

SEM - Zeiss Ultra 55 I

Date: 2020-03-13

Tags: SEM PSD 14/01/2020Synth Ultra55

Created by: James Bird

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Goals :

- Obtain SE micrographs of dropcast Ti_3C_2 from which particle-size distribution analysis can be carried out
- Use improved resolution of this microscope to image strata of MAX phase and gain additional insight into vacuum oven-dried film microstructure

Procedure :

- Samples (see [\[Experiment\] SEM stub preparation for PSD VI](#), [\[Experiment\] SEM stub preparation for film characterisation I](#) & [\[Experiment\] SEM stub preparation for film and MAX phase characterisation](#)) loaded into SEM chamber and vacuum acquired
- 1.5 or 5 kV accelerating voltage set for electron beam
- WD ~ 3, 4 or 8 mm (AWD \pm 6 mm)
- Everhart-Thornley secondary electron (SE) and in-lens SE detectors employed

Results :

Sample	Filename prefix
Ti_3AlC_2 MAX phase particles ([Experiment] SEM stub preparation for film and MAX phase characterisation)	Ti MAX pow
Vacuum oven-dried Ti_3C_2 film ([Experiment] SEM stub preparation for film characterisation I)	Ti MXene vac film
Dropcast Ti_3C_2 nanoparticles ([Experiment] SEM stub preparation for PSD VI)	Ti3 flakes

Again, use of the combination of the two detectors at low (1.5 kV) accelerating voltage and short WD (2.6 mm) demonstrates the excellent resolution obtainable in this FEG-SEM system. Strata/lamellar structures are visible in the MAX phase particles, although sample charging (streaking) is evident in some micrographs. Little new was observed in the vacuum oven-dried film samples. Micrographs suitable for PSD determination were obtained.

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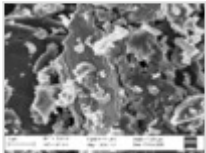
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Attached files

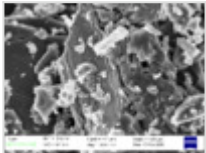
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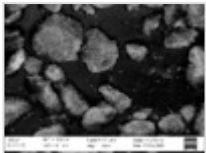
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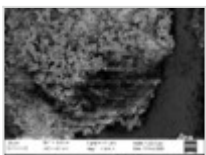
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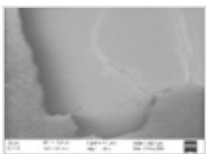
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Ti-MXene-vac-film00.tif

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Ti-MXene-vac-film01.tif

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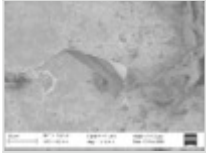
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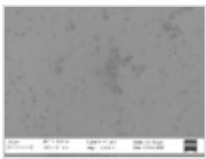
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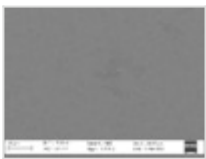
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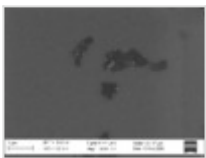
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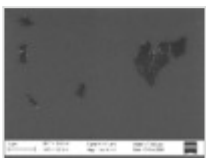
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Ti3-flakes-most-conc04.tif

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Link: <https://frankel-elab.manchester.ac.uk/experiments.php?mode=view&id=55>