

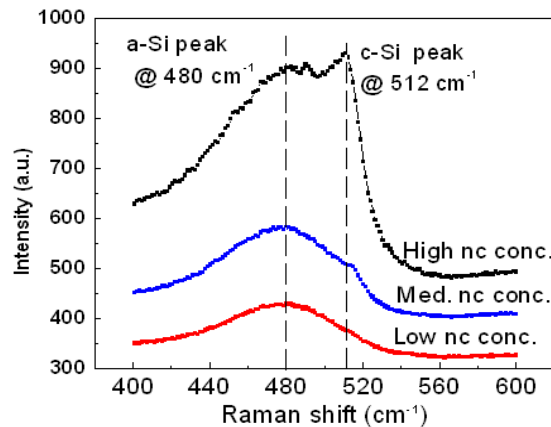
# Electronic Properties of Mixed Phase a/nc-Si:H

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NNIN Facilities utilized: Characterization Facility & Nanofabrication Facility

- Synthesis and characterization of mixed phase a-si:H films containing c-Si nanoparticle inclusions (a/nc-Si:H)

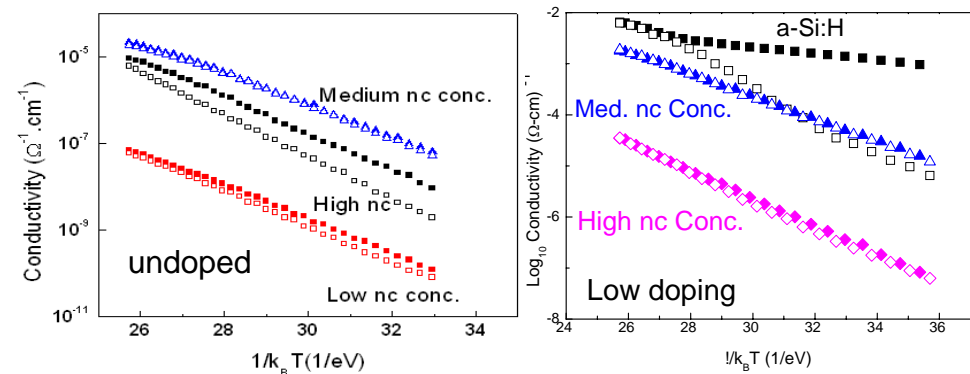
- ◆ Dual Chamber Co-Deposition system constructed to grow either undoped or doped a/nc-Si:H films
- ◆ Film properties can be optimized for solar cell applications
- ◆ Structural properties characterized via TEM, SEM, FTIR, Raman



Raman spectra of undoped a/nc-Si:H - c-Si peak shifted due to quantum confinement in nanocrystal - area of peak gives crystalline fraction in mixed phase film

- Electronic Transport Sensitive to Nanocrystalline Inclusions

- ◆ Conductance is highest in undoped a/nc-Si:H films containing 2 - 4% nanocrystalline fraction
- ◆ In contrast - for n-type doped a/nc-Si:H, addition of nanocrystals decreases conductivity
- ◆ Reduction of light induced degradation with nc inclusion



- Publications

- S. Thompson, C. R. Perrey, C. B. Carter, T. J. Belich, J. Kakalios and U. Kortshagen, J. Appl. Phys. **97**, 34,310 (2005).
- C. Anderson, C. Blackwell, J. Deneen, C. B. Carter, J. Kakalios and U. Kortshagen, Mat. Res. Soc. Symp. Proc. **910**, 79 (2006).
- Y. Adjallah, C. Blackwell, C. Anderson, U. Kortshagen and J. Kakalios, Mat. Res. Soc. Symp. Proc. **in press** (2008).
- C. Blackwell, X. Pi, U. Kortshagen, and J. Kakalios, Mat. Res. Soc. Symp. Proc. **in press** (2008).