

Calendering of freeze-cast MXene aerogel

Date: 2021-09-20

Tags: Freeze-cast 18/08/2021Synth Nanoplexus 400 2021 Calendering Aerogel

Created by: James Bird

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Goal : Verify calender press can achieve accurate aerogel thicknesses post-compression

Procedure :

- Place Sample #2, fabricated in [\[Experiment\] Freeze-casting of Ti₃C₂ MXene suspension](#), between two sheets of lens cleaning tissue (Fisherbrand)
- Seal both ends which are to be fed into the calender press (TMAXCN) with parafilm
- Calibrate thickness gauges (MEIXIN) with a feeler gauge to a precision of ~ 20 μm
- Set roller height to 1 mm
- Turn on calender and pass feed sample through to compress

Results :

Qualitatively, the parafilm doesn't adhere well to itself, and is too heavy relative to the tissue paper such that it's progression through the press is not clean, leading to bunching of the tissue paper which could lead to sample damage. The tissue paper is also too porous, so the nanomaterial transfers onto it. Sample density is increased from $4.57 \times 10^{-2} \text{ g cm}^{-3}$ to $9.82 \times 10^{-1} \text{ g cm}^{-3}$. The attached image shows the sample sealed between the lens cleaning tissue paper prior to compression.

Conclusions:

The set-up needs changing to reduce the adhesion of FC nanoparticles to the material used to progress it through the calender press. Sealing the paper appears to be unnecessary and only creates an obstacle. The press can be well calibrated with the feeler gauge.

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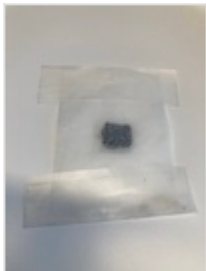
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Attached file

IMG_1538.JPEG

sha256: 3f3f3d28f19879bfe58fc5d7db9fd6cec245312582e233229526d6ade44b2353



Unique eLabID: 20230315-7c32471596909591ae4de99600c0e73d5e97855b

Link: <https://frankel-elab.manchester.ac.uk/experiments.php?mode=view&id=97>