Crystal Growth of Zeolites

Michael Tsapatsis (PI), € R. Lee Penn (PI), ¥ Sandeep Kumar, € ¥

Chemical Engineering and Materials Science, € Chemistry, ¥ University of Minnesota

NNIN Facility utilized: Characterization Facility

- Tracking of early stages of zeolitic crystallization in a tetrapropylammonium (TPA)-silica sol by SAXS and Cryo-TEM

- MAJOR OBSERVATIONS
  - Formation of aggregates of precursor nanoparticles (ca. 5 nm) before zeolitic crystallization
  - Observation of the regions of high-solubility in growing crystals, which suggests the aggregation of structurally distributed population of precursor nanoparticles

- Publications
  - S Kumar et al, JACS, 130 (51), 17284–1728, 2008
  - T M Davis et al, Nat Mater. 5 400–408, 2006

A high-resolution cryo-TEM image of a MFI crystallite in the synthesis sol aged for 220 days at room-temperature. Fast Fourier transform (FFT), shown in the inset, indicates the crystal to be oriented either along [100]- or [010]-axis.