Electronic Properties of Mixed Phase a/nc-Si:H
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NNIN Facilities utilized: Characterization Facility & Nanofabrication Facility

- Synthesis and characterization of mixed phase a-Si:H films containing Nanocrystalline Silicon inclusions (a/nc-Si:H)
  - Dual Chamber Co-Deposition system constructed to grow either undoped or doped a/nc-Si:H films
  - Structural properties characterized via TEM, SEM, FTIR, Raman

- Electronic Transport Sensitive to Nanocrystalline Inclusions
  - Conductance is highest in undoped a/nc-Si:H films containing \( X_c = 2 - 4\% \) nanocrystalline fraction
  - Observed shift in Activation Energy accounted for quantitatively by electronic doping of a-Si:H by electron transfer by nanocrystals without compensating defect incorporation
  - Reduction of light induced degradation \( \sigma_A/\sigma_B \) with nc inclusion

Silicon nanocrystals are grown in Particle Synthesis Reactor and then injected into second capacitively-coupled PECVD system, in which hydrogenated amorphous silicon is deposited.

Publications