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The effect of ionic correlations on ion distribution across polyelectrolyte blend interfaces[1] HA-KYUNG KWON, MONICA OLVERA DE LA CRUZ, Department of Materials Science and Engineering, Northwestern University, Evanston, Illinois 60208 — Recent developments in high-density energy storage and generation devices have identified as polyelectrolyte blends and copolymers as suitable candidate materials for use in these applications, as they combine the low volatility and high flexibility of polymers with ion-selective conductivity of the charge-carrying backbone. It has been shown that in polyelectrolyte melts, where the dielectric constant is relatively low, ionic correlations can significantly reduce miscibility, inducing phase separation even at negative values of χN. At selected values of ionic coupling strengths, the polyelectrolyte blend exhibits a triple point, where coexistence is observed between phases with different concentrations and ordering of ions. When salt is added, the system undergoes re-entrant behavior as electrostatic effects are screened out. Using a hybrid of self-consistent field and liquid state theories (SCFT-LS), we investigate the distribution of ions across the interface in polyelectrolyte blends. We demonstrate that the inclusion of ionic correlations induces complex charge-dependent adsorption behavior at the interface, leading to changes in the interfacial width and miscibility of the blend.

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