

Sample Preparation of Nanocomposites and Nanomaterials by *Ultramicrotomy*

a Powerful Alternative to FIB

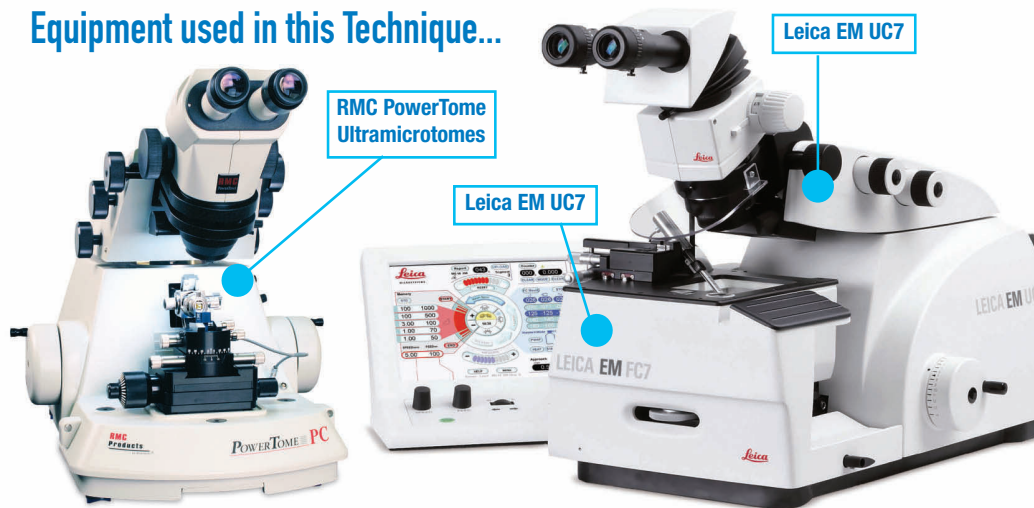
Join us at the **EMS Microscopy Academy** and learn the latest techniques to reveal internal structures of composites and polymers being investigated with transmission electron microscopy (TEM) and scanning transmission electron microscopy (STEM).

Sample preparation workflow will be illustrated using the Leica EM UC7 Ultramicrotome, its EM FC7 Cryochamber, and the RMC PowerTome Ultramicrotome. Differences between FIB (Focussed Ion Beam) and ultramicrotomy samples will also be covered.

Who can benefit from this alternative?

- Composite and polymer research companies - especially from the automotive and aviation industries
- Materials scientists already working with ultramicrotomy
- FIB users preparing TEM lamellas

Equipment used in this Technique...



DiATOME trimtool

Trimming of epoxy and acrylic embeddings, polymers and non-ferrous metals

DiATOME cryo

sectioning of cryo-protected specimens, frozen hydrated specimens and industrial samples such as polymers and rubber.

DiATOME ultra AFM

Surface sectioning for AFM investigation

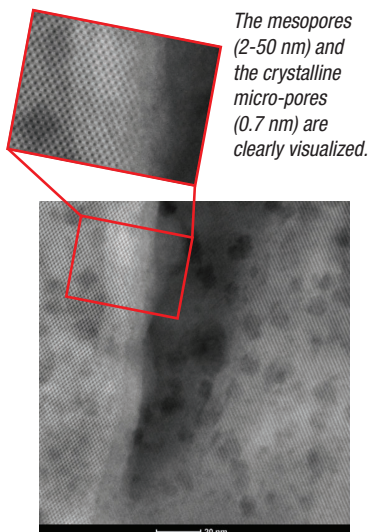
DiATOME ultra sonic

Rigid polymers such as PS, PMMA, ABS, HIPS, modified PP, etc.



Applications...

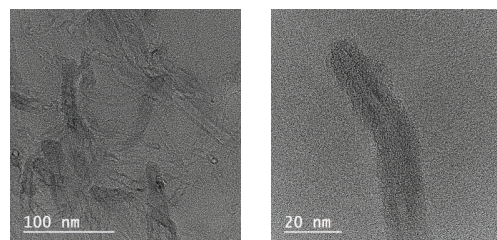
Zeolite USY30 Crystal morphology STEM analysis



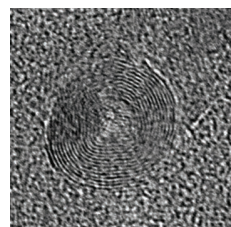
[110] Tom Willhammar, Sara Bals, EMAT Antwerpen

The mesopores (2-50 nm) and the crystalline micro-pores (0.7 nm) are clearly visualized.

Epoxy loaded with amino-functionalized CNTs TEM analysis



Good preservation of the interphase



Gravitational stroke!

Mert Kurttepe, Sara Bals, EMAT Antwerpen

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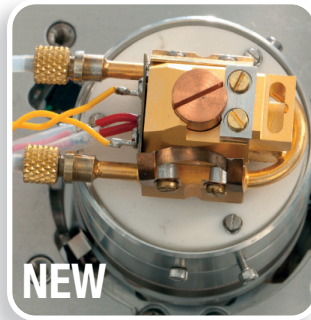
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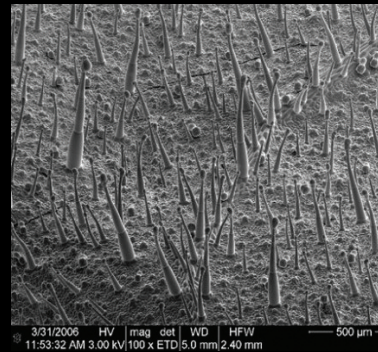
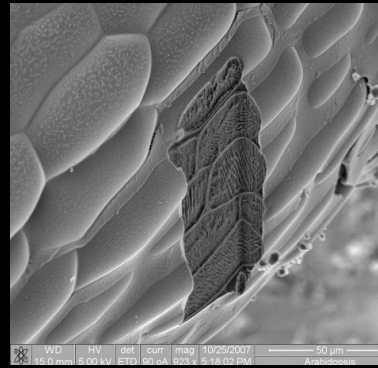
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PP3006 CoolLok

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- Rapid specimen freezing option
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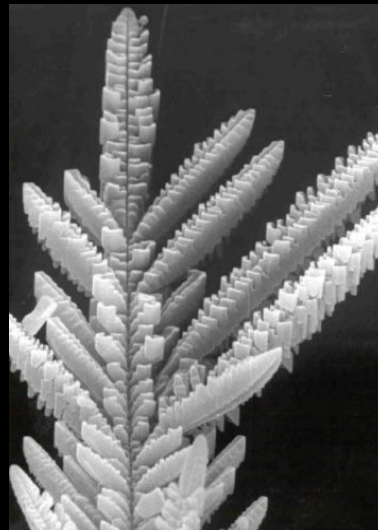
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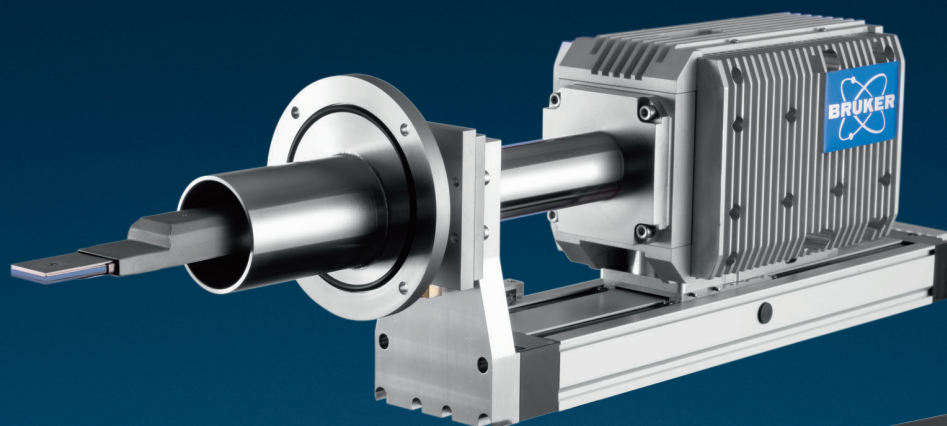




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Someone has to be first.

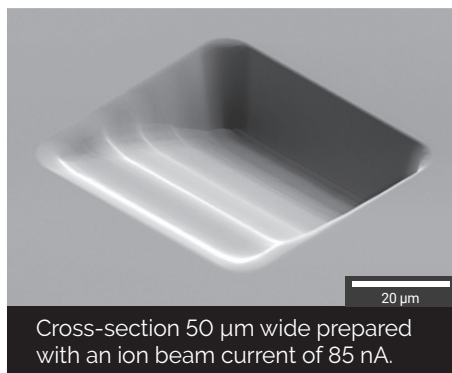
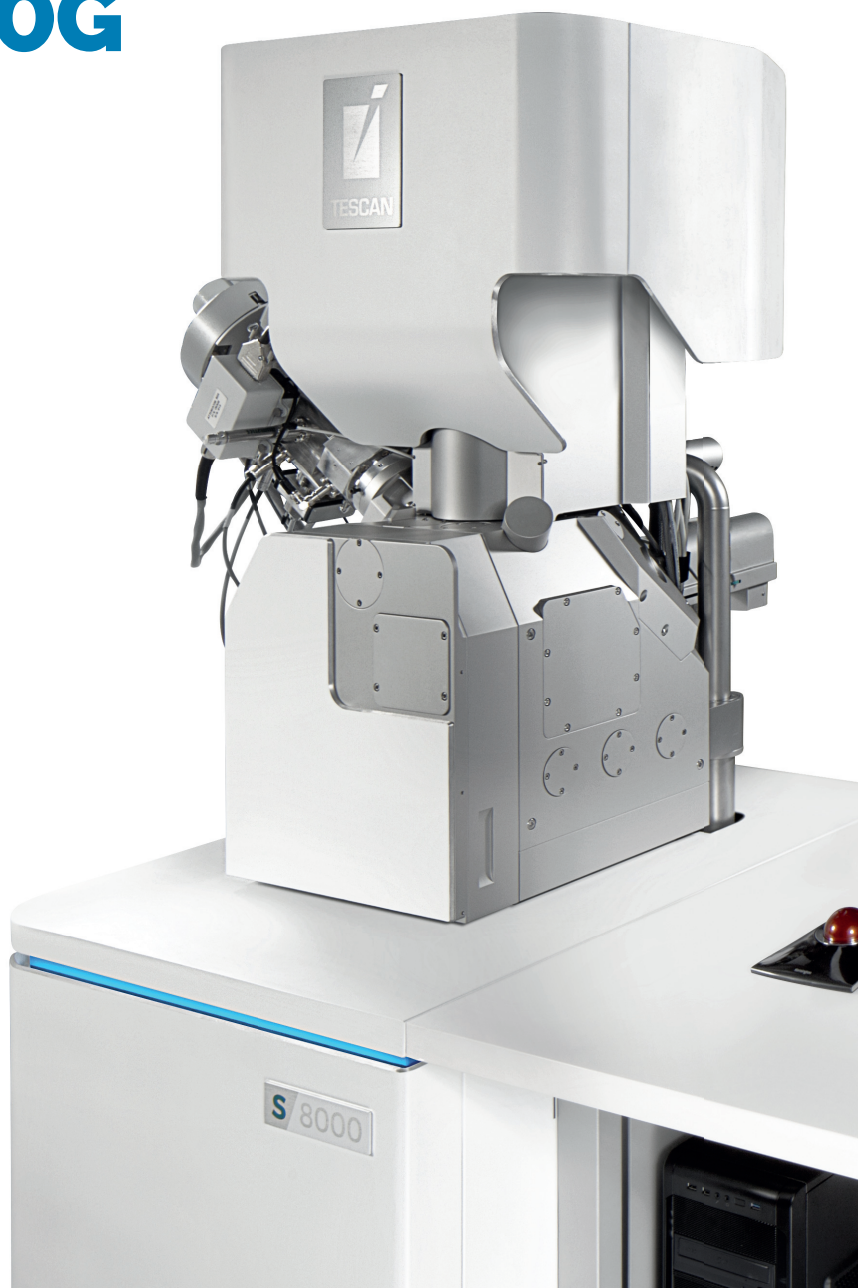


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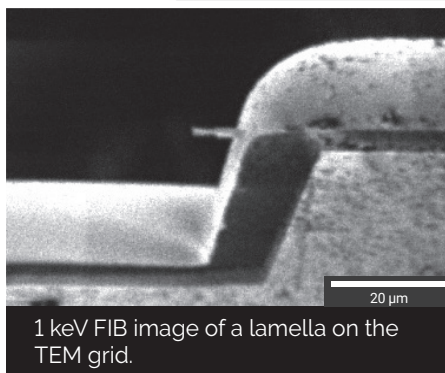
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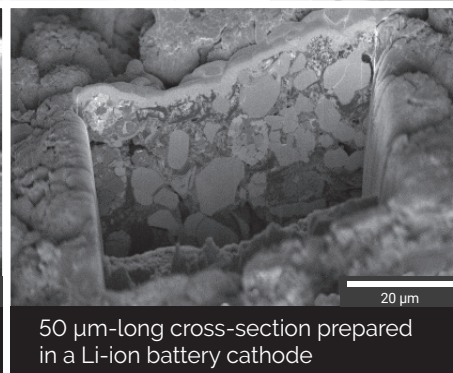
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Cross-section 50 μm wide prepared with an ion beam current of 85 nA.



1 keV FIB image of a lamella on the TEM grid.

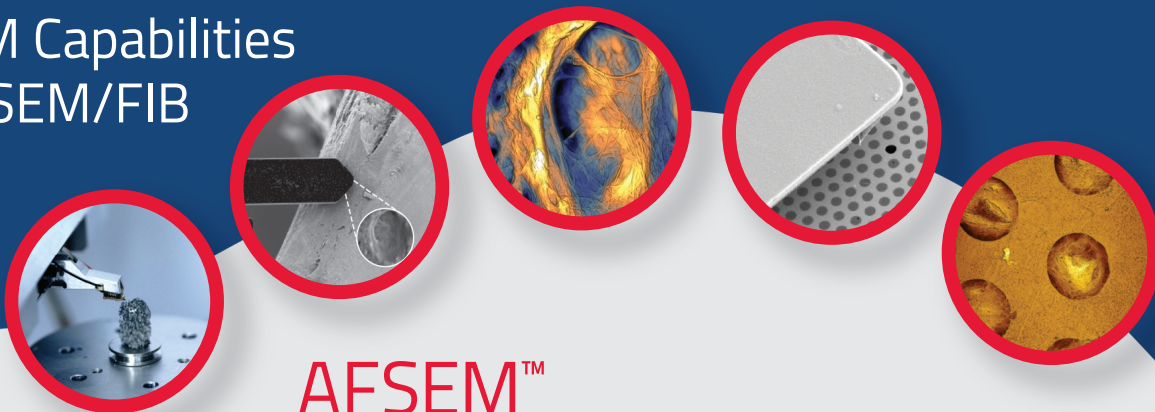


50 μm-long cross-section prepared in a Li-ion battery cathode



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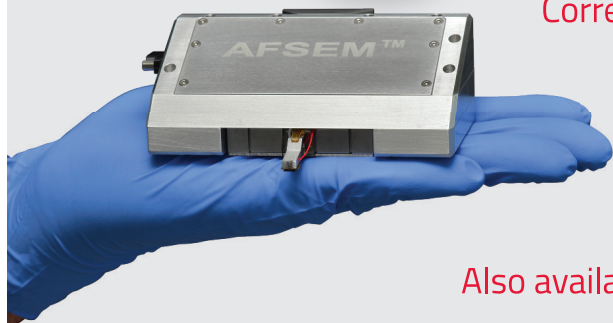


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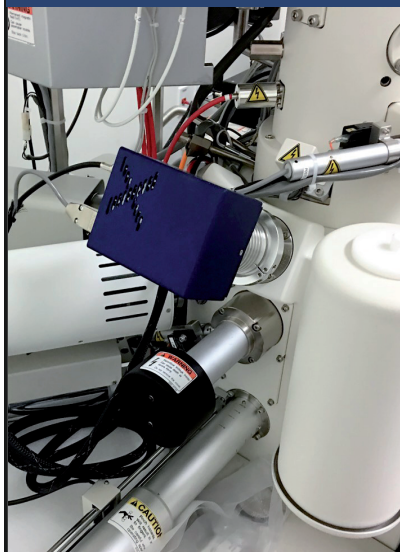


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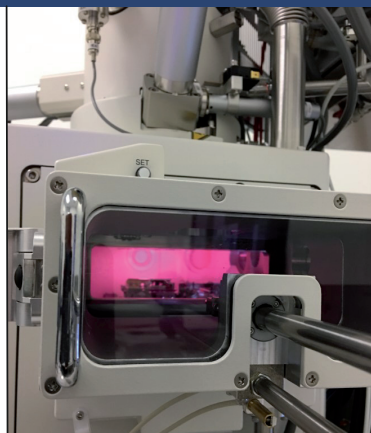
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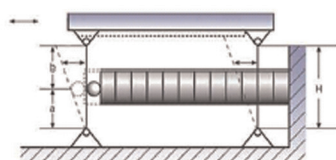
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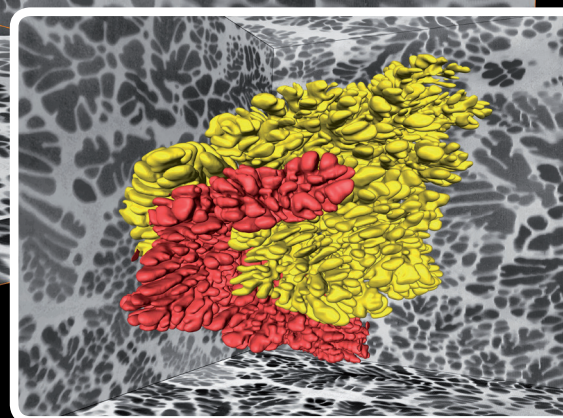
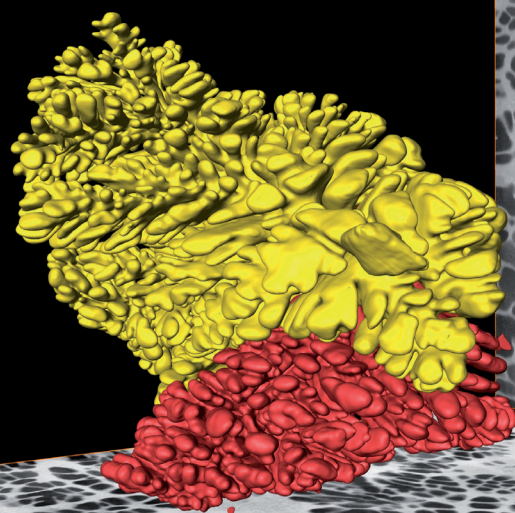
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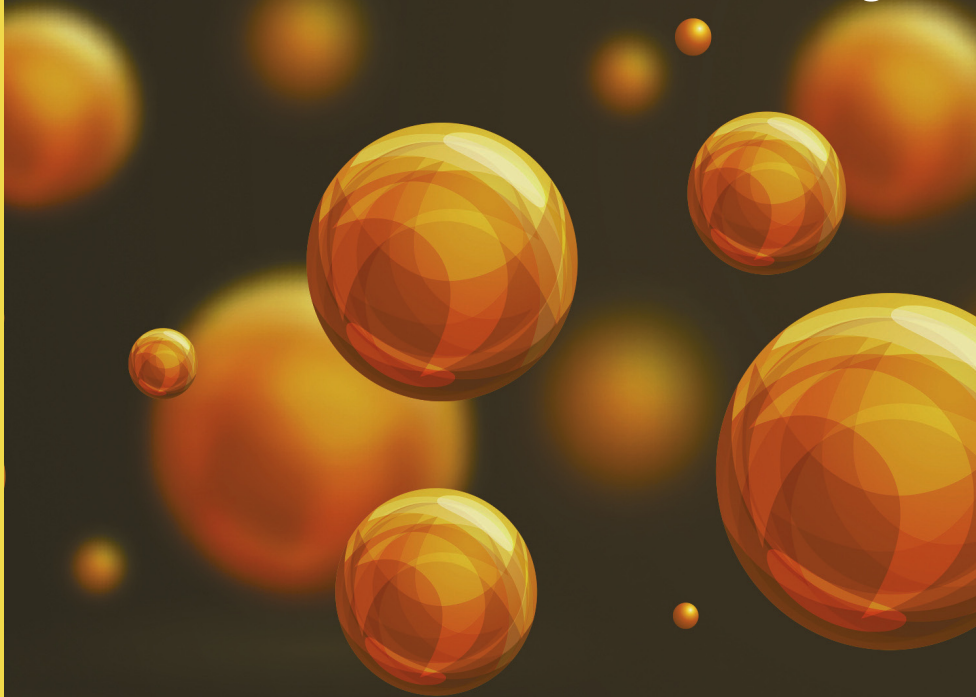
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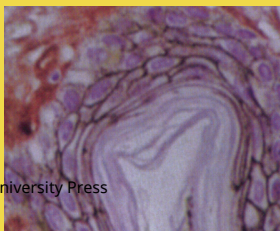
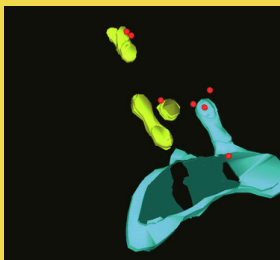
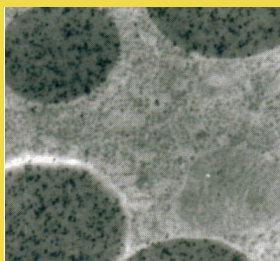
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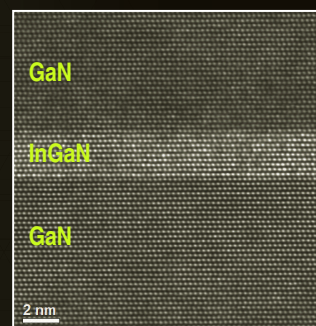
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