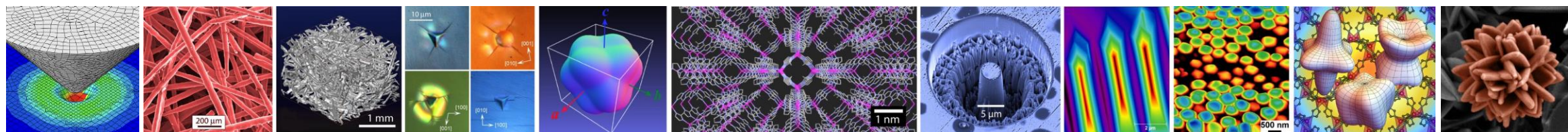


OXIMS = Oxford *In Situ* Microscopy and Spectroscopy Research Facility (SRF)

Alfredo Zafra

Jin-Chong Tan



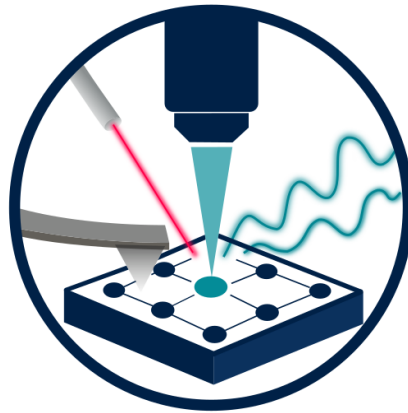
Fusion of two previous SRFs

LIMA

Laboratory for In-situ Microscopy and Analysis

MBLEM

Multi-Beam Laboratory for Engineering Microscopy



OXIMS

Oxford *In Situ* Microscopy & Spectroscopy Research Facility

Equipment available in OXIMS

Microscopy:

- TESCAN FIB-FEGSEM
- Zeiss ESEM

Characterisation:

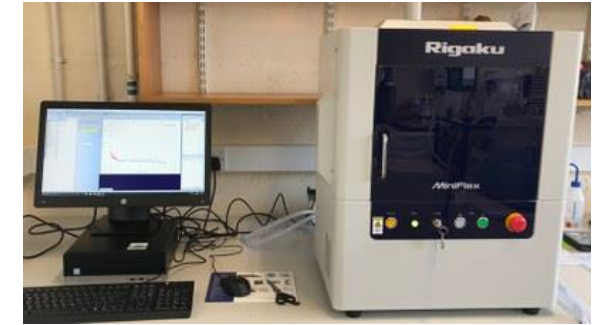
- AFM
- Raman
- XRD
- Nanoindentation

**With micro-mechanical stages to
conduct in-situ experiments**

AFM



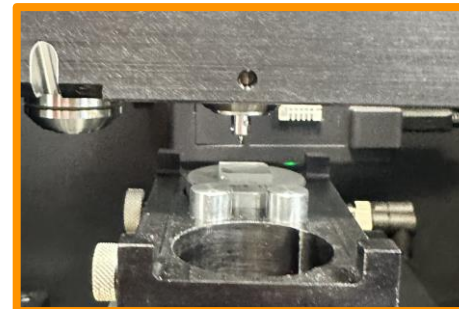
XRD



Raman



Nanoindenter



Scanning Electron Microscopes (SEM)

£85 / hr

£60 / hr

Tescan FIB-FEGSEM (dual-beam)

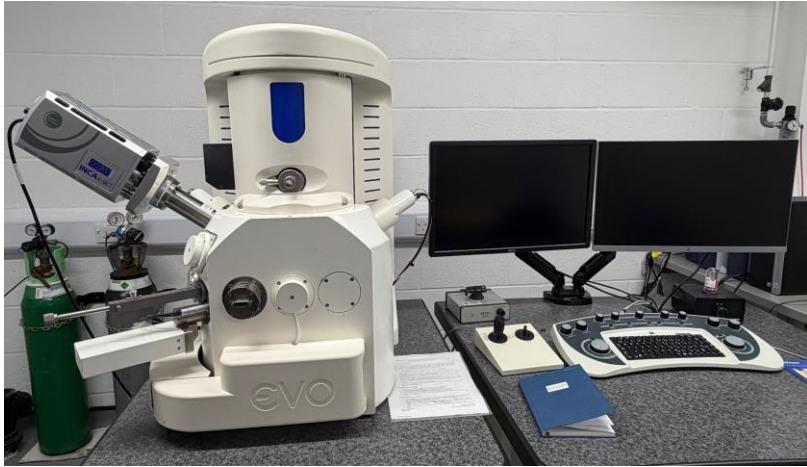
- Field emission gun (FEG) source $\Rightarrow$ **$\sim 10\text{-}100\text{ s nm}$ resolution**
- Focused ion beam (FIB) $\Rightarrow$ Ga^+ milling
- Many different detectors (SE, EBSD, BSD, EDS, STEM, ...)

Sputter coater

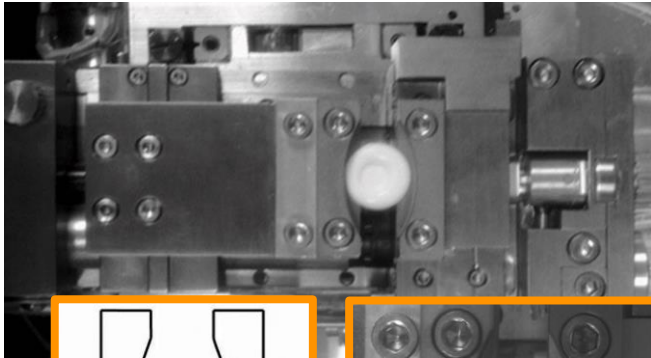
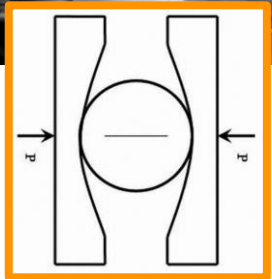
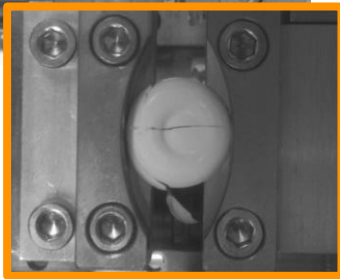
Zeiss Evo ESEM <LIMA>

- LaB_6 source $\Rightarrow$ **$\sim 1\text{ }\mu\text{m}$ resolution**
- Large chamber $\Rightarrow$ *in situ* Deben stages
- Variable pressure; SE, EDS, EBSD, BSD

Example applications: Zeiss Evo ESEM

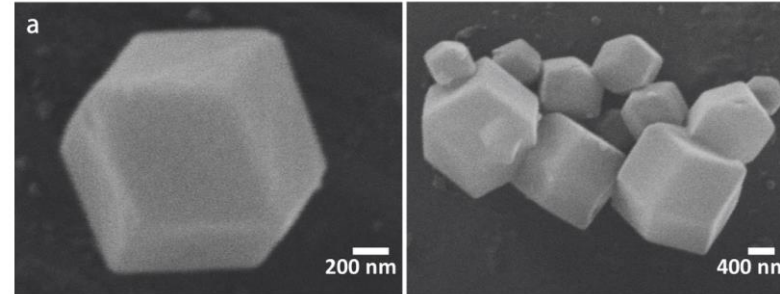


- *In situ* micromechanical testing

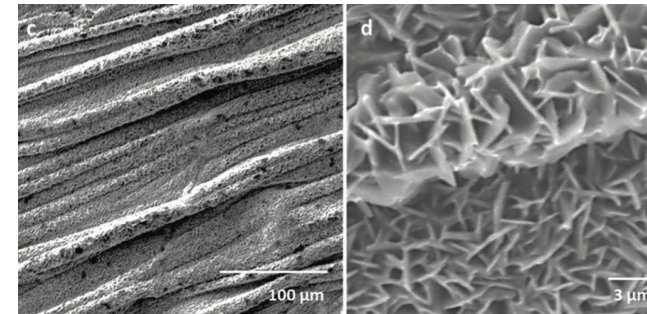


Microscopy & microanalysis, 2019

Secondary Electron (SE) $\Rightarrow$ Surface topography imaging

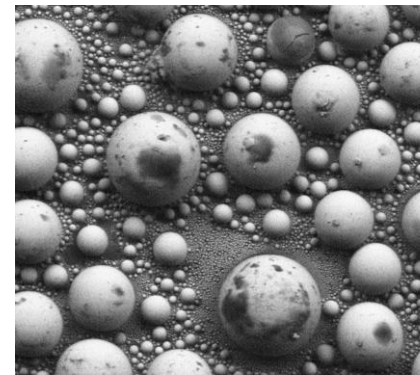
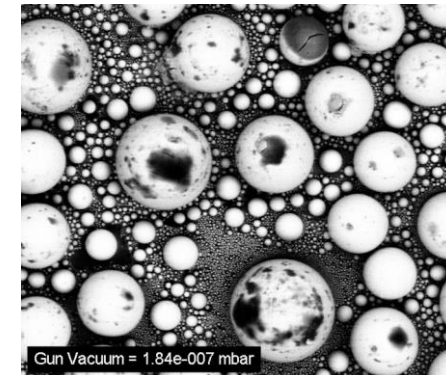


ACS Appl. Mater. Interfaces 2020, 12, 37477–37488



Adv. Mater. 29(2017) 1701463

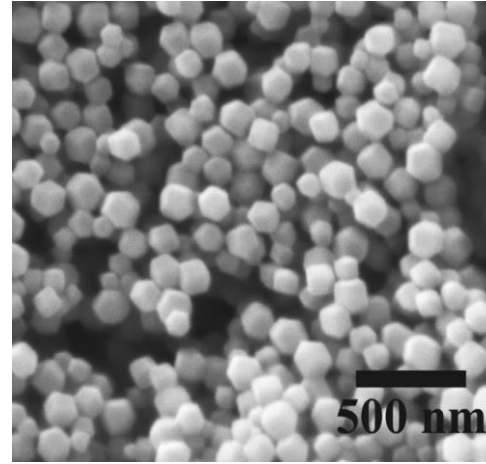
Backscatter Electron (BSE) $\Rightarrow$ Compositional imaging



Tin spheres
on C tape

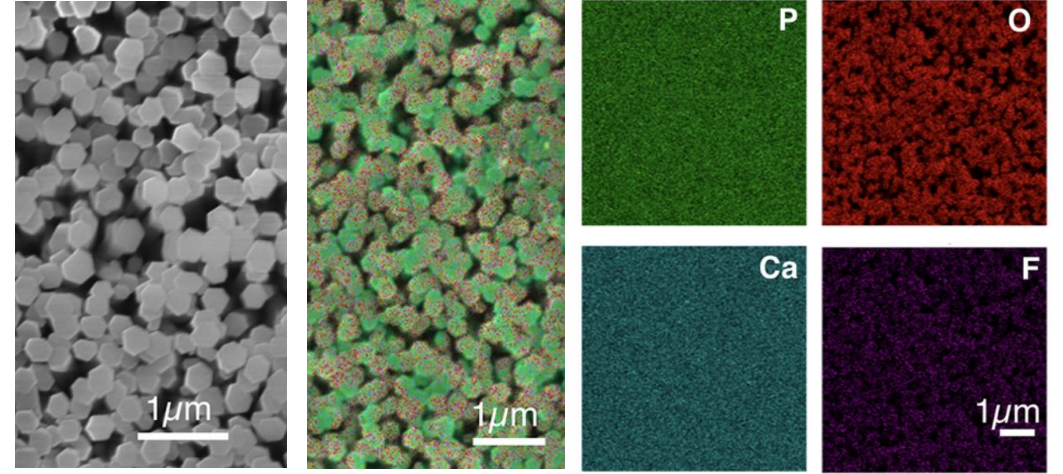
Example applications: Tescan FIB-FESEM

Nanomaterials

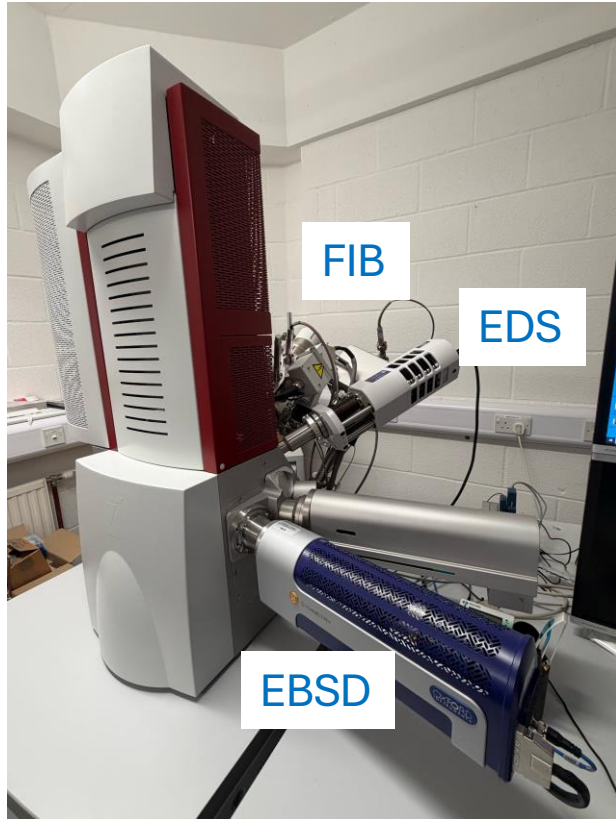


J. Membr. Sci. **498**(2016) 276–290.

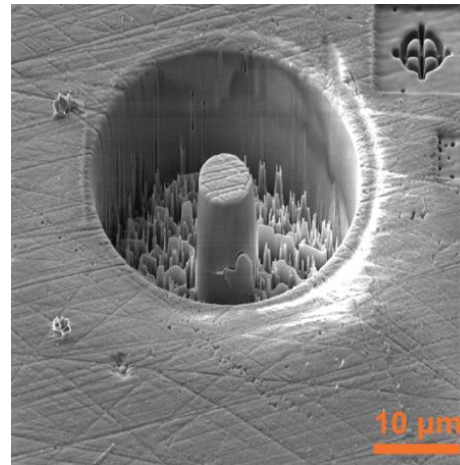
EDS



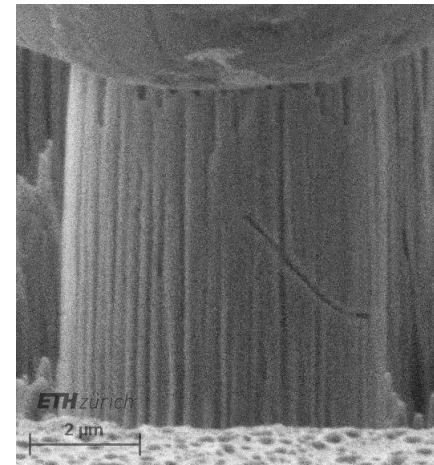
ACS Appl. Mater. Interfaces **17**(2025) 50505–50518.



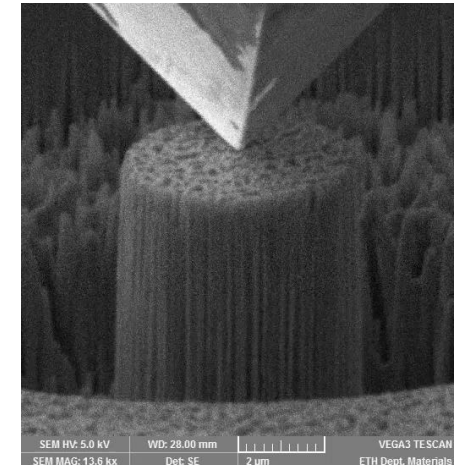
FIB: Micropillars



Comm. Mater. **4**(2023) 86.



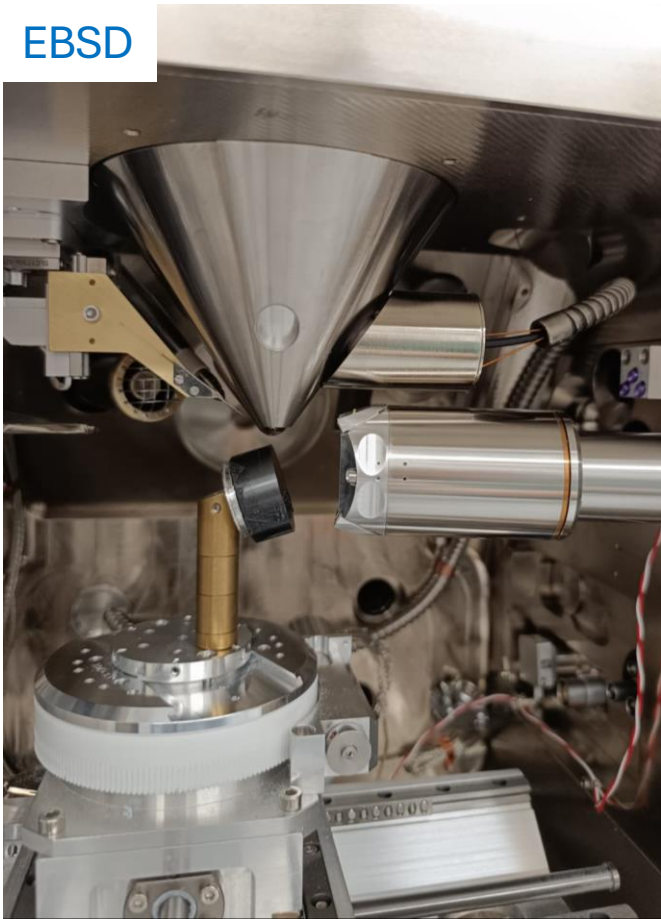
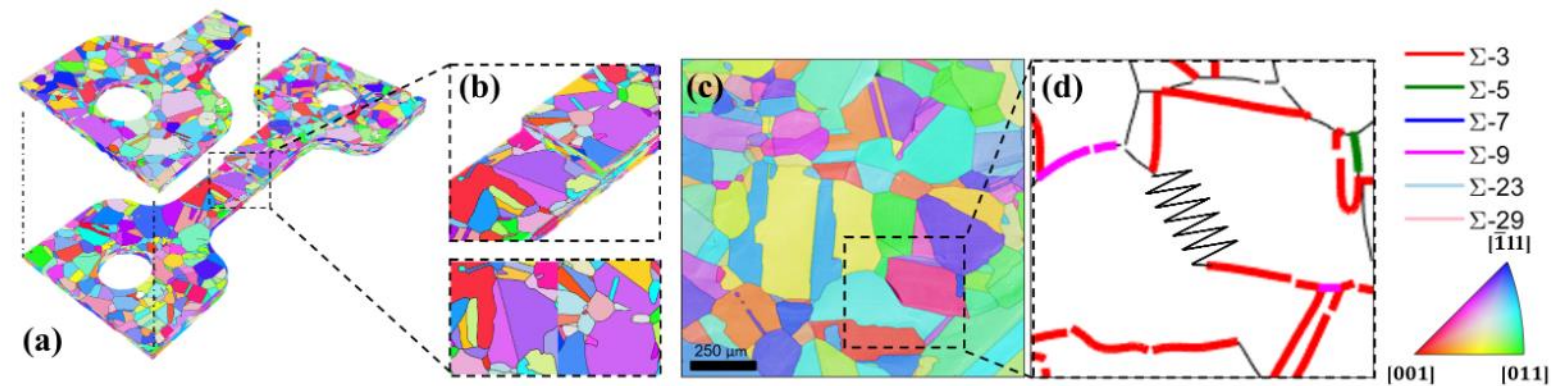
Commun. Chem. **6**(2023) 63.



Fracture toughness

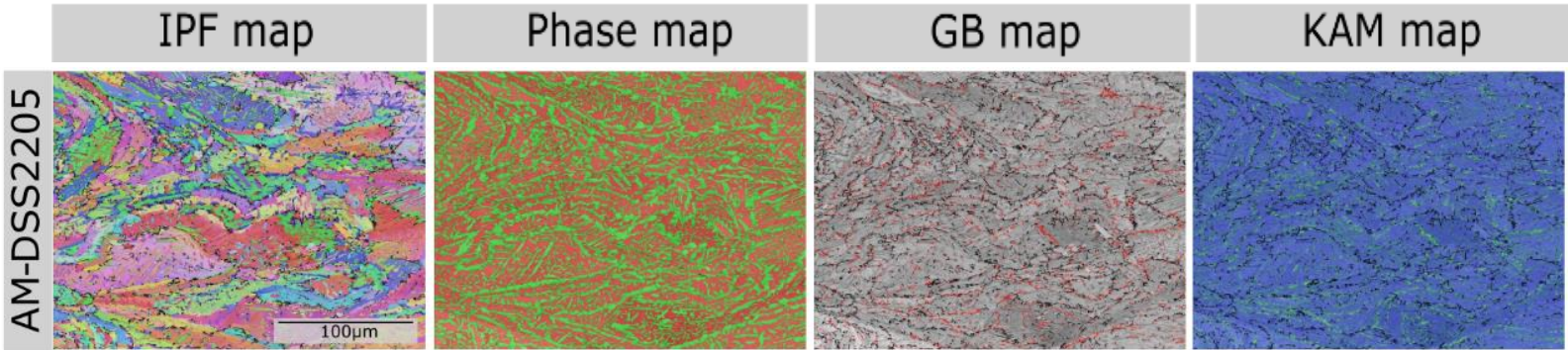
Example applications: Tescan EBSD

In-situ crack analysis during mechanical testing



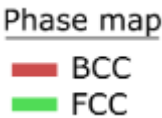
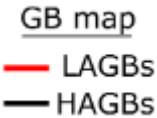
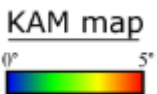
Mat. Sci. Eng. A 950 (2026) 149545.

Microstructural analysis



2-3 h / scan

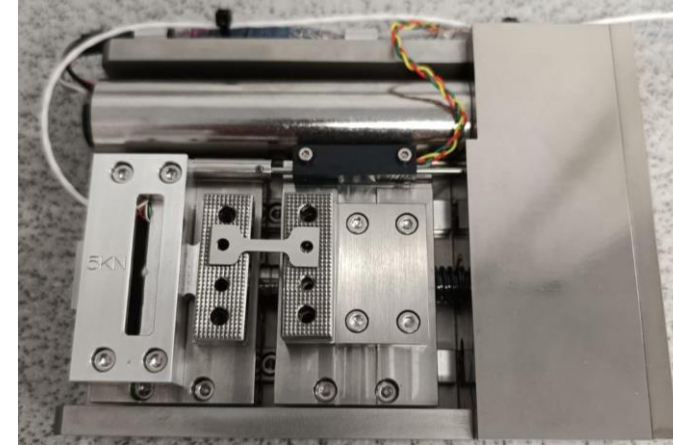
Unpublished



What makes our facility unique?

Unique capabilities:

- In-situ mechanical testing inside SEM
- Variable pressure microscopy / wet or non-conductive samples
- FIB+EBSD+EDS workflows
- Residual-stress measurements



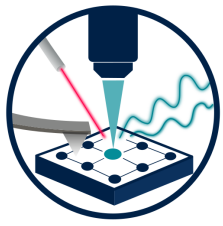
Easy access:

- Flexible personalised training
- Short waiting times
- Sample-preparation facilities

Competitive internal rates:

- TESCAN: Subscription plans: up to 20% off (£68/hr)
- Zeiss → Students in our department: 25% off (£45/hr)





OXIMS

Oxford *In Situ* Microscopy & Spectroscopy Research Facility

‘Training sessions in OXIMS with
department students’

Thanks!

Have a sample or an idea?
Come and talk to us.

