

P2PNBC02 - CHARACTERIZATION OF POLYMERIC NANOMATERIALS**Module I** (10 hours)

Compositional surface analysis: Ultraviolet (UV) and X-ray photoelectron spectroscopy (XPS), Secondary ion mass spectrometry (SIMS)

Module II (10 hours)

Microscopies: Optical microscopy, fluorescence & confocal microscopy, Cathodoluminescence (CL) and photoluminescence (PL), TEM, SEM

Module III (10 hours)

Probe techniques: Atomic force microscopy (AFM), scanning tunnelling microscopy (STM), scanning nearfield optical microscopy (SNOM), deep level transient spectroscopy (DLTS)

Module IV (10 hours)

Kelvin-probe measurements, Nanoscale current-voltage (I-V), capacitance-voltage (C-V) relationships, thermal & thermo-mechanical analysis (DSC, TGA, DMA)

Text Books

1. Turi; Edith A. (Ed.), Thermal Characterization of Polymeric Materials, Academic Press Inc., New York (1981).
2. Sawyer; Linda C. and Grubb; David T., Polymer Microscopy, Chapman and Hall, London (1987).
3. Mitcheli Jr.; John, Applied Polymer Analysis and Characterization-Recent Development in Techniques, Instrumentation, Problem Solving, Hanser Publishers, Munich (19--).
4. Ishida; Hatsud, Characterization of Composite Materials, Butterworth Heinemann, Boston (1994).
5. Haines; Peter J., Thermal Method of Analysis: Principles, Applications and Problems, 3rd Edition, Blackie Academic and Professional, London (1995).

Reference Books

1. Nanostructures & Nano Materials :Ghuzang Cao
2. Hand Book of Nanophase: Zhong Lin Wang (Springer) & Nanomaterials (Vol. I&II)
3. Microstructural Characterization of Materials - David Brandon and Wayne Kaplan, John Wiley and Sons, New York, NY, 1999.
4. Elements of X-ray Diffraction – BD Cullity and SR Stock, Prentice Hall, New Jersey, 2001.
5. Scanning Electron Microscopy and X-Ray Microanalysis - Joseph I Goldstein, 3rd ed., Dale E. Newbury Academic / Plenum Publishers, New York, 2003.
6. Transmission Electron Microscopy - David B Williams and Barry Carter, Plenum Press, NY. London 1996 (or a newer edition).
7. Principles of Instrumental Analysis - Douglas A Skoog, F. James Holler and Timothy A. Nieman, 4th Edition ©1998.