

Metallic Materials Science Unit (MMS)

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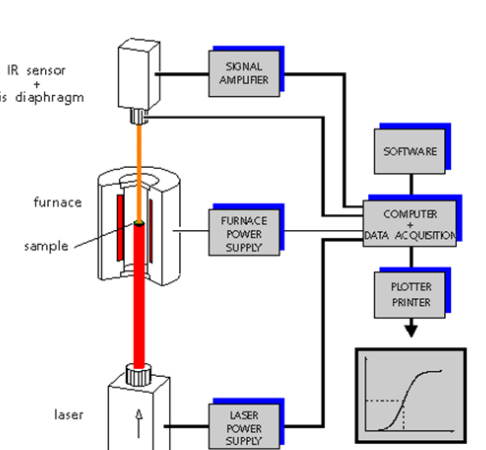


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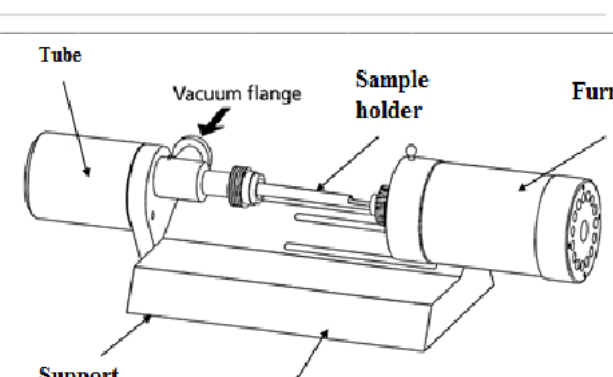
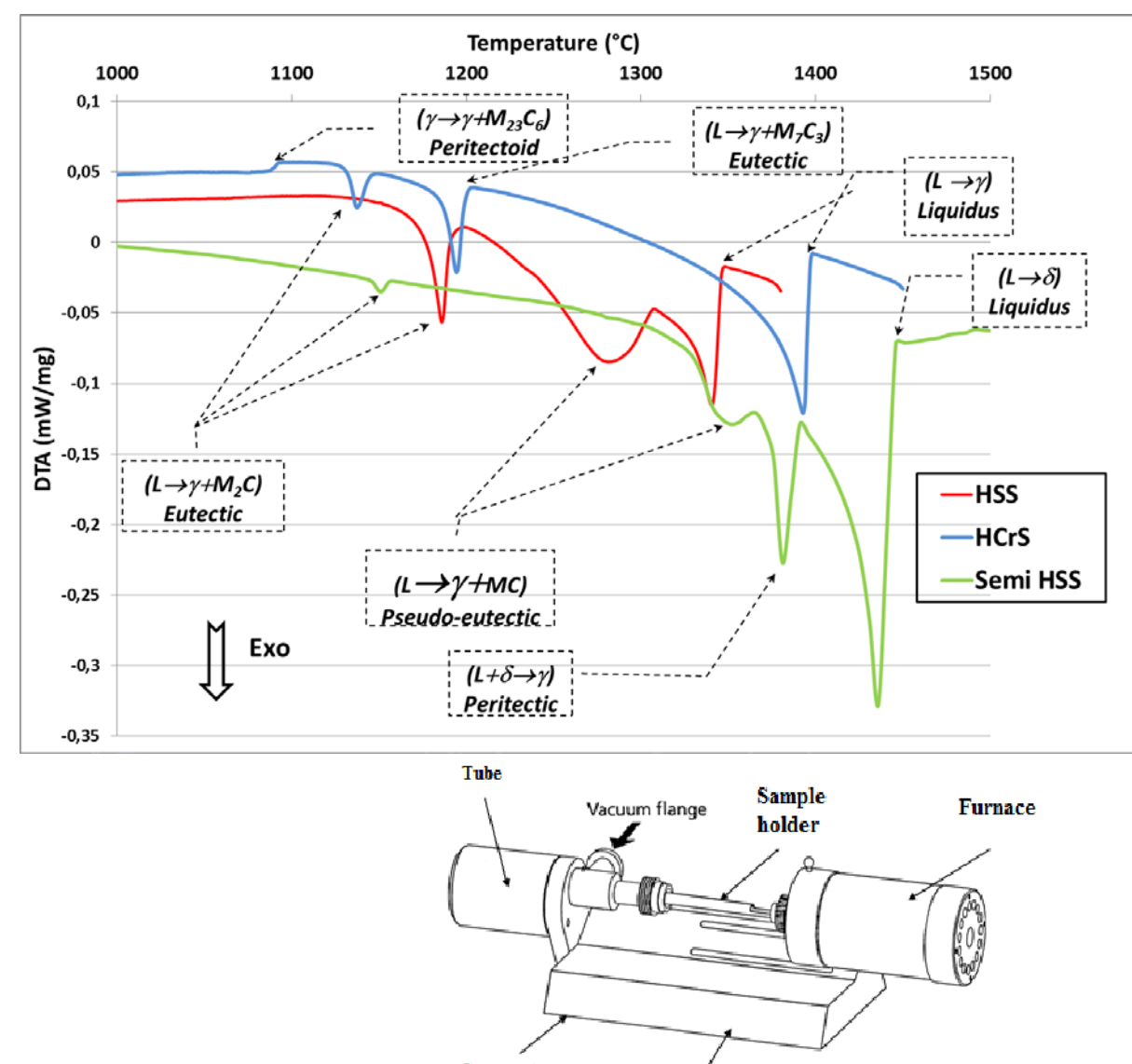
Thermo physical properties by DTA, Dilatometer, Laser Flash and DSC

Evaluation of
the high
temperature
phenomena at
through DTA
analyses

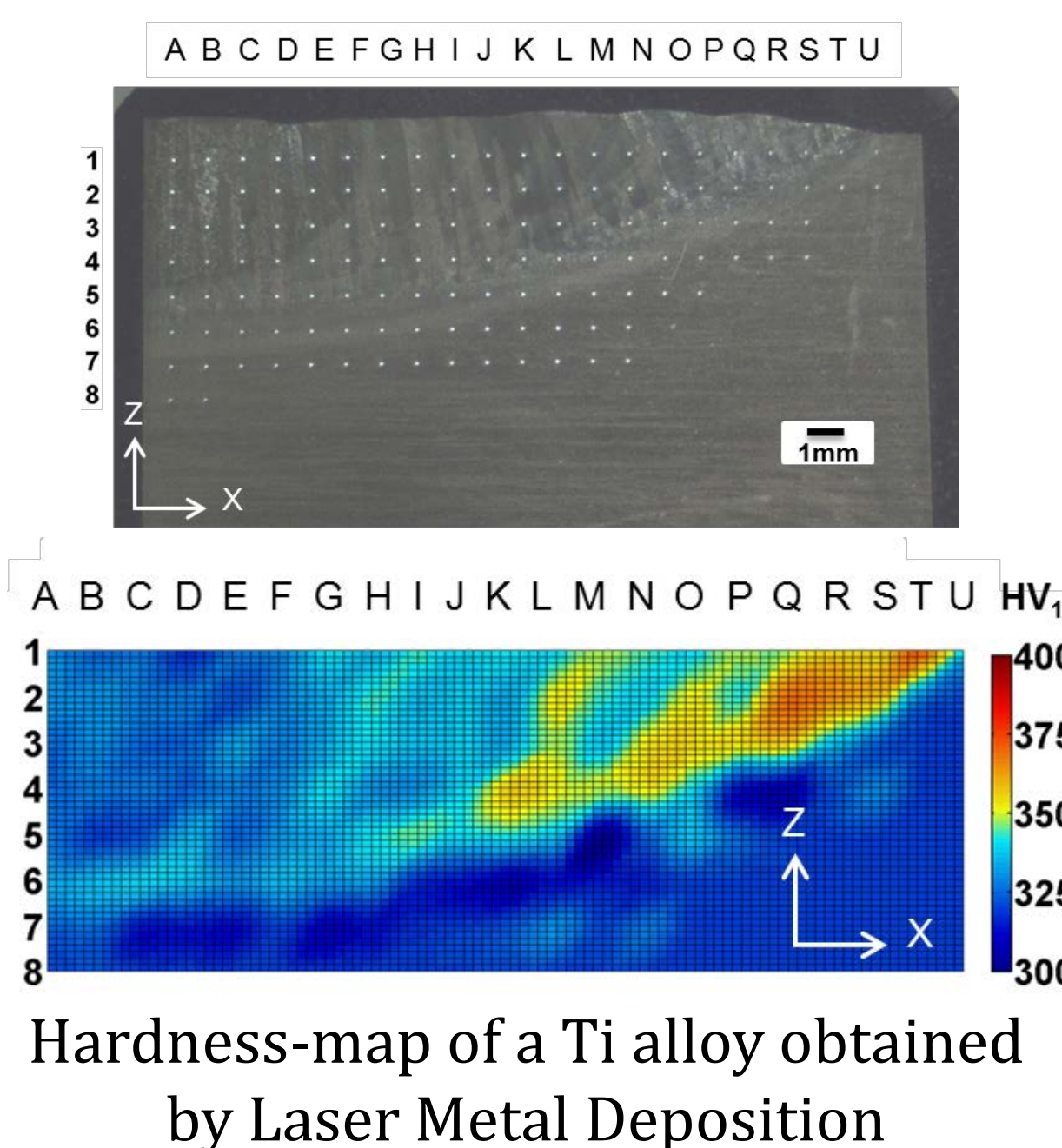


$\alpha(T)$ = Thermal diffusivity,
measured by Laser Flash

$\rho(T)$ = Density, measured by
Dilatometer

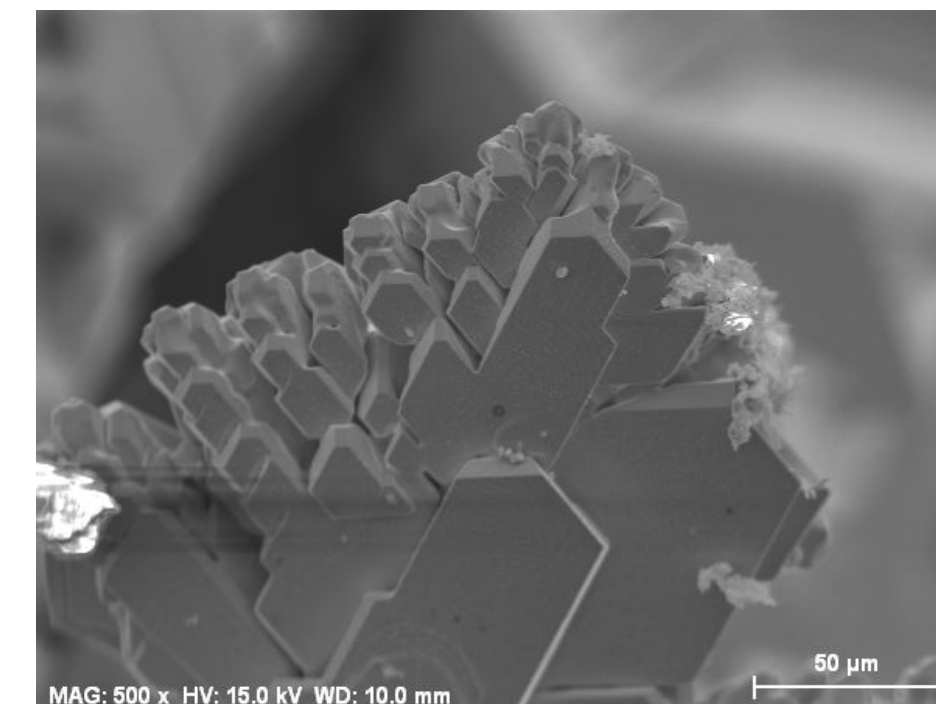


Hardness-map



Hardness-map of a Ti alloy obtained
by Laser Metal Deposition

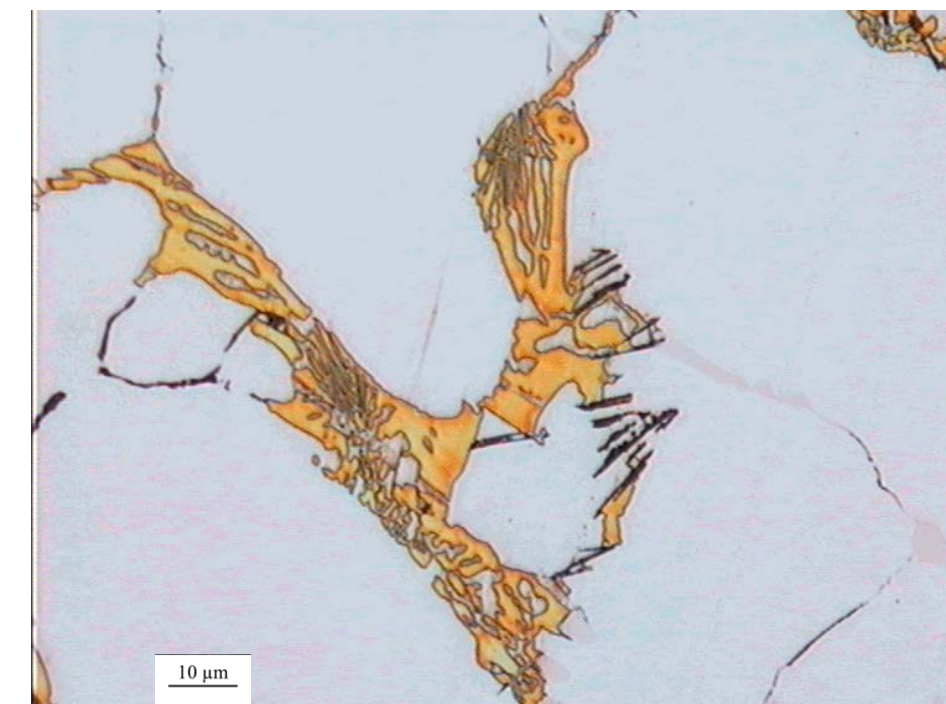
Microscopy observations



Multi scale crystal structure
from Pt-Rh deposition

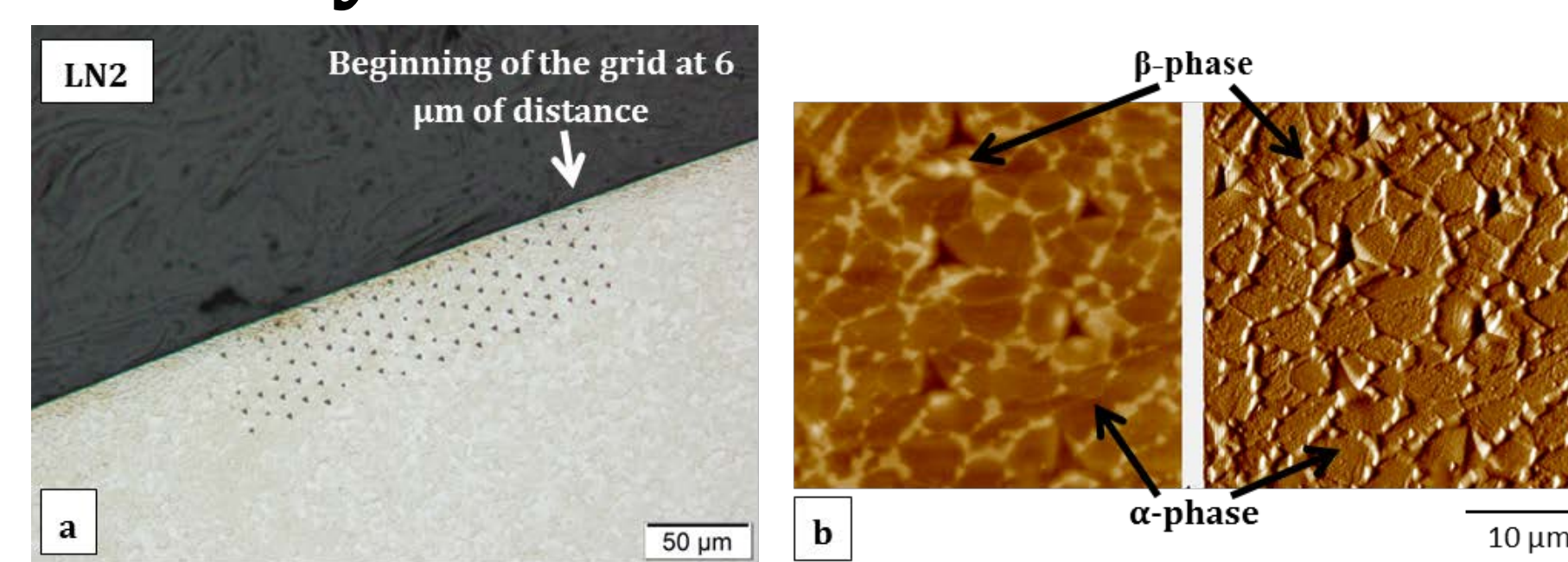


Mixed carbides (M_7C_3 , M_6C)
in High Strength Steel
with electronic microscope



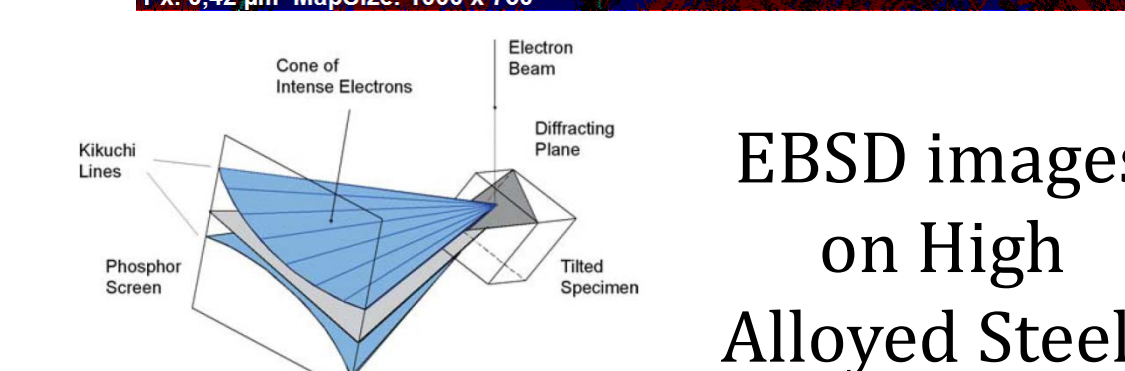
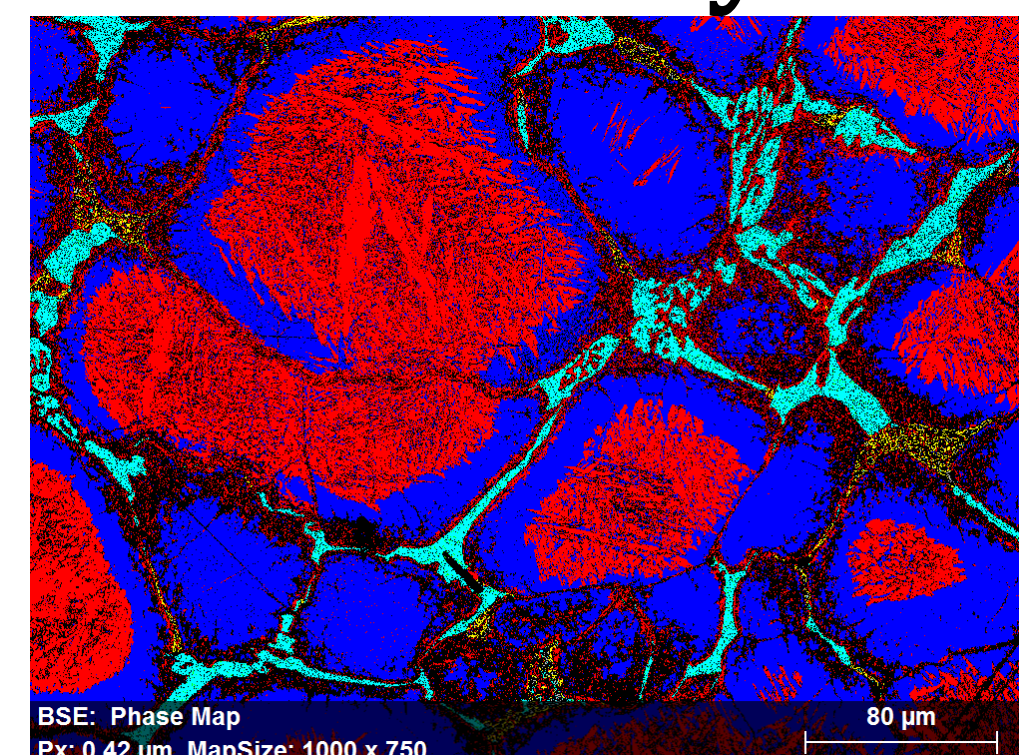
Carbides with light
microscope: M_7C_3 (Orange), M_2C
(Brown) and MC (Pale pink)

Nano-hardness by nano-indentations

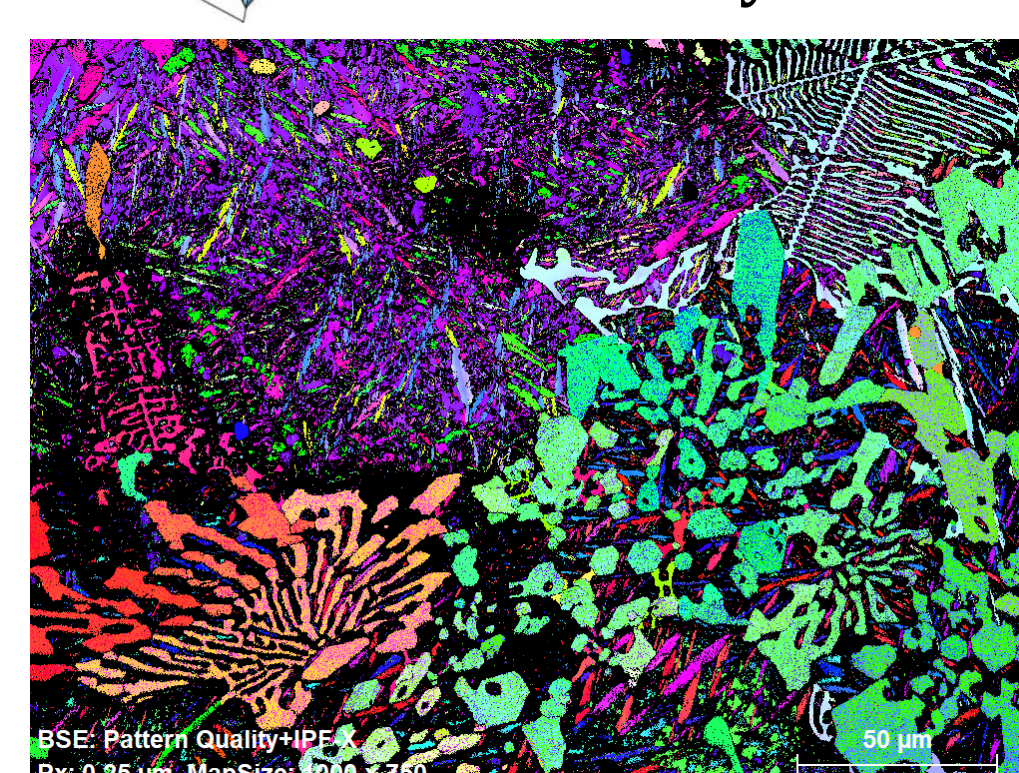


Nano-indentations on machined α - β Ti alloy

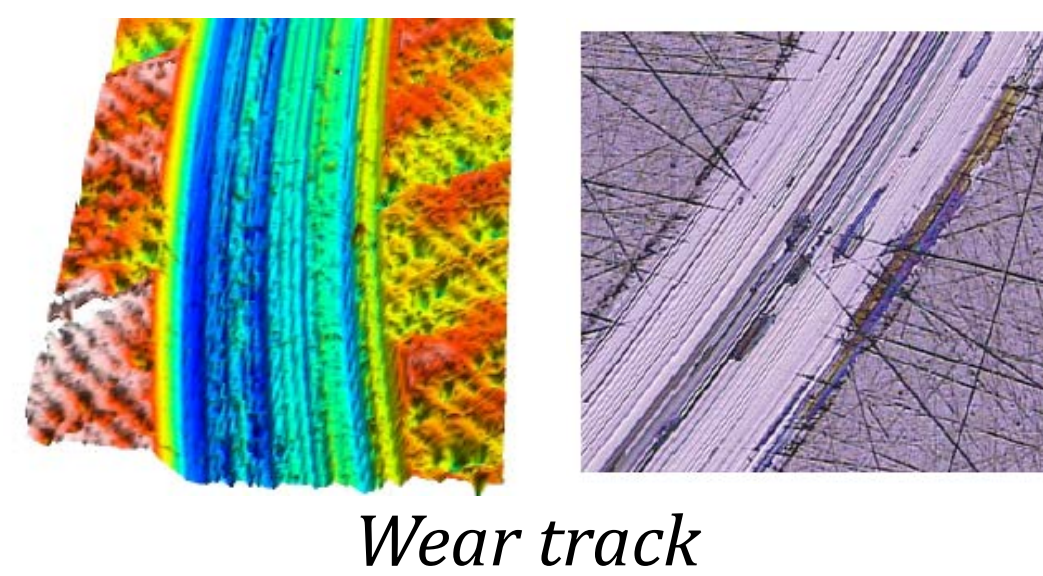
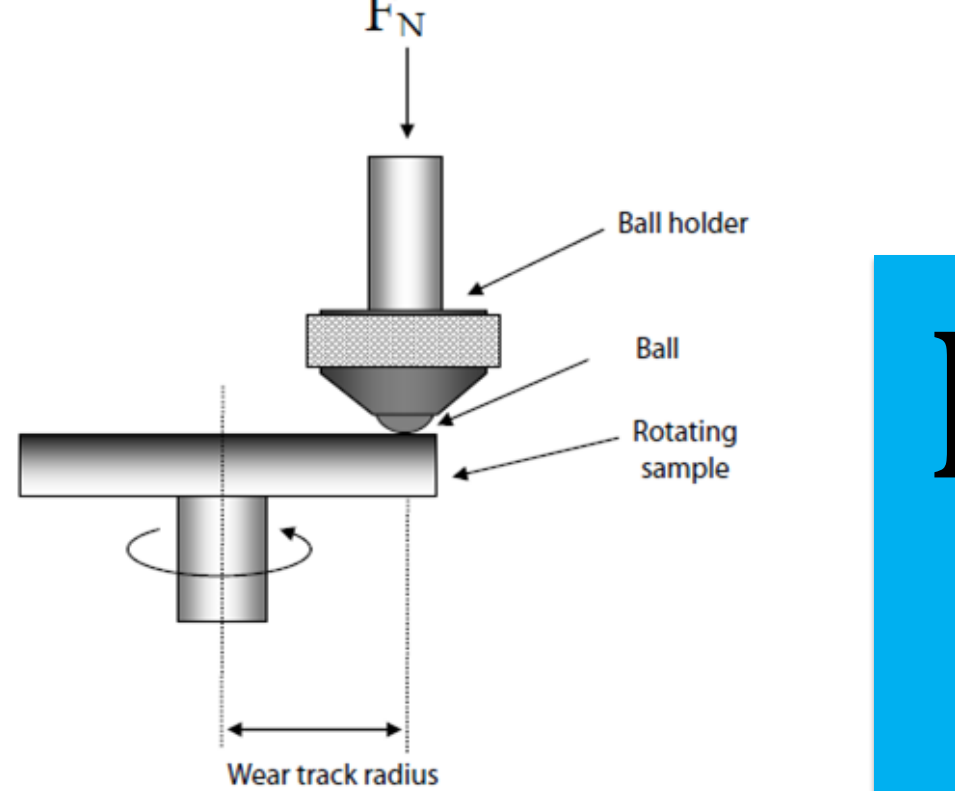
EBSD analyses



EBSD images
on High
Alloyed Steels



Pin-on-disc (High Temperature Friction)

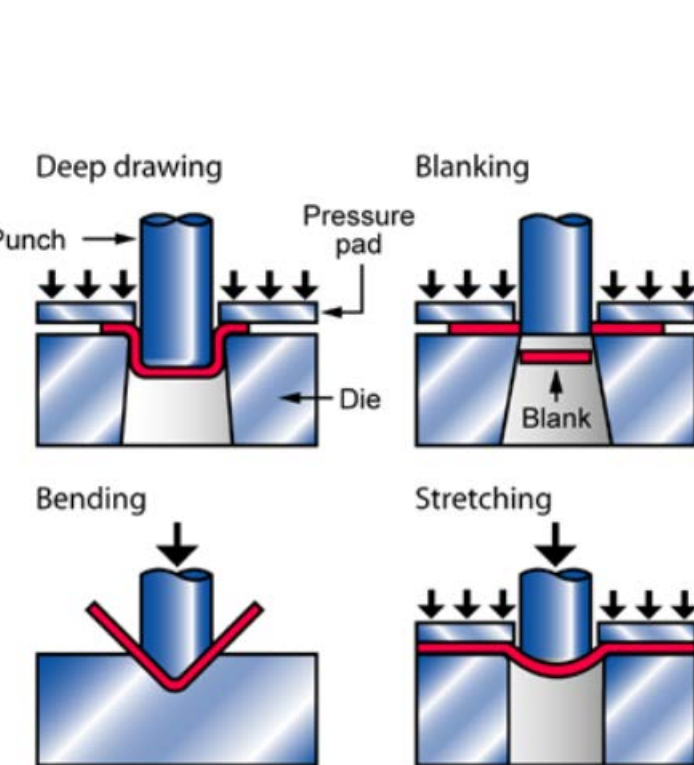
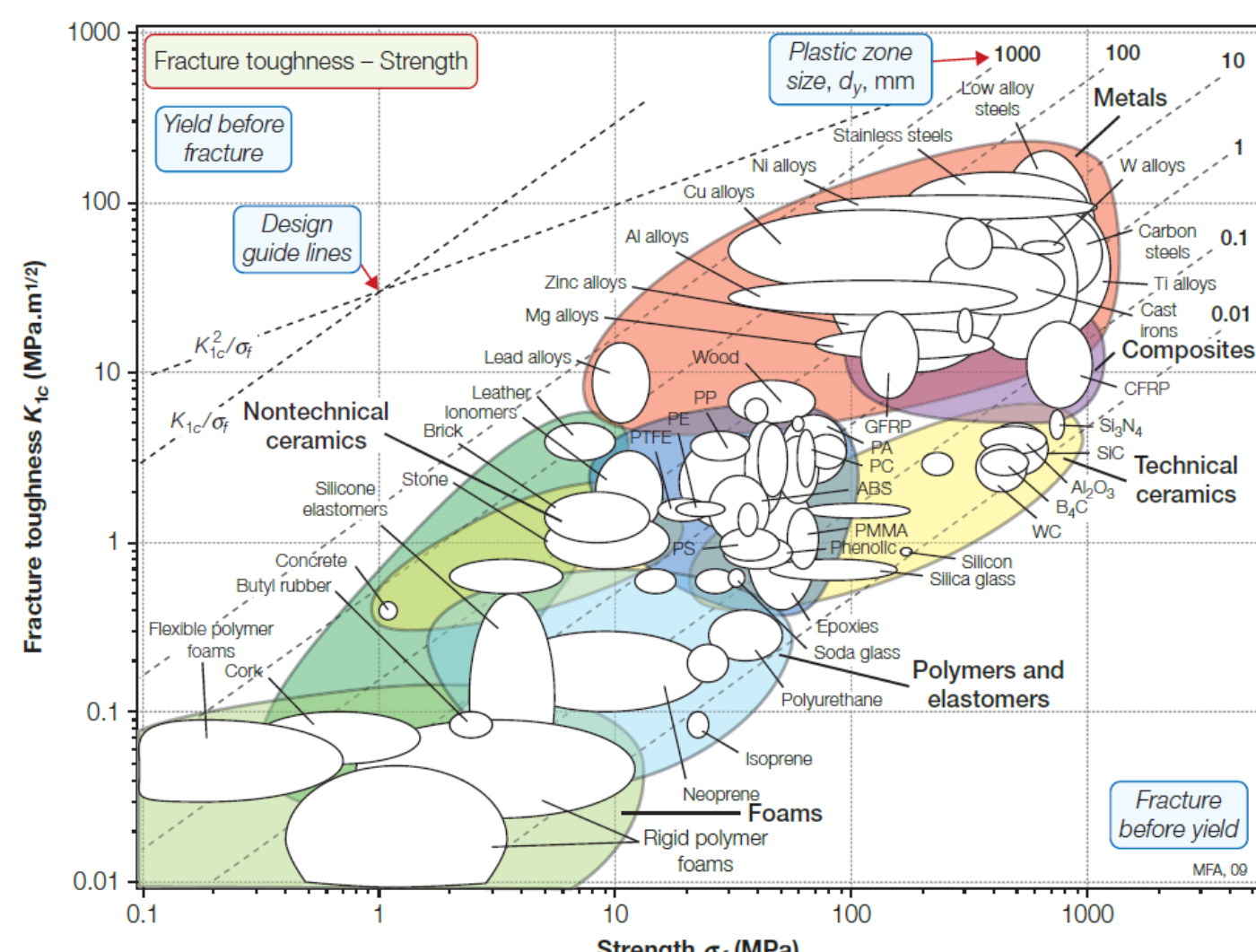


Wear track

Macro-properties
of materials

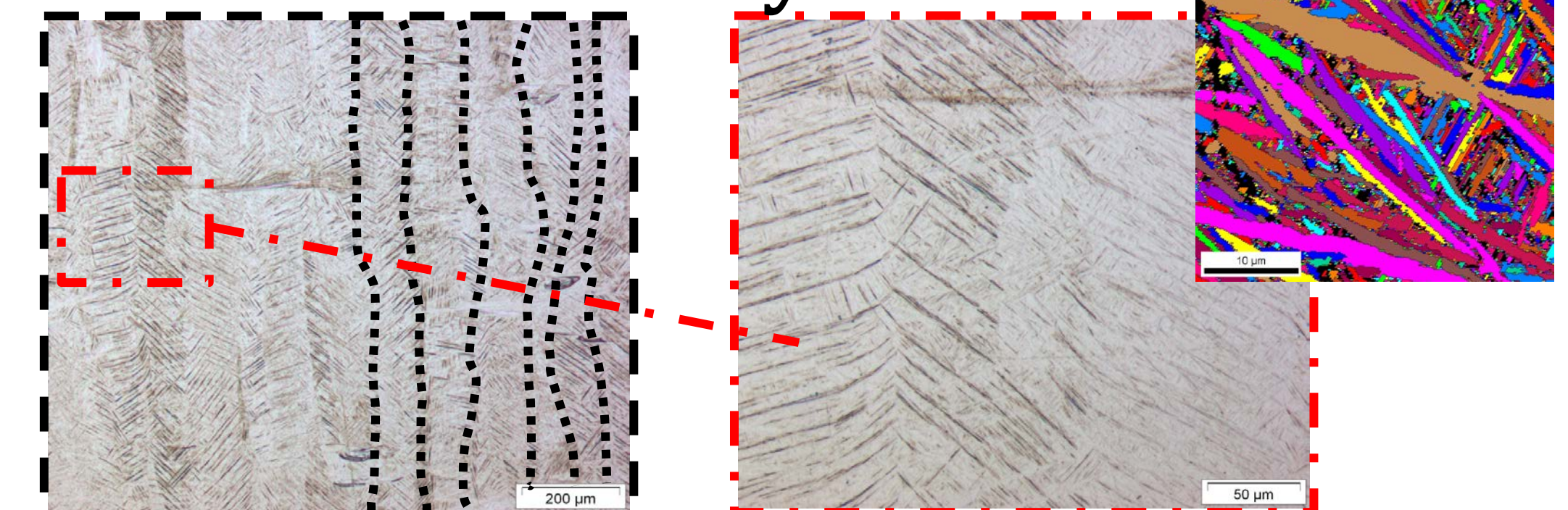
Microstructural
characterisation

Materials selection with CES



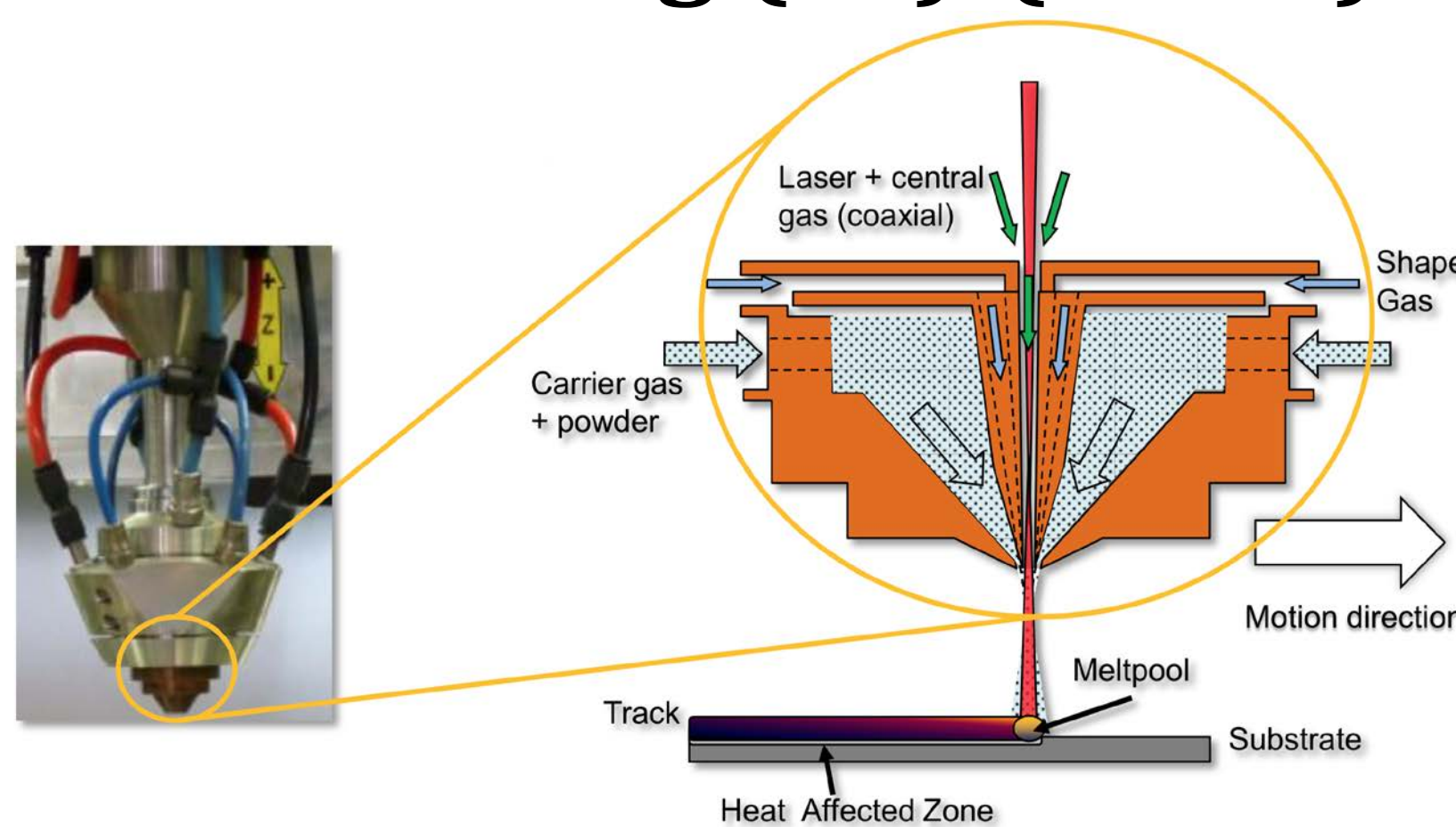
Optimisation of
processing
parameters

Epitaxial growth of Titanium fabricated by SLM



$\alpha + \beta$ multiphase alloy
Step size = $0.15 \mu m$, Grain
colour EBSD representation

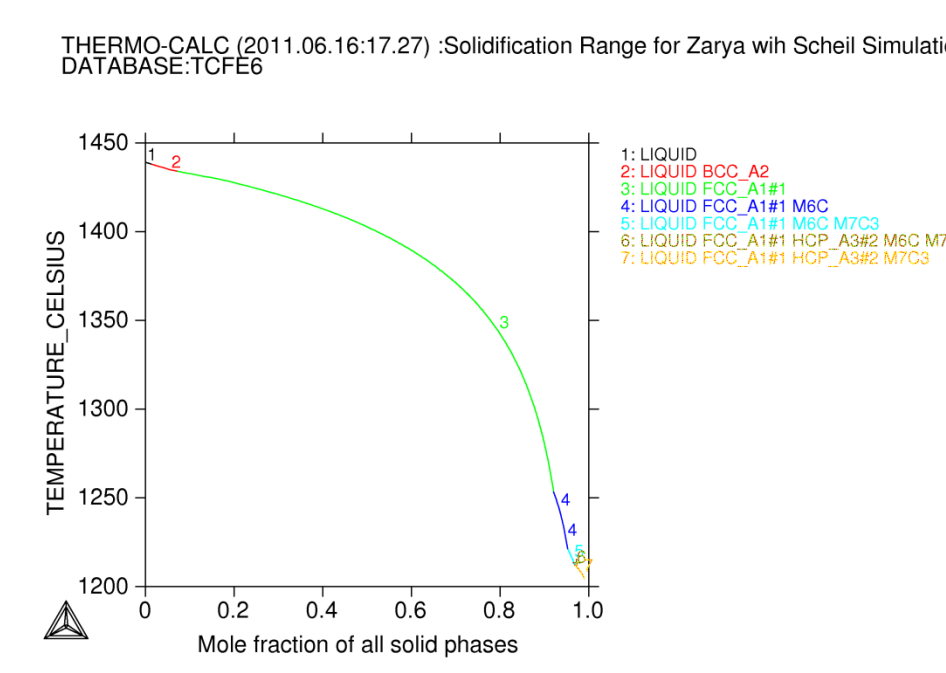
Laser Cladding (LC)-(Sirris)



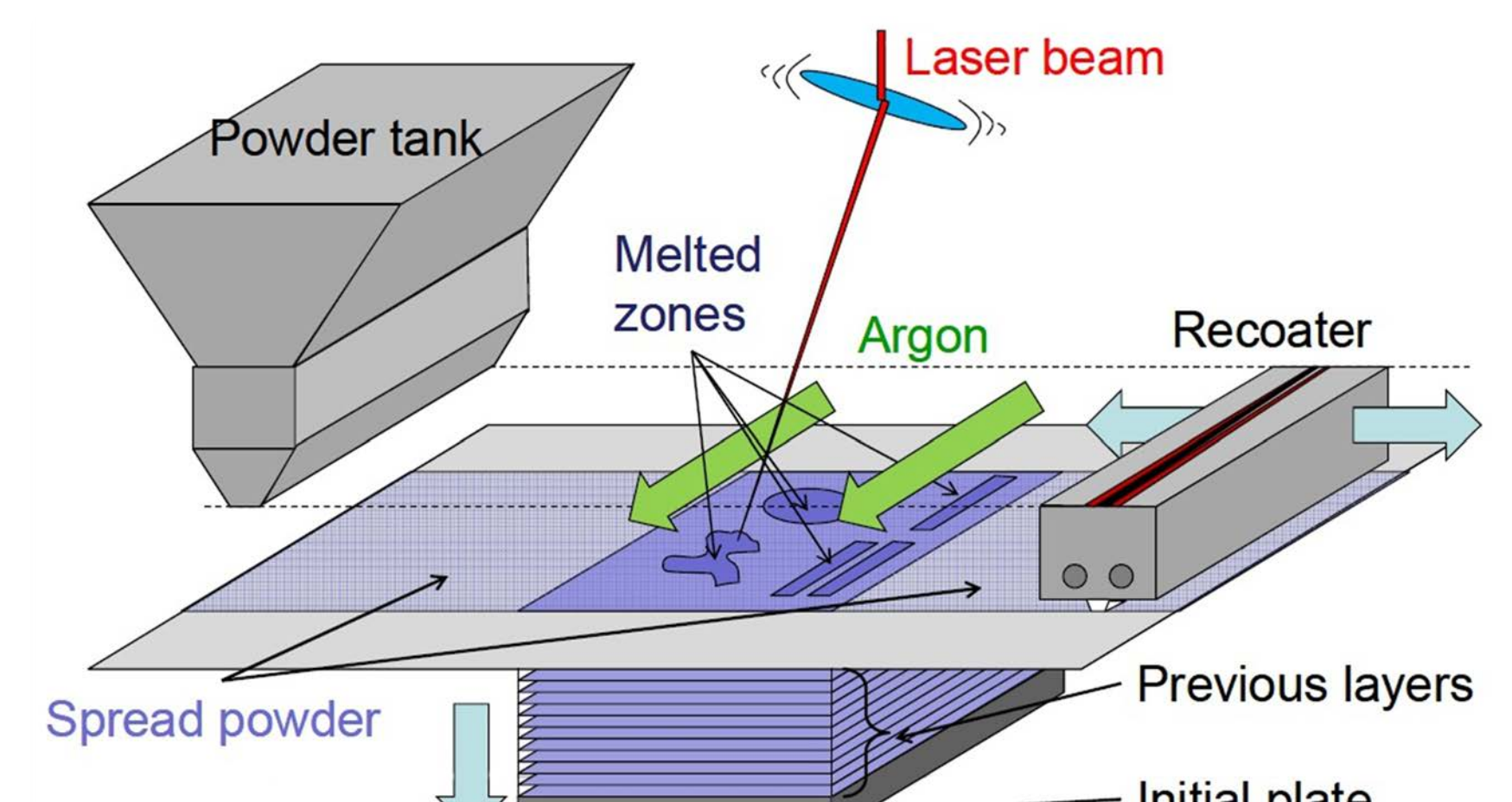
A Stream of powder is fed into a focused laser beam while
being scanned across a substrate, thus leaving behind a
coating or object.

Thermodynamic calculation with ThermoCalc

Solidification range for
High Speed Steel (HSS)



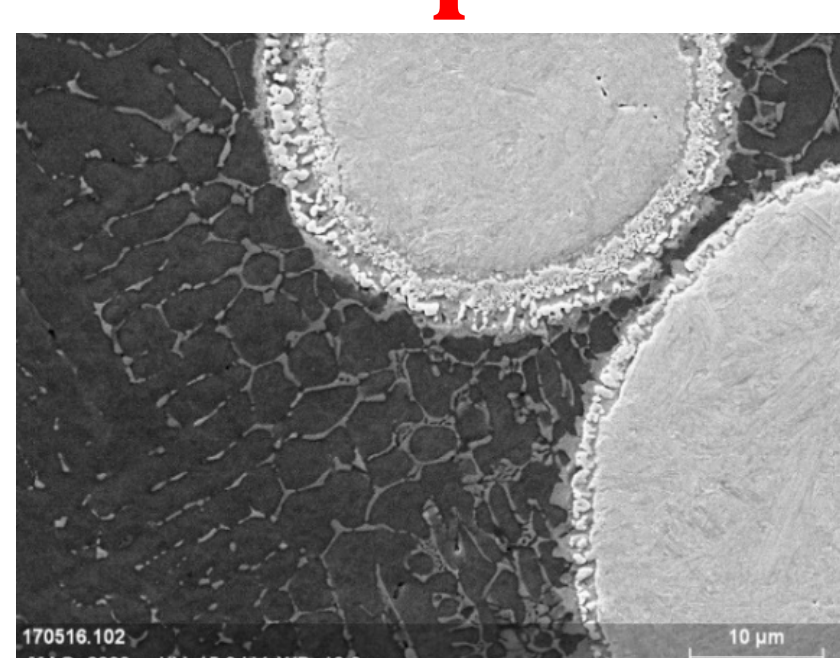
Selective Laser Melting (SLM)-(Sirris)



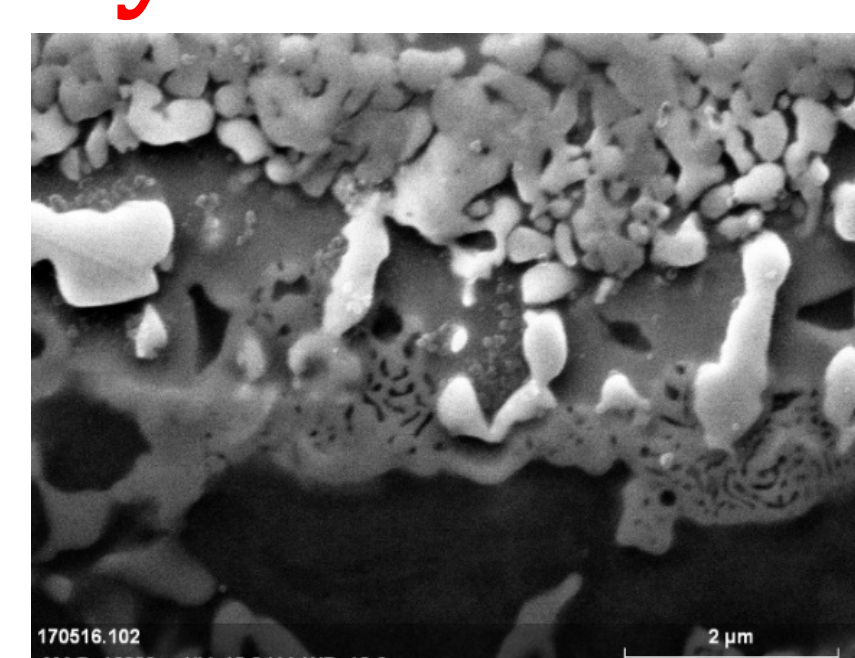
Fine metal powders are fully melted layer by layer in
thicknesses from 20 to 100 μm to achieve 3D structures

STUDY ON

316L+XC composite produced by LC

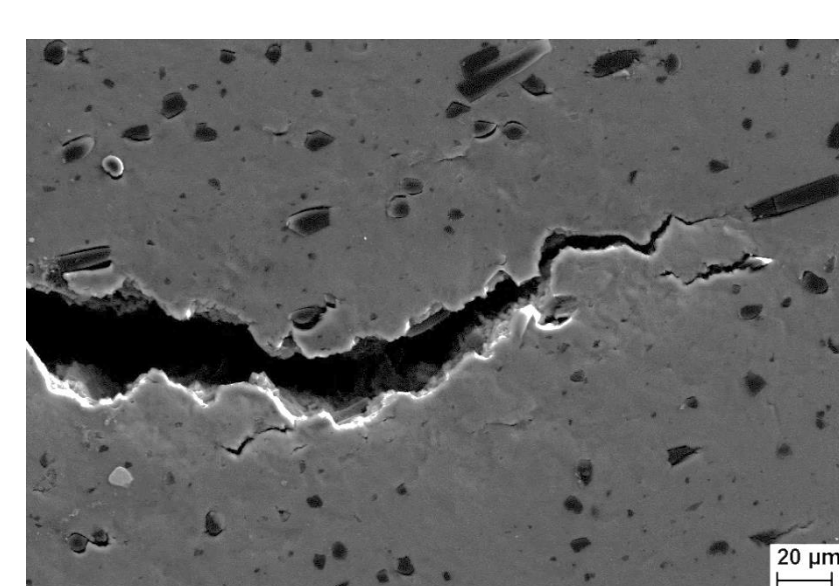


Dissolution of the
reinforcements by reactions
with the metallic matrix

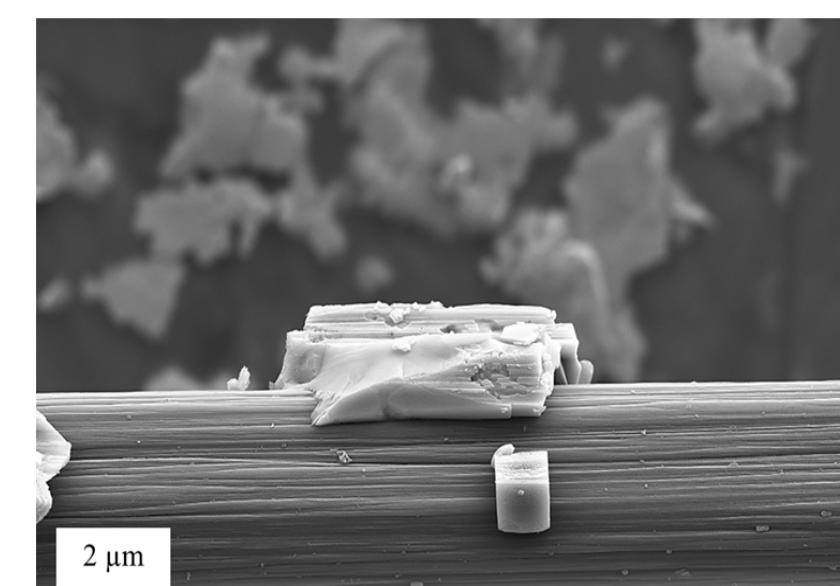


Formation of several phases
by ultra-fast cooling

Carbon Magnesium Composites

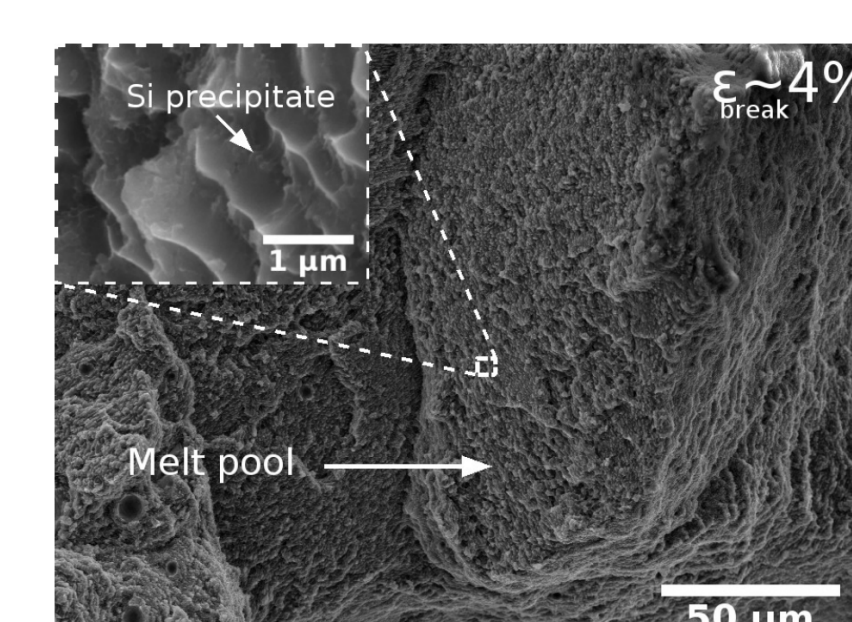


Crack propagation
on C-Mg composite

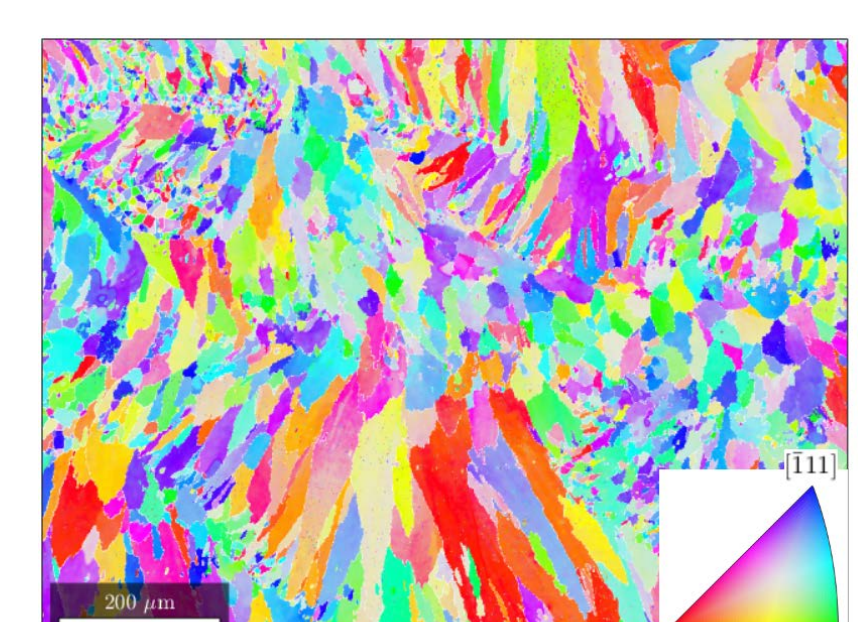


C fiber pretreated with
 K_2ZrF_6

AlSi10Mg produced by SLM



Ductile fracture
after traction test



Columnar grain structure

All publications by the MMS unit are available at www.orbi.ulg.ac.be