

In-situ neutron reflectivity investigations of D₂O-H₂O exchange kinetics in thermoresponsive PNIPAM based block copolymer thin films

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Responsive polymers, especially in thin film morphology, are of great interest for a wide variety of applications where a strong change of volume is desired even for small changes of an external stimulus such as temperature. In this context the most prominent representative is poly(N isopropylacrylamide) (PNIPAM). We study a new block copolymer which comprises a PNIPAM block and a poly(sulfobetaine) (PSB) block. Thin films are prepared by spin coating on silicon substrates. We have followed the swelling of such films in water vapor atmosphere and found signature of H₂O - D₂O exchange in FT-IR data. We use neutron reflectivity to study the swelling behavior and the H₂O - D₂O exchange of PNIPAM-b-PSB films in more detail. In-situ neutron reflectometry enables to follow the kinetics and determine the underlying fundamental processes.

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