

# Ordering Kinetics in Nanoscale Systems –Present Experiments and Future Applications at an ERL Light Source–

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Small-angle x-ray scattering, both in transmission (TSAXS) and grazing incidence geometry (GISAXS) is ideally suited to probe structure and self-organization in nanoscale systems, such as block copolymers, nanocomposites, and nanoparticle arrays. In recent years, time-dependent studies have revealed much new detail, such as solvent annealing of copolymer thin films and self-organization processes during swelling or drying. This research has been facilitated by the great compatibility of small-angle scattering with sample environments for in-situ and real-time studies.

For applications of small-angle scattering at a possible future ERL source at Cornell we envision combining SAXS techniques with the outstanding small-divergence x-ray microbeams such a source would produce. Microbeam SAXS has evolved into a powerful method of probing complex heterogeneous and hierarchical materials in biology, medicine, and materials science. At an ERL the gap between real-space scanning resolution and scattering resolution could be closed and the high photon flux would enable real-time studies at shorter time-scales than currently achievable. An overview of recent ERL developments at Cornell and current plans for a microbeam scattering beamline will be presented.