

Quantification of Thickness and Wrinkling in 2D MFI-zeolite nanosheets

Scientific Achievement

Analytical Transmission Electron Microscopy (TEM) method was developed to determine thickness and wrinkles in electron beam sensitive 2-dimensional (2D) MFI nanosheets.

Significance and Impact

- Thickness of exfoliated MFI nanosheets was precisely determined to be 1.5 unit cells (3 nm).
- Presence of wrinkles in MFI nanosheets was shown for the first time by comparison with *multislice* simulations.
- Method is applicable to electron beam sensitive materials like 2D metal organic frameworks and aluminosilicates.

Research Details

- Acquisition of electron diffraction patterns at various tilt angles allowed 3D mapping of reciprocal space.
- Changes in diffraction spot intensity with tilt is found to be a fingerprint of the 2D zeolite thickness.
- Changes in diffraction spot shape with tilt is representative of wrinkles in the MFI nanosheet.

Kumar *et al.* **Nature comm.** 2015, in press

