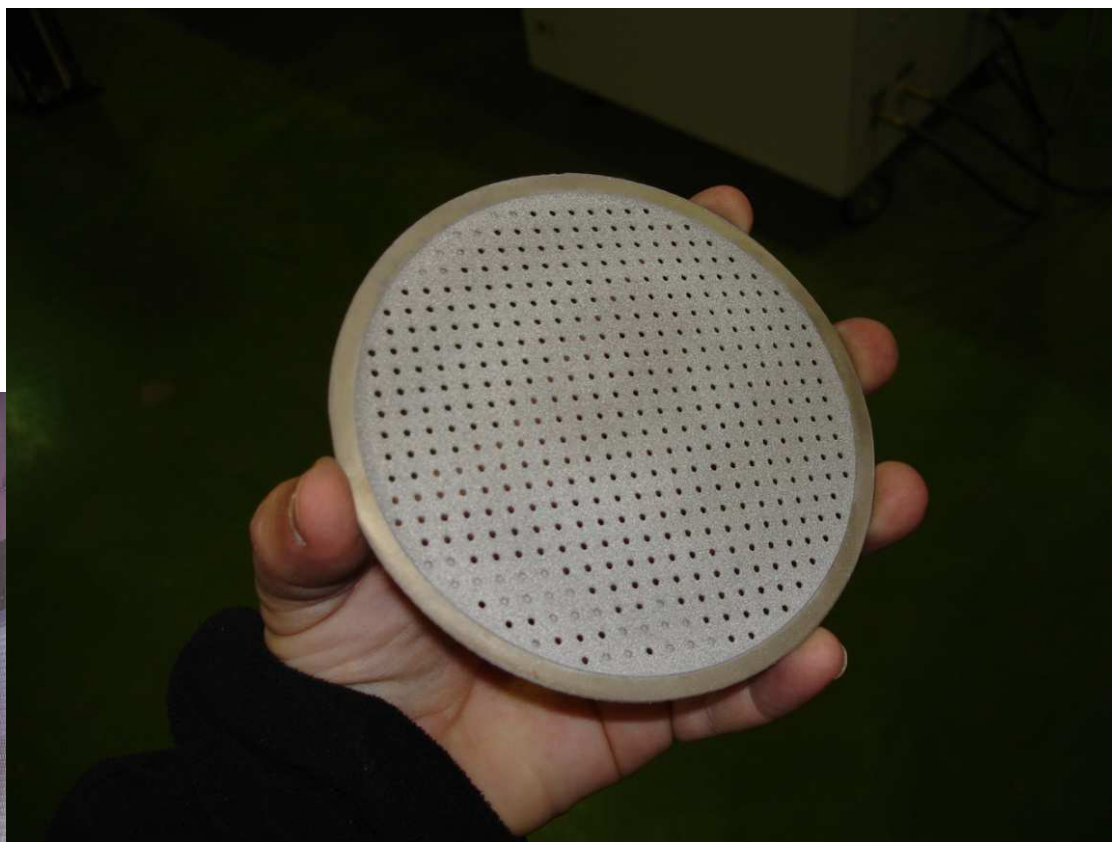


GENEDIS-SOFC
CEXICELL ENK5-CT-200200642
SOFCSPRAY CRAFT-2004508266

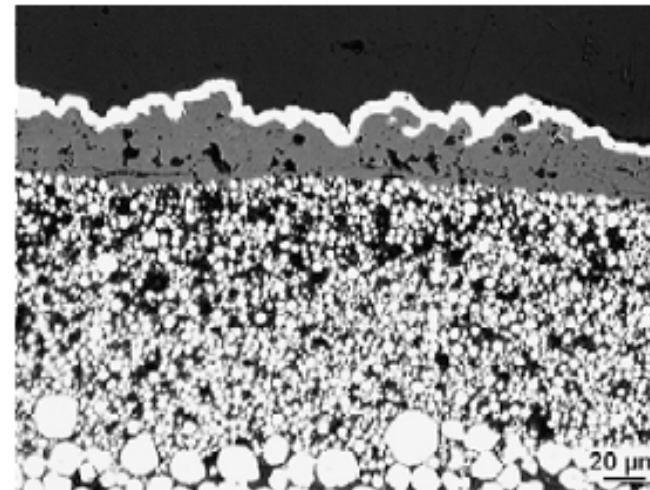
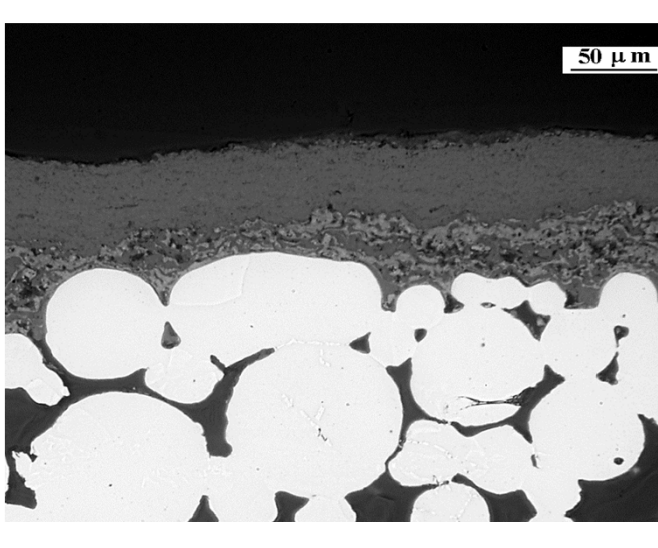


Single pass technique

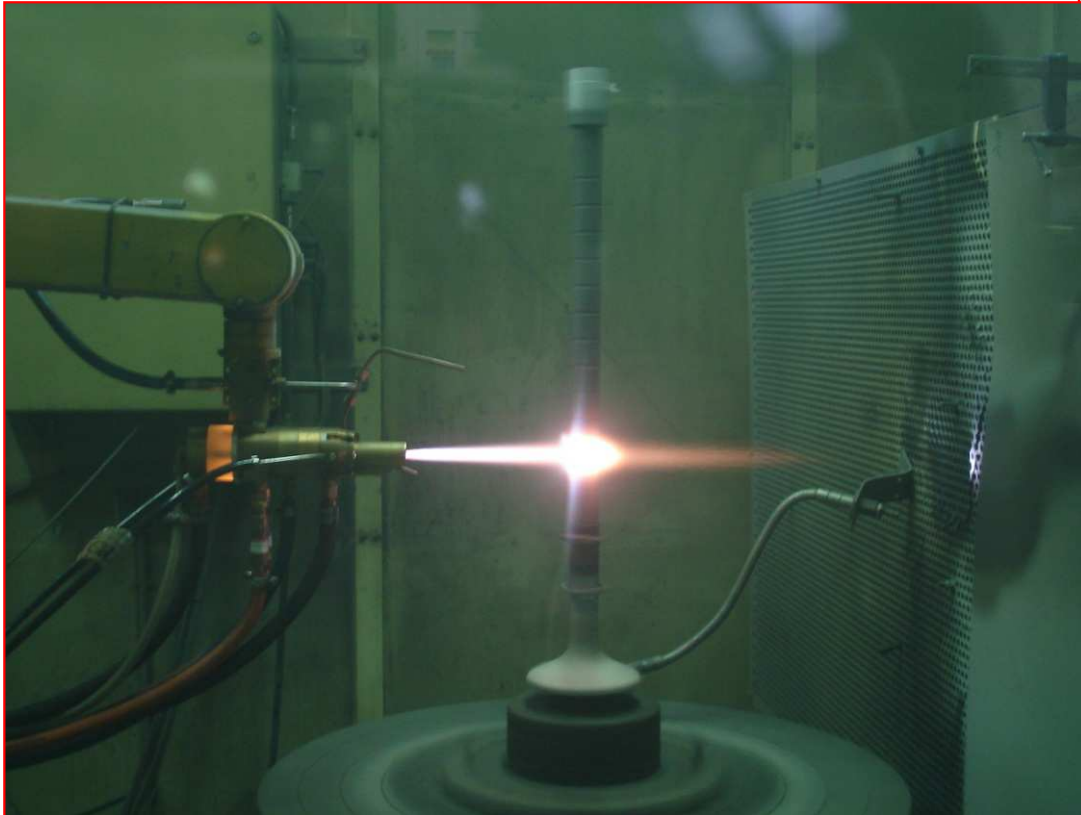
SPHERA project



- **Metprocell project**
- **Development of ceramic and metallic membrane supports**
 - Controlled porosity bonding layers
 - Ceramic interdiffusion layers for Pd based alloys
- **MIEC membranes for H₂ and O₂ separation**
 - Thin nanostructured MIEC coatings on porous support for O₂ separation



OFIENGINE project



POYAN-VALVES

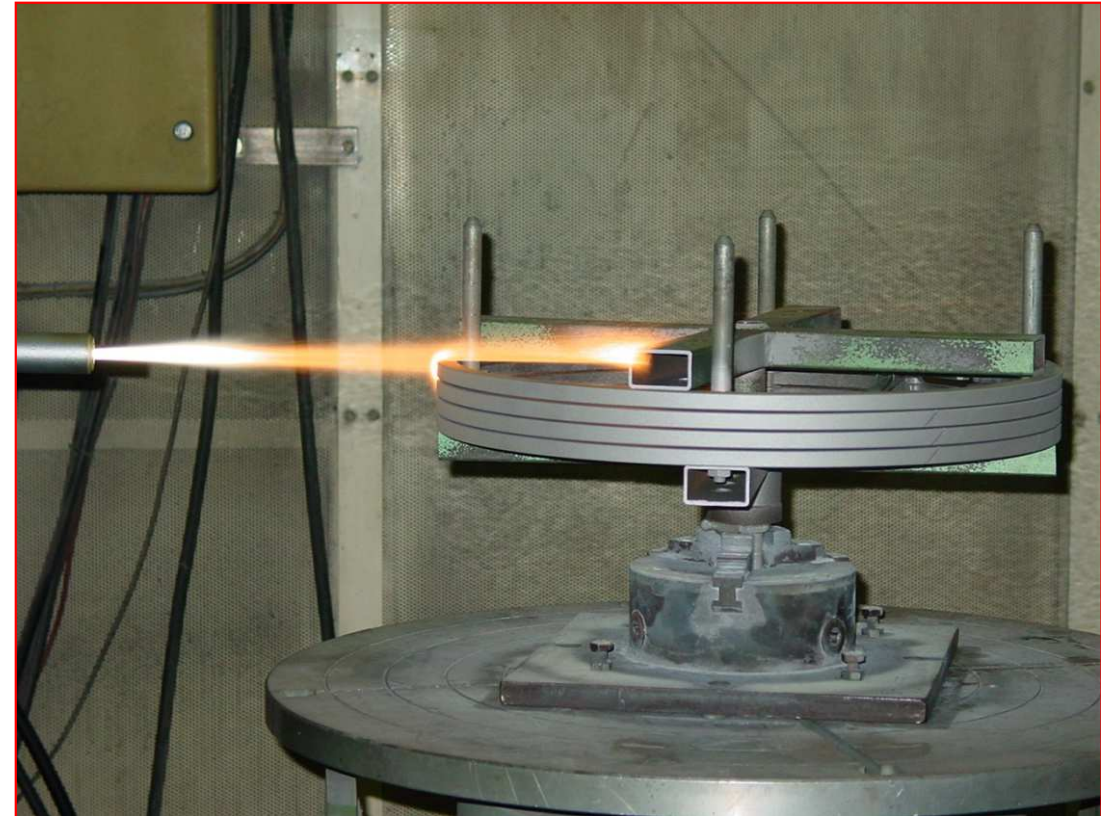
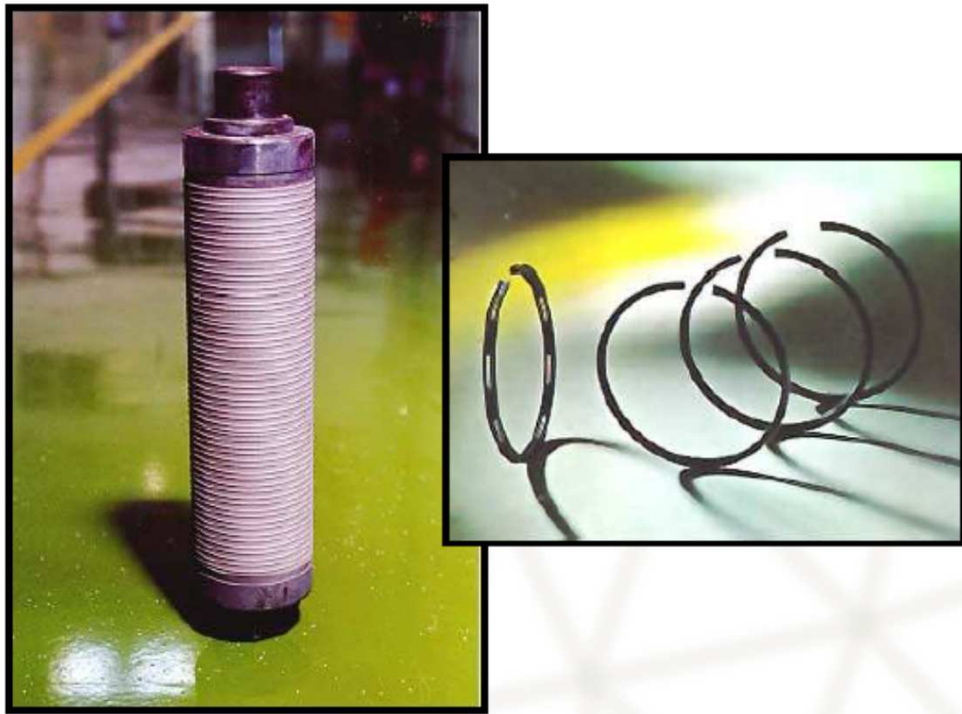


COEUS project



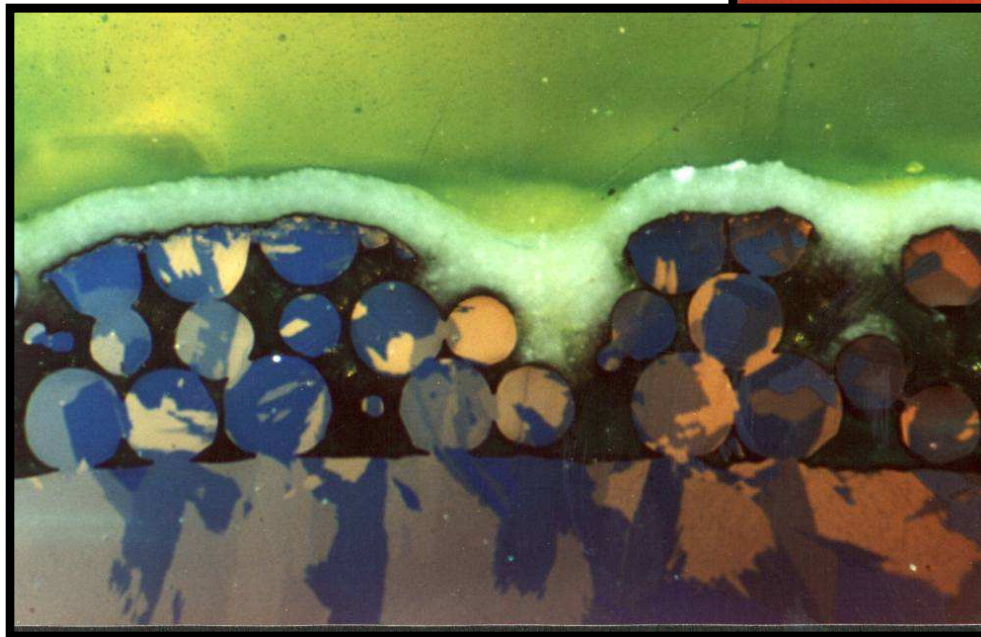
Thermal spray coatings on carbon-epoxy substrates

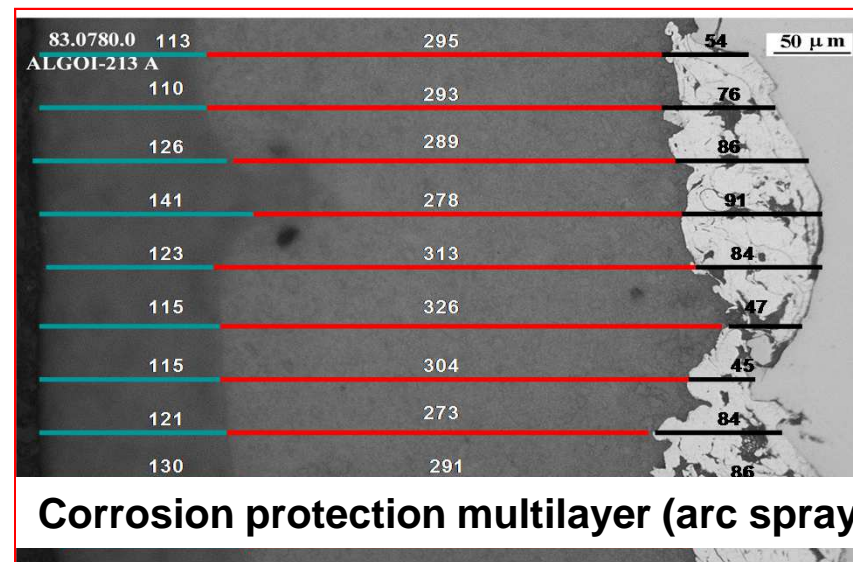
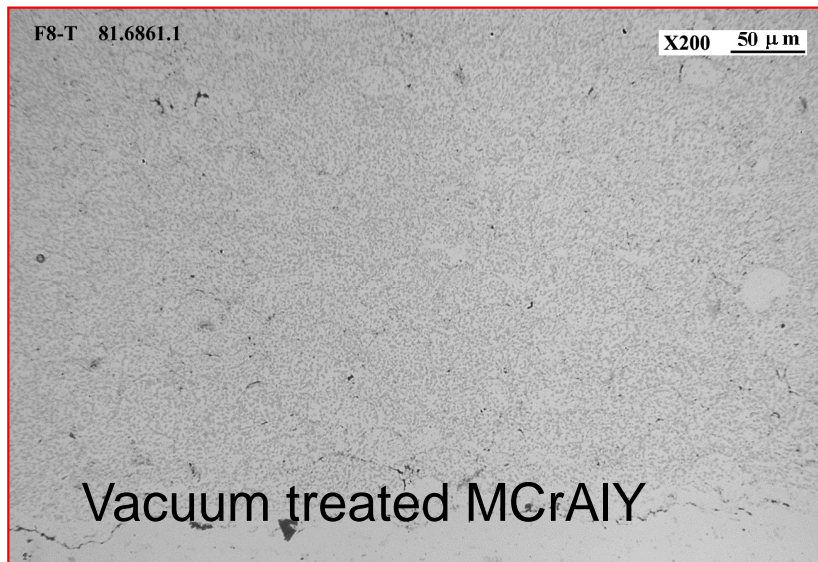
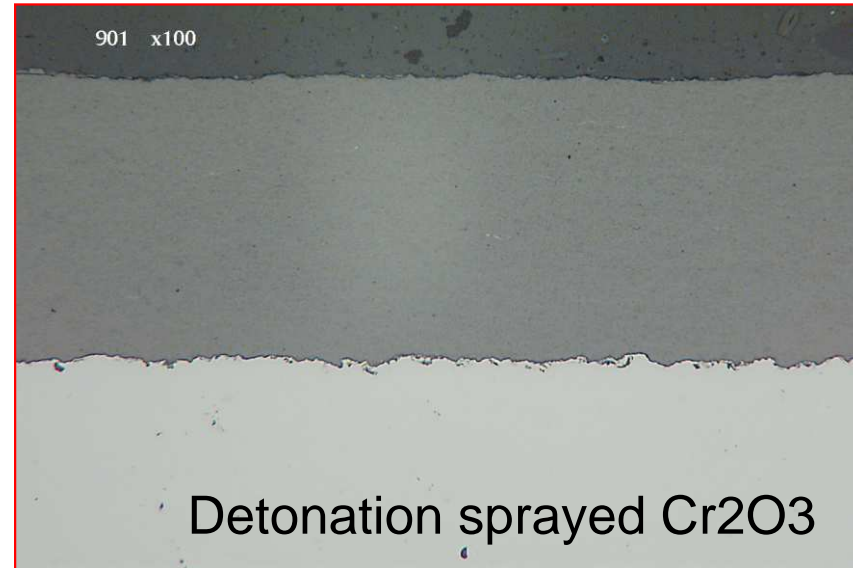
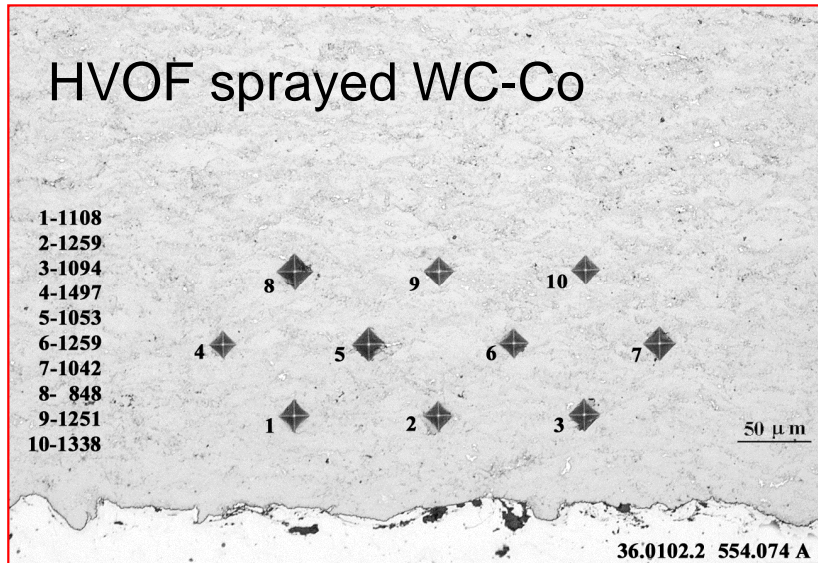
RINGCOAT project

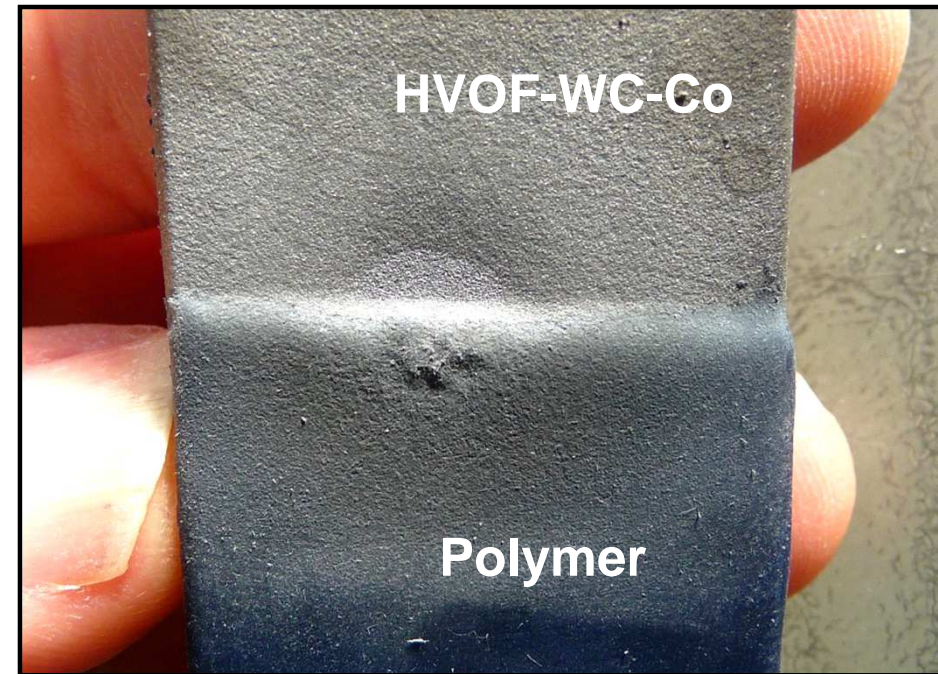




Air plasma treatment of stone

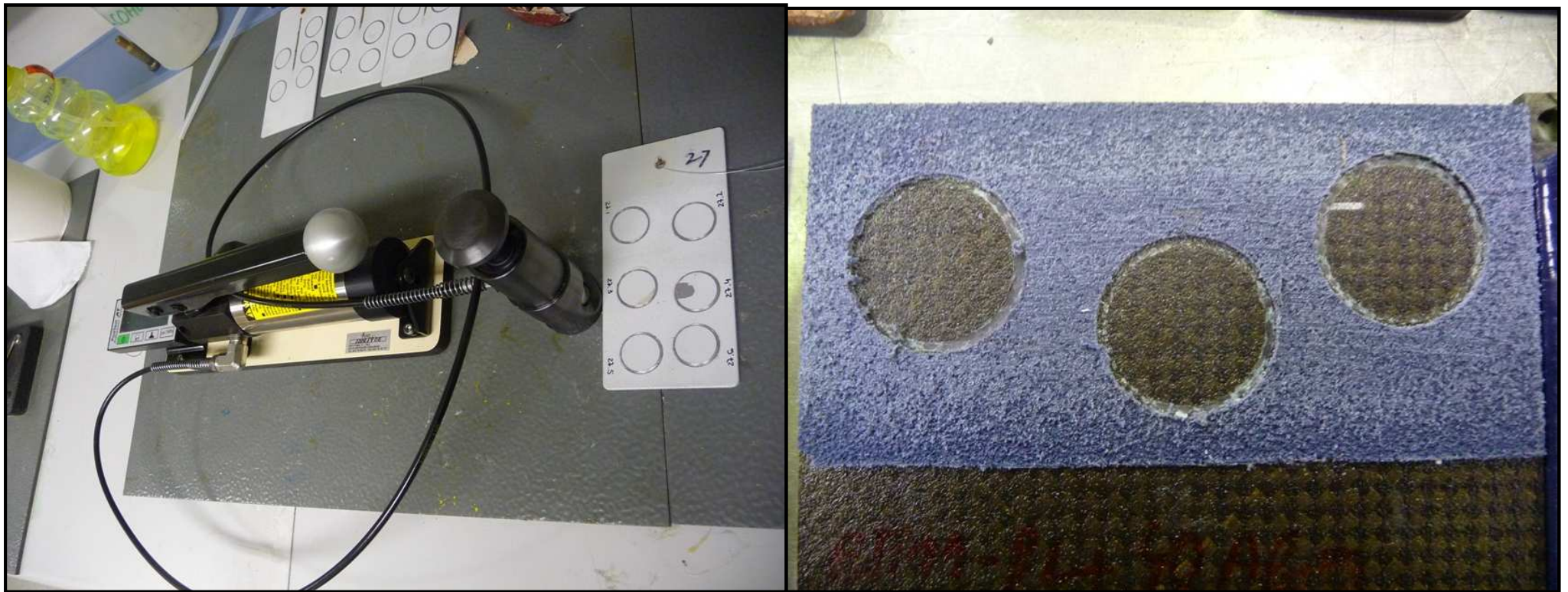




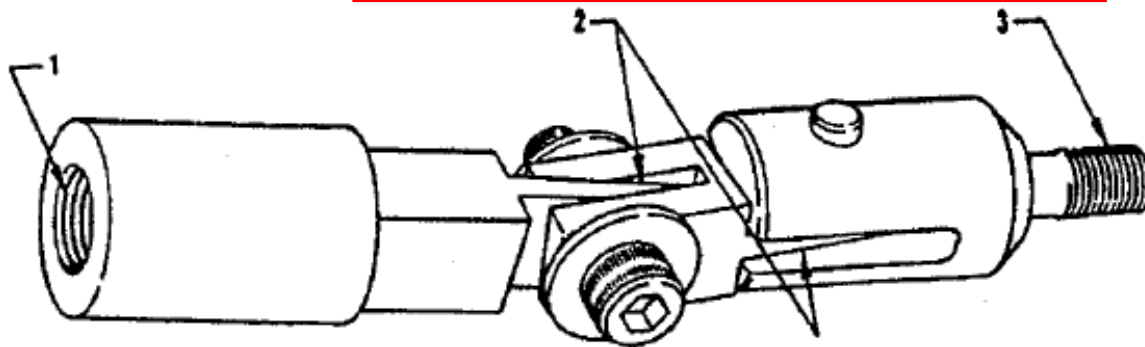


Erosion test: HVOF-WC versus polymeric coatings

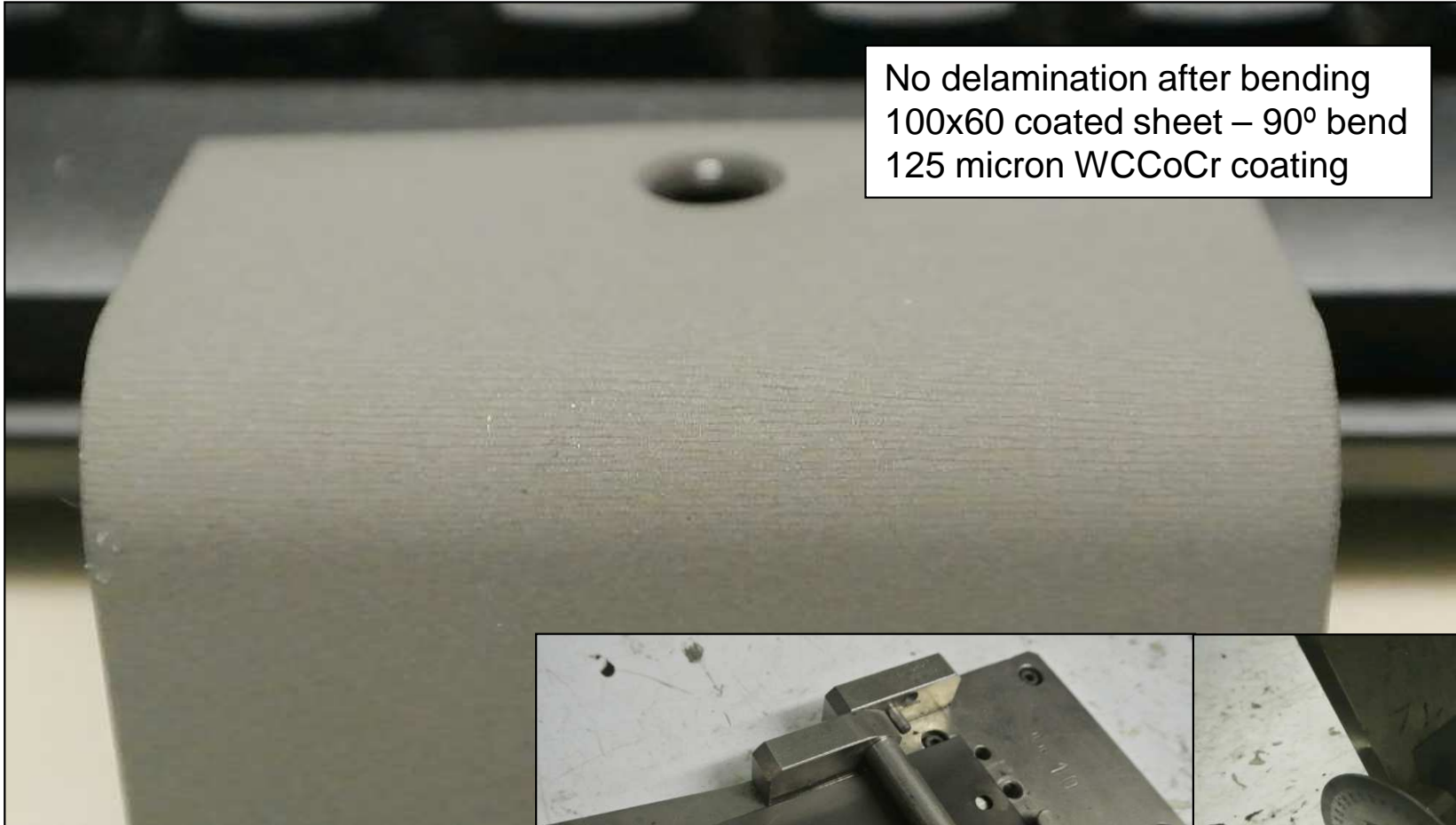
Procedure & Equipment ASTM 4541



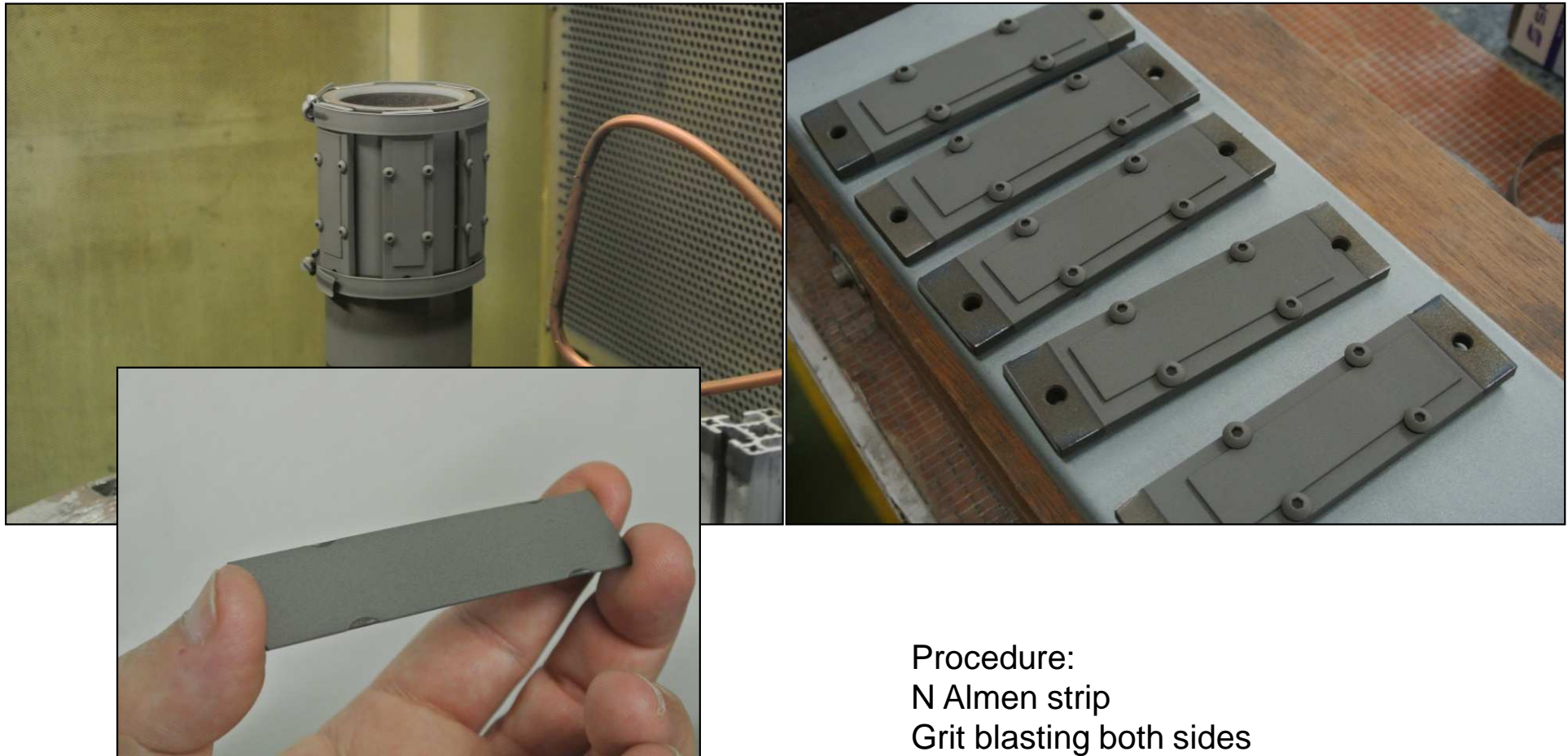
Based on ASTM- C633



HVOF coating : WC-Co-Cr Adherence Bending



HVOF coating : WC-Co-Cr Residual Stress Almen (N Strip)



Results:

Compressive deflection

Normalized arc height about 180 micron

Coating thickness 120 micron

Procedure:

N Almen strip

Grit blasting both sides

Measurement of initial arc height

Mounting and fixing on the holder

Deposition on rotating device

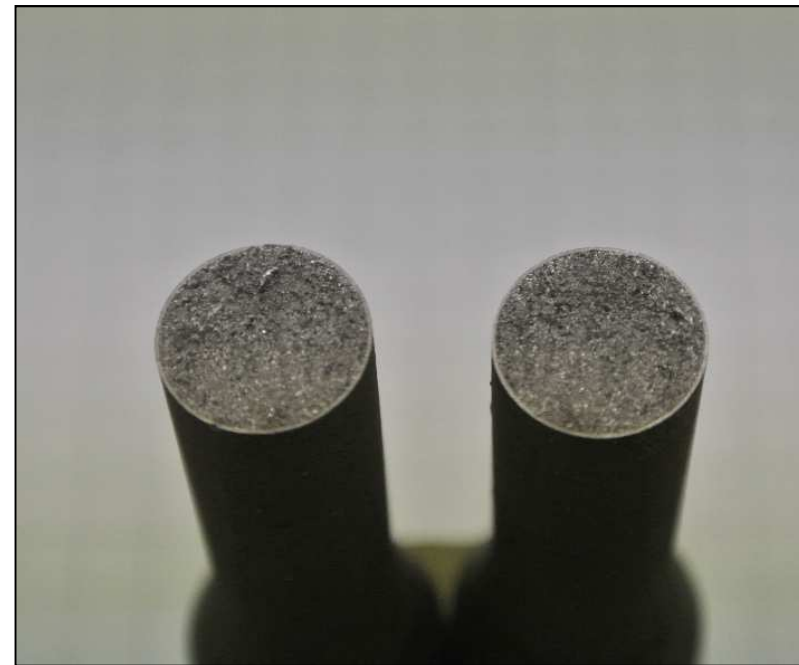
Measurement of arc height and calculation



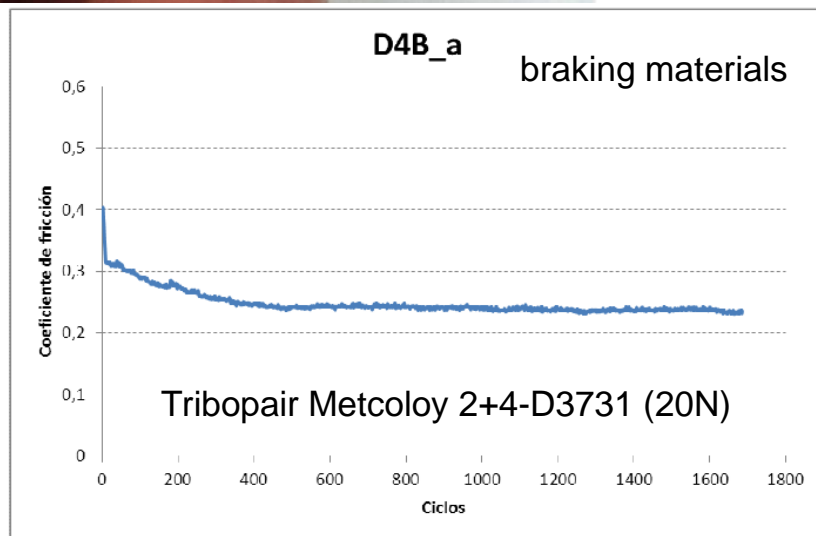
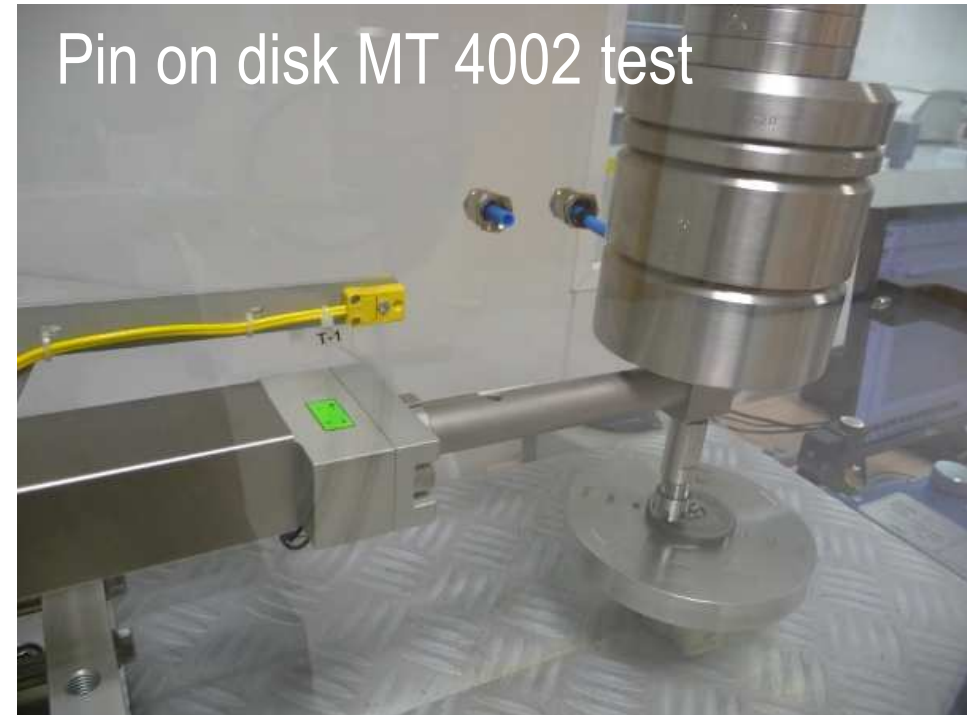
Salt fog testing of wire sprayed steel coatings



Aspecto de la probeta de fatiga (GJS400) recubierta
270 MPa – 2.106.000 ciclos



Thermal Spray Technologies Examples D: Tribological characterization of coatings



High temperature plasma flame erosion test

