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Gelation, Phase Behavior and Dynamics of Beta-Lactoglobulin Amyloid Fibrils at Varying Concentrations and Ionic Strengths RAFFAELE MEZZENGA, SREENATH BOLISETTY, ETH Zurich, LUDGER HARNAU, Max-Planck-Institut, Stuttgart, JIN-MI JUNG, University of Fribourg — We discuss the thermodynamic and dynamic behavior of Beta-lactoglobulin fibrils in a vast region of the concentration-ionic strength phase diagram, by combining static, dynamic and depolarized light scattering (SLS, DLS, DDLS), small angle neutron scattering (SANS), and cryo-TEM. We focus on the region of the phase diagram where ionic strength and concentration changes induce transitions in gelation and lyotropic liquid crystalline behavior. Increase in ionic strength, by NaCl salt, causes the phase transitions from nematic to gel phases. Increase in fibril concentration induces first a phase transition from an isotropic to a nematic phase; further increase induces the formation of a gel phase. SANS and osmotic compressibility calculated by SLS measurements, capture the main features of the IN transition of Beta-lactoglobulin protein fibrils. The form and structure factors measured by scattering experiments are analyzed by polymer reference interaction site model (PRISM). Dynamics of the protein fibrils at different concentrations, measured by polarized and depolarized dynamic light scattering, shows both individual and collective diffusion after the IN transition. cryo-TEM images further demonstrate the alignment of the protein fibrils, quantified by a 2D order parameter.

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