# ELECTROSPINNING COMPLEX COACERVATES

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As polymer-based materials become ever more integrated into our daily lives, there is an increasing need to develop both materials that are safe for the consumer, and manufacturing strategies that have a minimal impact on the environment. However, the vast majority of polymers require either organic solvents for dissolution, or the use of potentially cytotoxic cross-linking agents to prevent material dissolution. Additionally, many of the chemistries and solution conditions necessary for processing can damage cargo molecules and create biocompatibility issues for subsequent use. Complex coacervation is an associative, liquid-liquid phase separation that has the potential to circumvent many of the challenges associated with processing traditional polymers and encapsulating actives. Complex coacervation is driven by the electrostatic and entropic interactions between oppositely-charged polymers in water. For many coacervating systems, the solid or liquid nature of the complex can be tuned via the concentration of salt present. Additionally, the strength of the electrostatic interactions within the complex are such that in the absence of salt, solid complexes are highly resistant to thermal melting and/or solvent dissolution. Furthermore, complex coacervation has a strong history of use for the encapsulation of a range of cargo. We have taken advantage of this salt-driven plasticity to enable fabrication of ultra-stable electrospun fibers directly from aqueous solutions. These efforts have required the simultaneous characterization of coacervation, as well as the effect of cargo molecules on the phase behavior and rheology of the resulting coacervates/precursor solutions. Furthermore, these materials show tremendous promise for the use of electrospun coacervate-based nanofiber meshes across a range of applications.