

Time-Resolved SAXS

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The behavior of materials on length scales of a few nanometers or longer can frequently be probed in real time by time-resolved SAXS (TR-SAXS) methods. Required components of any TR-SAXS experiment are (1) an appropriately configured beamline, (2) a specimen and specimen stage suitable for initiation, monitoring and control of the time-dependent behavior, (3) time-resolved x-ray detectors, and (4) adequate x-ray intensity. This talk will be a tutorial on these four required components, with emphasis on what can be done at the CHES D-1 and G-1 stations. Example applications to be discussed, to provide ideas for future experiments, include microfabricated flow cells to study macromolecules in solution; changes in copolymers upon strain or shear; electric field induced reorientation of polymer liquid crystals; liquid crystal phase transitions upon sudden changes in pressure, temperature or composition; contracting muscle; and GISAXS to study changes in surface morphology.