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Aging and Glassy Behaviors in a Model Soft Colloidal System QI LI, XIAOGUANG PENG, GREGORY MCKENNA, Texas Tech University, TEXAS TECH UNIVERSITRY TEAM — In the vicinity of glass transition, colloidal and molecular systems share similar behaviors. Inspired by temperature jump aging experiments in molecular systems, volume fraction up-jump experiments (induced by temperature down-jumps) were used to study both aging responses and equilibrium dynamics for a thermoresponsive PS-PNIPAM/AA soft colloidal system using light scattering (diffusing wave spectroscopy, DWS). Long-term aging responses were investigated under both equilibrium and non-equilibrium conditions. In the equilibrium state, liquid-to-glass transitions were observed as effective volume fraction increases. For the equilibrium α-relaxation processes, the α-relaxation time of the samples aged into equilibrium deviate from the Vogel-Fulcher-Tammann (VFT)-type expectations and the super-Arrhenius signature disappears below the glass transition volume fractions. The non-equilibrium aging responses of the samples show decoupling of the α-relaxation time and the time for the structural evolution into equilibrium. As a microrheological method, DWS was found to probe the dynamics of the investigated colloidal systems differently from macroscopic rheology when in non-equilibrium regimes.

Qi Li
Texas Tech University

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