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**Aggregation and network formation in aqueous methylcellulose near the sol-gel transition** SARA ARVIDSON, JOHN MCALLISTER, JOSEPH LOTT, FRANK BATES, TIMOTHY LODGE, University of Minnesota — Methylcellulose (MC) is a semi-flexible polymer which can be soluble in water at low temperatures, depending on the average number of methoxyl groups on each repeat unit. Upon heating, soluble MCs pass through a lower critical solution temperature (LCST) and undergo thermoreversible gelation, which is well described by Winter-Chambon critical gelation theory. The relaxation exponent ( $n$ ) exhibits a smooth variation with concentration, approaching  $n = 1$  at low concentration and  $n = 0.5$  high concentration. We selected a set of commercial MC for materials with similar degrees of substitution, but known for their significant variations in gelation temperature in water. MCs which gel at higher temperatures also exhibit a plateau in elastic modulus at low frequencies, which indicates two relevant length scales coexist just below the gel point. Scattering experiments (static, dynamic, and small angle x-ray and neutron) are compared to rheological measurements to reveal the MC chain structures and aggregation associated with phase separation and gelation and enable a mechanistic understanding of these phenomena.

Prefer Oral Session  
 Prefer Poster Session

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