SEM - Zeiss Ultra 55

Date: 2020-02-07
Tags: *Training SEM PSD 14/01/2020Synth Ultra55 Oxidation*
Created by: James Bird

Goal : Obtain SE micrographs of dropcast Ti_3C_2 **from which particle-size distribution analysis can be carried out**

Procedure :

- Samples (see [Experiment] SEM stub preparation for PSD V) loaded into SEM chamber and vacuum acquired
- 1.5, 5 or 10 kV accelerating voltage set for electron beam
- WD between 2.6 or ~ 6 mm (AWD 6 mm)
- Everhart-Thornley secondary electron (SE) and in-lens SE detectors employed.

Results :

Sample	Filename prefix
2.364 x 10^{-4} wt% dropcast Ti_3C_2 suspension (see Sample #5 in [Experiment] UV-Visible Spectroscopy for concentration calculation)	Ti3_2.3e-4_wt%

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Each micrograph obtained with the conventional SE detector has a matching counterpart captured with the in-lens SE detector, which bears a suffix increment. 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 obtained with each in this FEG-SEM system. Conventional Everhart-Thornley detection gives clear, predominantly topographical contrast, whilst the in-lens detector gives predominantly phase contrast. Faceted, bright particles are visible atop particles exhibiting typical MXene nanoparticle morphology. Considering the brighter particle location, distribution and the fact that this MXene was produced 3.5 weeks earlier and dropcast for SEM analysis 2.5 weeks prior, it is presumed these particles are nanoscale titania.

Micrographs for PSD collection were not obtained.

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Attached files

Ti3_2.3e-4_wt_TiO2_03.tif
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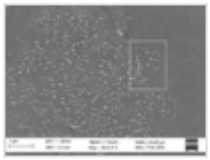

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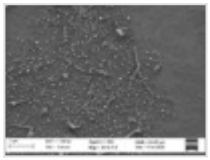

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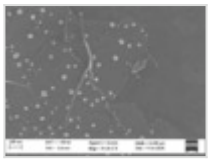

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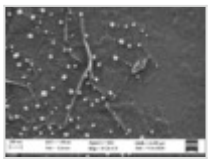

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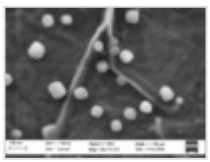

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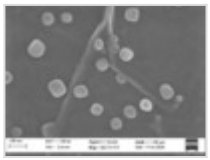

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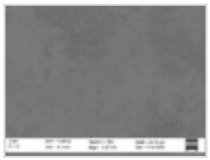

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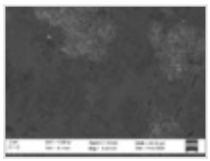

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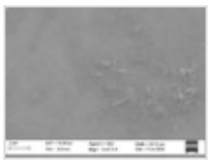

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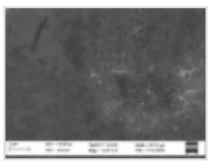

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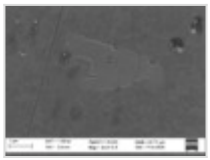

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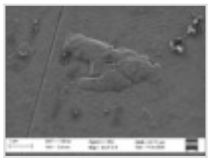

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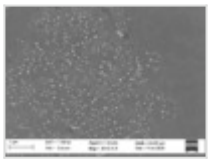

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