

SEM - FEI Quanta 200 III

Date: 2020-01-29

Tags: SEM 07/10/2019Synth Quanta200 14/01/2020Synth

Created by: James Bird

1 / 6

Goals :

- Obtain micrographs to reassess vacuum oven-dried film homogeneity with a combination of backscatter and secondary electron detection
- Obtain SE micrographs from which a particle-size distribution analysis can be carried out

Procedure :

- Samples (see [\[Experiment\] SEM stub preparation for film characterisation I](#) and [\[Experiment\] SEM stub preparation for PSD V](#)) loaded into SEM chamber and vacuum acquired
- 3, 5, 8 or 10 kV accelerating voltage set for electron beam
- WD between 6 and 10 mm
- Everhart-Thornley secondary electron (SE) and back-scatter electron (BSE) detectors employed.

Results :

Note that the concentration mismatch between that given in sample definition and filename prefix derives from an earlier miscalculation. Concentrations given in sample column are correct.

Sample	Filename prefix
Vacuum-oven dried film	vac_oven_dried_film
Dropcast Ti_3C_2 suspension at 1.3×10^{-3} wt% (Sample #3 in [Experiment] UV-Visible Spectroscopy for concentration calculation)	0.01wt
Dropcast Ti_3C_2 suspension at 4.8×10^{-4} wt% (Sample #4 in [Experiment] UV-Visible Spectroscopy for concentration calculation)	0.003wt
Dropcast Ti_3C_2 suspension at 5.5×10^{-3} wt% (Sample #2 in [Experiment] UV-Visible Spectroscopy for concentration calculation)	0.05wt

SEM - FEI Quanta 200 III

Date: 2020-01-29

Tags: SEM 07/10/2019Synth Quanta200 14/01/2020Synth

Created by: James Bird

2 / 6

Film imaging

Silver particles appear bright and agglomerated in both BSE and SE imaging. BSE imaging with electron beam acceleration voltage at either 5 or 8 kV didn't show areas of contrast within the vacuum oven-dried film as had appeared previously. Use of silver DAG to prevent charging of the film and hence streaking of the image appeared to be successful.

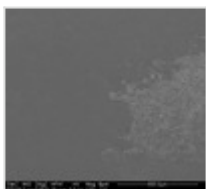
Dropcast samples

Artefacts present on drop-cast samples presumed to be due to sample preparation issues - incomplete cleaning of silicon substrate prior to dropcast deposition leaves streaks. Failed to get images at high resolution and/or with reasonable contrast and brightness for particle identification.

Attached files

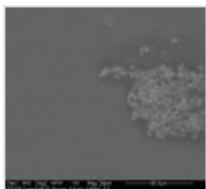
vac_oven_dried_film_SE_001.tif

sha256: 192df6acc34068b74b080c60da7398ef52af0f0940f17894be9b55a50fe07334



vac_oven_dried_film_SE_002.tif

sha256: 4fc7e349ed4e2a403f995dddb5f89fa021d5deaa58fe01905bb2a4c5a88da7ff



vac_oven_dried_film_SE_003.tif

sha256: a0498ab7023738b95b5942bc5cf568c240bfe6f4f91834ac246afd701169e670

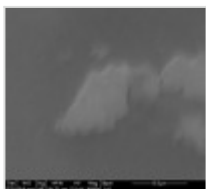
SEM - FEI Quanta 200 III

Date: 2020-01-29

Tags: SEM 07/10/2019Synth Quanta200 14/01/2020Synth

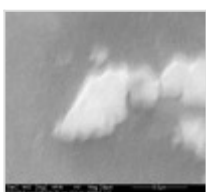
Created by: James Bird

3 / 6



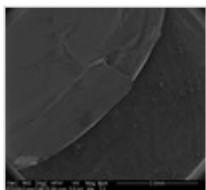
vac_oven_dried_film_SE_004.tif

sha256: 6a47b2e4b28276cdb86f4e38b683458b5a7c2140021ba315304ffbd8fb1dcb75



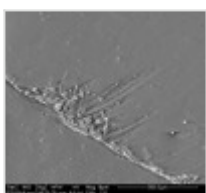
vac_oven_dried_film_SE_005.tif

sha256: 47e014f2afa8121879cd68c13b6939a3f34ea5b0daa48a6b424438bb23bc9bdb



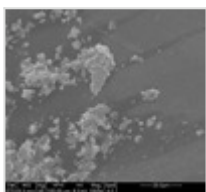
vac_oven_dried_film_SE_006.tif

sha256: 5ad8abb60bafc27d317359f56148e4bdeb4dff41719d3a3e1ab7c3f124210cad



vac_oven_dried_film_SE_007.tif

sha256: 0f5cae93d3c65fcaeedeaa034c47bf212a884ede11f792f5296d716776efd39c



vac_oven_dried_film_SE_008.tif

sha256: c4b7cf331bd5cb181854d51d2f0461300d01d4164dbc0c7af7f211a0375b806b

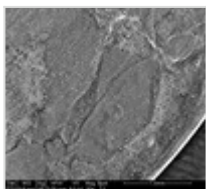
SEM - FEI Quanta 200 III

Date: 2020-01-29

Tags: SEM 07/10/2019Synth Quanta200 14/01/2020Synth

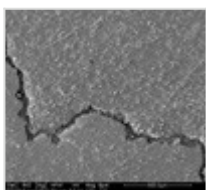
Created by: James Bird

4 / 6



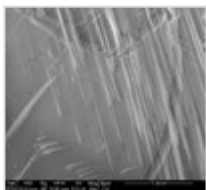
vac_oven_dried_film_SE_009.tif

sha256: eb34307134143714f099ebf9f1c2a89a3b364e8614c0e215b79dfe2ca7bc9b90



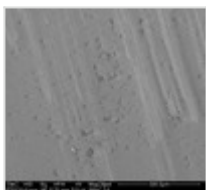
0.01wt_percent_streaky.tif

sha256: 8bc03fdb79d2442c22c6d10b2fb27849a29c2ec5c6f1e36ce3bd9b0eae30ed3d



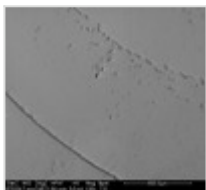
0.01wt_percent_streaky_001.tif

sha256: 50397fd259804d4f220913ec24d9921f557748372268016baffe43aaa4326873



0.003wt_percent_Ti3_MXene.tif

sha256: 501fda8f252d25d5848e41b89e8d492c86a43ac40e7621e08f7fbdba5b4fc667



0.05wt_percent_Ti3_MXene_001.tif

sha256: 672a349dc87a4566a057d97958b2712cf37d673b75fd489d7d24a41e66d1f655

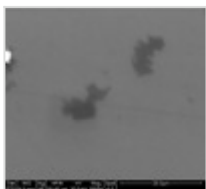
SEM - FEI Quanta 200 III

Date: 2020-01-29

Tags: SEM 07/10/2019Synth Quanta200 14/01/2020Synth

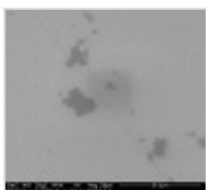
Created by: James Bird

5 / 6



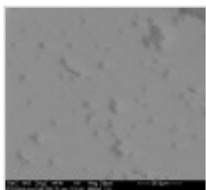
0.05wt_percent_Ti3_MXene_002.tif

sha256: 361b5f0b3fc10a159ccb9838b145cada7353df46a60deea9cf2e001d15574d55



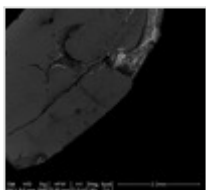
0.05wt_percent_Ti3_MXene_003.tif

sha256: 647d36eb4b4544c6fca02e70cc9664d5c10f731007e5f28b80a461e184bddbd6



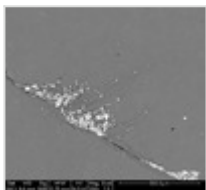
vac_oven_dried_film_BSE_005.tif

sha256: d58e295b3d9bee1c015d56ff16cfbc581667cdb4c044f38c24698890efaa1135



vac_oven_dried_film_BSE_006.tif

sha256: 2b3d29b38ea5c75767683b4164a58a03fc44b175ff6e36f860d21f7ea12cb45c



vac_oven_dried_film_BSE_007.tif

sha256: 5e9a3b54d07671534d92a221941de23cb661140c0f29883616da6b37c7043a90

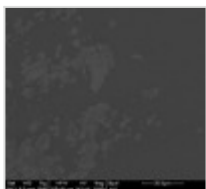
SEM - FEI Quanta 200 III

Date: 2020-01-29

Tags: SEM 07/10/2019Synth Quanta200 14/01/2020Synth

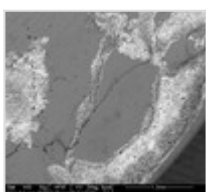
Created by: James Bird

6 / 6



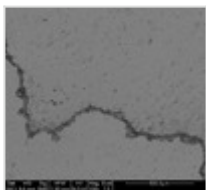
vac_oven_dried_film_BSE_008.tif

sha256: dc6e0617d27532dd511d8f9b2a4e865c3b3d21523fe9a91119dd5d5737459a91



vac_oven_dried_film_BSE_009.tif

sha256: b42a1882ec3b530f4b207605f01168640e3b8e80d8830685f13cb38339649362



Unique eLabID: 20221017-d9147cc65c9dde4e77594cb4d544ba6fa6e0c258

Link: <https://frankel-elab.manchester.ac.uk/experiments.php?mode=view&id=42>