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Probing Photovoltaic Performance

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A wide range of nanostructured materials including organic bulk heterojunction blends, solution processed colloidal semiconductors, and hybrid organic/inorganic thin films are being explored for solar energy applications. These systems typically exhibit nanoscale heterogeneity in their electronic and optical properties. Scanning probes are critical for building a microscopic picture of the performance of new nanostructured and thin film photovoltaic materials—and may ultimately prove to be a valuable metrology tool for process control during production—because scanning probe microscopy provides a unique opportunity to correlate local charge generation, recombination and transport with local structure in these systems. In this talk I will focus on techniques developed and lessons learned during our group's study of thin film solar cell materials with a particular emphasis on nanostructured organic bulk heterojunction blends.