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Effects on gelation transition by tuning the interaction of solvent-solute molecules in a bridging system[1] GUANGCUI YUAN, NIST - Natl Inst of Stds Tech , JUNHUA LUO, CHARLES C. HAN, Institute of Chemistry CAS, YUN LIU, University of Deleware — A mixed suspension of large hard spheres and small soft microgels with well-defined bridging interaction is used to construct a new short-range attractive system. Soft poly (N-isopropylacrylamide) microgels (R = 80 nm) are absorbable to the surface of hard polystyrene spheres (R = 960 nm) in aqueous solution. For a constant volume fraction of hard spheres (Φ_{MS}), gradually increasing amount of microgels (Φ_{MG}) leads to a liquid-gel-liquid transitions through bridging and steric stabilized mechanisms. Rheological measurements were performed on suspensions with Φ_{MS} ranging up to 0.35 to carefully identify the transition boundaries between liquid-like and solid-like behaviors triggered by Φ_{MG}. Meanwhile, neutron scattering technique with Baxter's sticky hard-sphere potential fit was used to investigate the effective interparticle potential at and around the gelation boundaries. By exhibiting a set of experimental results from this explicit model system and comparing with the theoretical data, we try to clarify a debate issue about the relative position of the gel line and the liquid-gas coexistence line in the potential $U - \Phi$ plane.

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