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Effect of solvent on the ps dynamics in PNIPAM microgel

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Microgels are stimuli responsive polymers with possible applications e.g. for drug delivery. A key feature of them is the sudden shrinkage, induced by temperature or other external parameters, called Volume Phase Transition (VPT). The VPT is intrinsically connected to the water-polymer, or more generally to the solvent-polymer interaction. PNIPAM in ethanol, e.g. remains swollen also at higher temperatures. We used Quasielastic Neutron Scattering (QENS) at the Time-of-Flight Spectrometer FOCUS at PSI to study the differences in atomic level water-polymer and alcohol-polymer interactions through their dynamics. In order to avoid the presence of bulk-like solvents, but preserve the network structure, re-hydrated freeze-dried powders were used. Ab initio molecular dynamics (AIMD) simulations delivered inputs for choice of model, fit parameter restrictions and interpretation.

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