

SEM - Zeiss EVO 50

Date: 2019-07-12

Tags: Training 01/07/2019Synth SEM PSD EDX EVO50

Created by: James Bird

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Goal : Train on microscope by identifying characteristic morphology of dropcast nanoparticles in suspension and practice using energy-dispersive X-ray spectroscopy (EDX)

Procedure :

- Samples (see Experiment SEM stub preparation for PSD) loaded into SEM chamber and vacuum acquired ($< 1.3 \times 10^{-4}$ mbar)
- EDX working distance (WD) should be $9 < \text{WD} / \text{mm} < 15$
- 20 kV accelerating voltage set for electron beam
- Working distance either 20.5 or 21 mm (outside of proposed WD for EDX)
- Secondary electron detection only (Everhart-Thornley)

Results :

- Saw typical 'coffee stain' structure at low magnification (50 x) where concentric circles visible around a core where the majority of suspended particles collect. Symptomatic of accelerated drying procedure and too high suspension concentration.
- Apparently much MAX phase present, appearing as brighter crystals atop dark, continuous MXene base. Failed to track samples so could be viewing sediment from 01/07/2019 synthesis
- Some dispersed MXene particles (dark on light silicon background) visible with micron-scale lateral dimensions (and smaller) at higher magnification of $\sim 3,000 \times$
- Unable to image clearly at higher magnification due to poor selection of imaging conditions
- Quick linescan with EDX (under non-ideal conditions) showed aluminium presence in the crystals described above, alluding to unetched MAX phase presence

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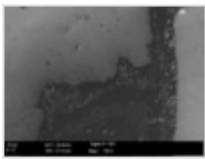
Attached files

EDX-First-SEM-EVO50-Unknown-MXene.docx

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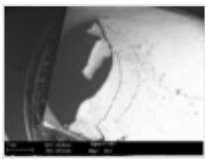
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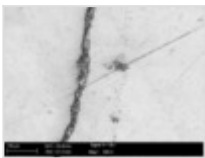
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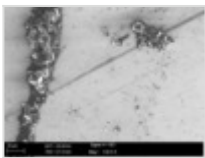
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Unknown-MXene03.tif

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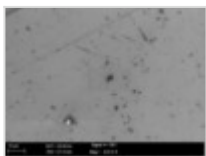
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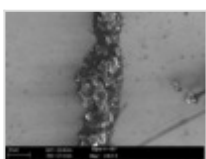
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Unknown-MXene05.tif

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Unique eLabID: 20221005-c254706af3bda140a3cfc8945a1d7a8c9d74f0d4

Link: <https://frankel-elab.manchester.ac.uk/experiments.php?mode=view&id=5>