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Spontaneous formation of aqueous droplets in complex coacervate systems SAMIM ALI, VIVEK PRABHU, National Institute of Standards and Technology — Complex coacervation occurs when a solution of two oppositely charged polymers undergoes liquid-liquid phase separation under suitable conditions. The coacervate forms the highly viscoelastic polymer-rich phase that exhibits very low interfacial tension with the polymer-poor supernatant. This presentation will describe the spontaneous formation of micron-sized aqueous droplets in the polymer-rich coacervate domain as the temperature of the system is increased above a critical value. The spherical droplets, initiated at the liquid-liquid interface, propagates into the bulk coacervate domain. Moreover, the average size of the droplets increases monotonically with increase in temperature. This results in an optically turbid appearance of the coacervate. We evaluate the role of liquid-liquid interface and polymer structure inside the coacervate phase during such transition using rheological techniques and small-angle neutron scattering. These observations provide a foundation to understand coacervate properties at conditions useful to encapsulation, delivery media, and wet adhesives.

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