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Experimentally Determined Polyelectrolyte Complexation Phase Diagrams LU LI, SAMANVAYA SRIVASTAVA, MATTHEW TIRRELL, IME, The University of Chicago — Polyelectrolyte complexation is the associative phase separation of oppositely charged macromolecules in aqueous environments, caused by the correlated electrostatic interactions among the chains and the entropy gains from release of the counterions associated with the chains. Understanding the phase compositions and small molecule partitioning during complexation are of vital importance in motivating development of complex-based materials for biomedical applications. Harnessing the availability of synthetic polyelectrolytes with controlled properties, we will present experimentally determined complexation phase diagrams for several low-polydispersity polymer systems with varying hydrophobic and electrostatic properties. Using meticulous measurements, we will demonstrate that while parts of the phase diagrams agree with the general trends predicted by traditional Voorn-Overbeek model, the contributions of polyelectrolyte backbone hydrophobicity become increasingly significant with increasing polymer as well as salt concentrations, leading to non-trivial deviations from the expected results.

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