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Stoichiometric Polyzwitterion-Inorganic Heteropolyanion Complexation into Tunable Coacervates and Hydrogels. BENXIN JING, MANUELA FERREIRA, YINGXI ELAINE ZHU, Department of Chemical Engineering and Materials Science, Wayne State University, Detroit, MI 48202, United States — Complexation of polycations and polyanions into different condensed phases has been much investigated, yet the mechanism behind the formation of liquid-like coacervates and solid/gel-like complexes remains debated. Instead of using two oppositely charged polyelectrolytes in salted aqueous solutions, we have successfully prepared a series of stoichiometric organic-inorganic macroion coacervates by using zwitterionic polysulfobetaine (PSBMA) and inorganic polyoxometalates (POMs) polyanions of similar atomic coordination structure but varied valence and charge density in LiCl solutions. Additionally, by tuning POM-to-PSBMA charge ratio, LiCl salt concentration, and temperature, reversible phase transition among homogeneous solution, biphasic liquid-like coacervation, and gel is observed. Measurements of electric potential of PSBMA upon PSBMA-POM coacervation suggest ion pairing formed between cation sites of PSBMA dipolar side groups and multivalent POM anions. The composition analysis by TGA and conductivity of supernatant solution also suggest that the entropy gain by releasing simple ions to solution due to the binding of POMs with PSBMA is responsible for the coacervate formation.

Benxin Jing
Wayne State University

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