

Development and characterization of metal coatings



materize

Scientific Expertise Beneficial to Business

Dr.phys.Krišjānis Šmits



40 Years of Expertise



Materials for electronics
and photonics



Thin films and coating
technologies



Nanomaterials
and ceramics



Theoretical modelling
and design



Materials for energy
harvesting and storage

Materize context

- Based in Latvia (EU, NATO)
- **Strong national innovation** eco-system player
- Strongest national materials research and innovation center
- **40 years** in material science from complex oxides to organic semiconductors
- Deep expertise in spectroscopy
- Prototyping laboratory with 680 m² of **ISO class 7-8 cleanroom** facility
- 200 employees / **110** in Photonics / **90 PhD**



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Materize

Institute of Solid State Physics UL industry collaboration and innovation platform

- **Single point of contact** customer experience
- Talk with industry in **business language**
- **Pro-active** business / industry style projects management

- Clear message -
We make Scientific Expertise Beneficial to Business

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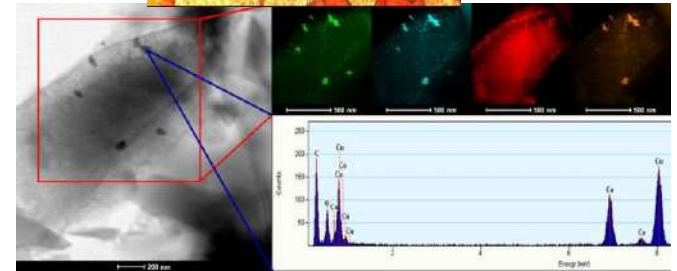
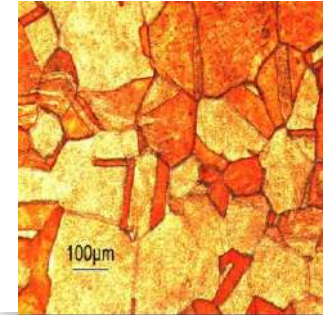
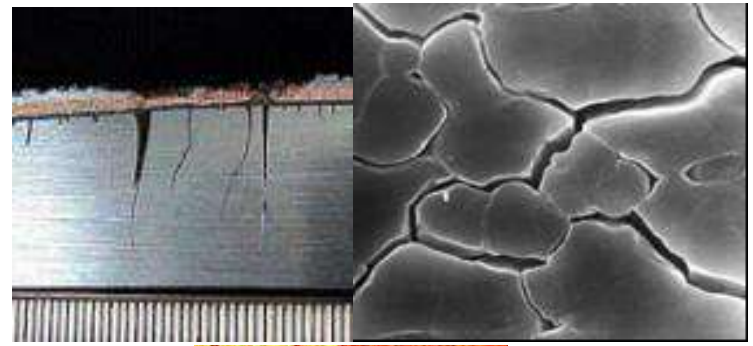


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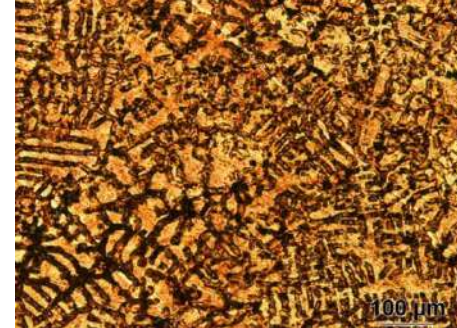
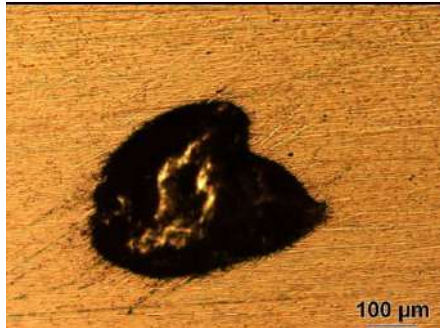


Characterisation methods

- MACHINING (cutting, polishing)
- STRUCTURE DETERMINATION (XRD, ED, Raman)
- CHEMICAL ANALYSES (EDX,XRF,XPS...)
- METALLOGRAPHICAL STUDIES
(OM, AF, SEM, TEM, Hardness measurements)
- Heat treatment

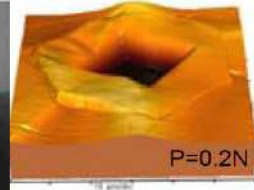
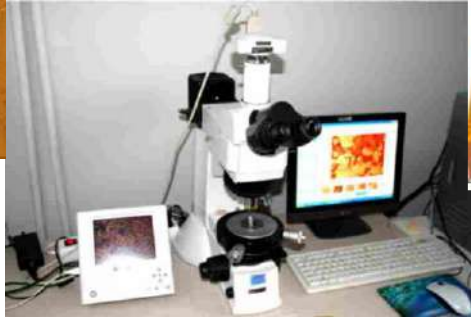


CUTTING, GRINDING, POLISHING, ETCHING

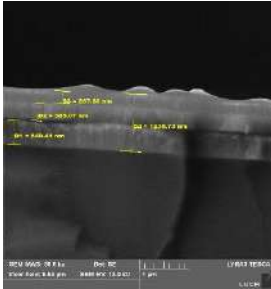


MICROSCOPY

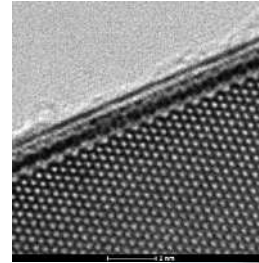
OM



AFM



SEM



TEM

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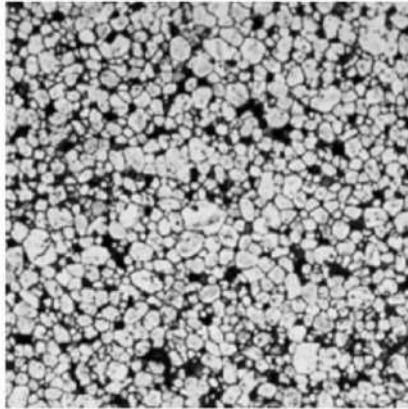


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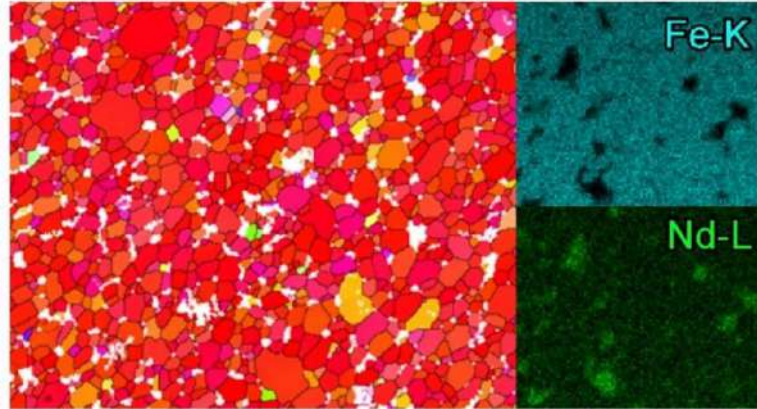
MICROSCOPY

Grain Size Quantification

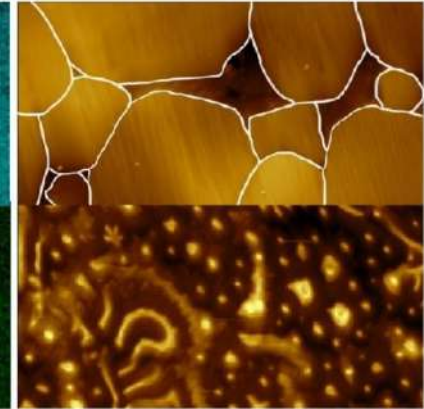
OM



SEM-EBSD/EDS



AFM/MFM



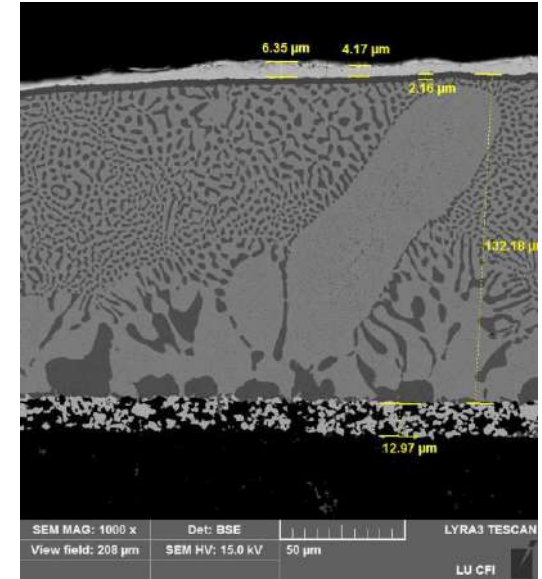
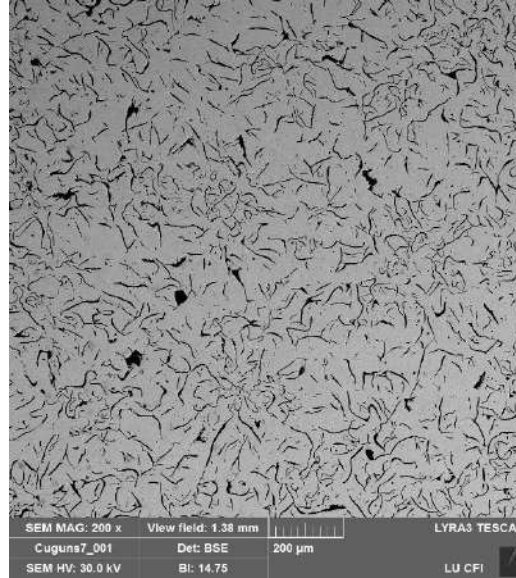
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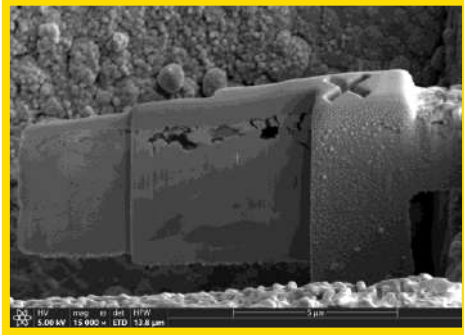
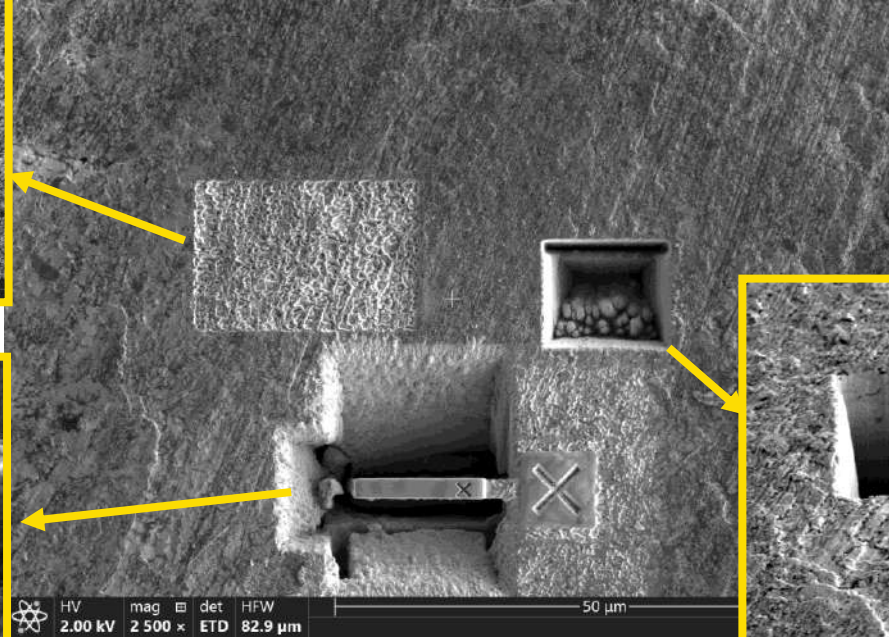
Failure analysis

Quality tests

Reverse Engineering



Characterisation and treatment (inside microscope)



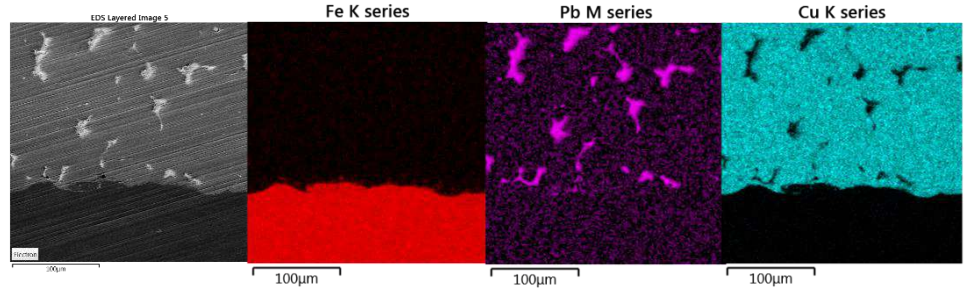
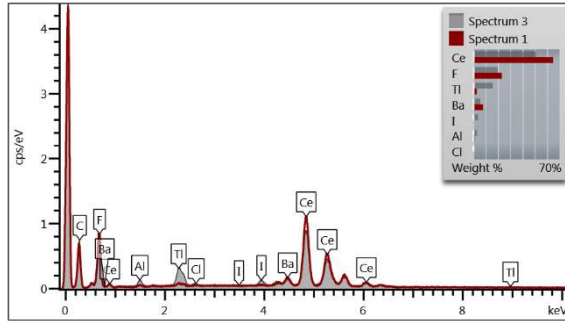
CHEMICAL ANALYSIS

EDS

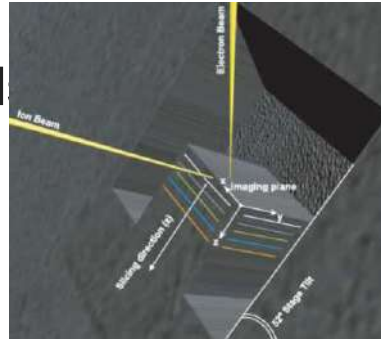
XRF

XPS

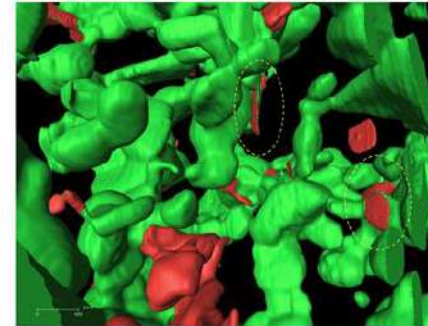
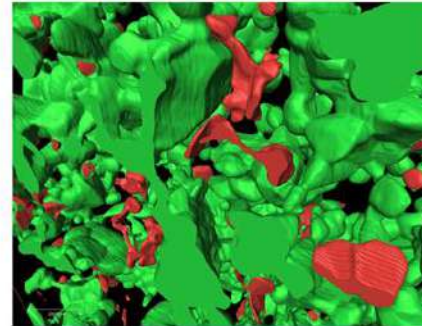
Wet chemistry method



Quantification using AVIZO software: SiC phase



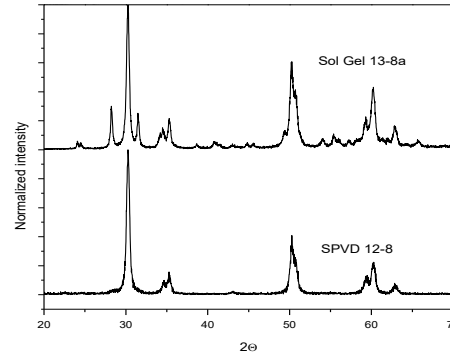
3D EDS



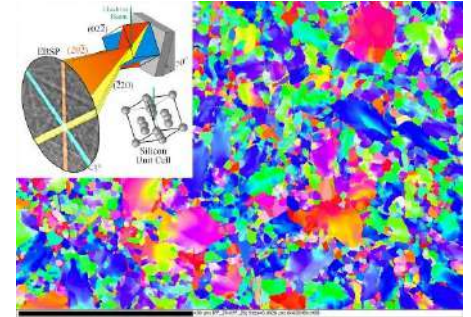
STRUCUTRE DETERMINATION



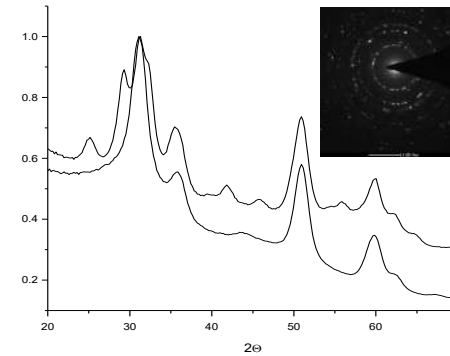
XRD



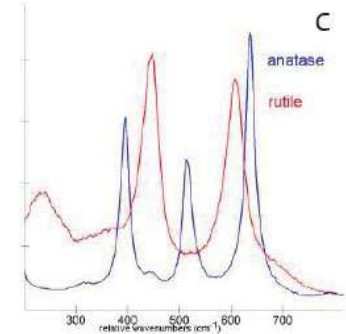
XRD



EBSD

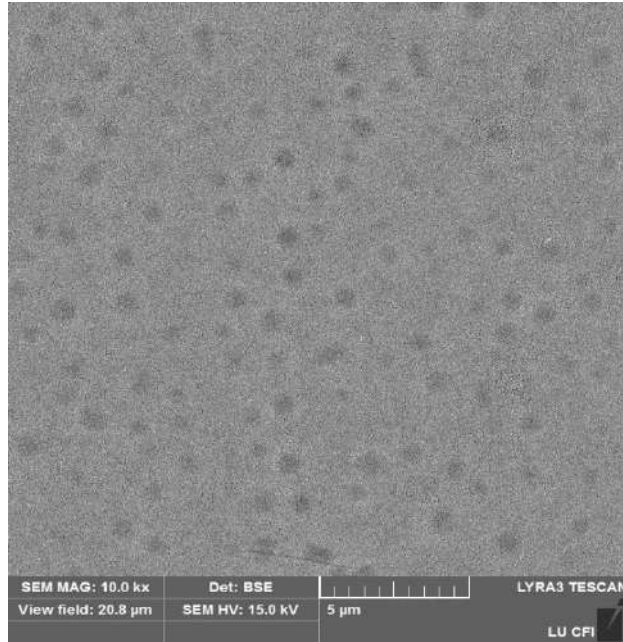


ED

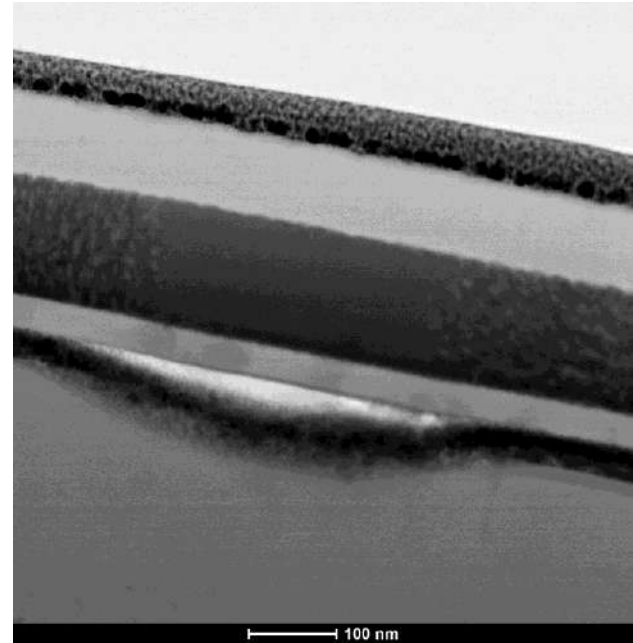


Raman

Example



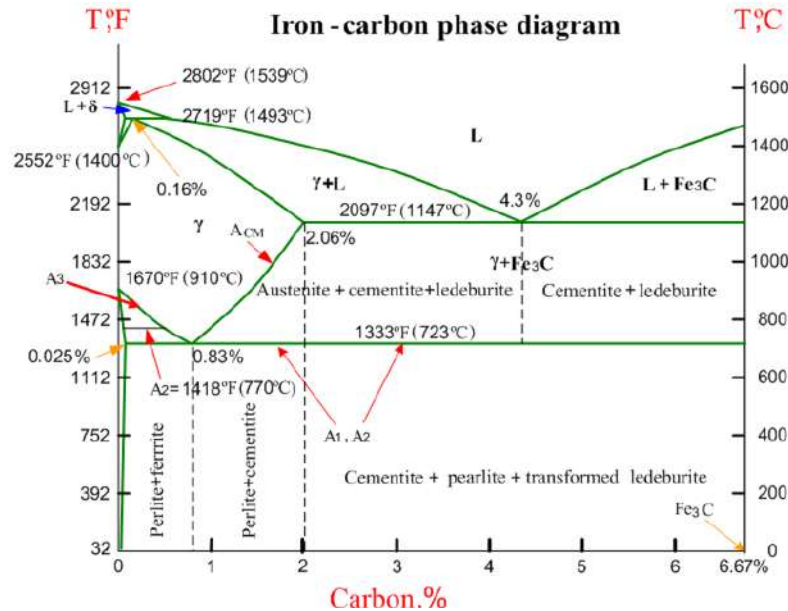
SEM



TEM

THERMAL TREATMENT

Up to 1800°C



Welcome to collaborate

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More on our expertise
and case studies

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Industry partners in photonics



EUROLCDs

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