

# Solubility and interfacial segregation of salts in ternary polyelectrolyte blends

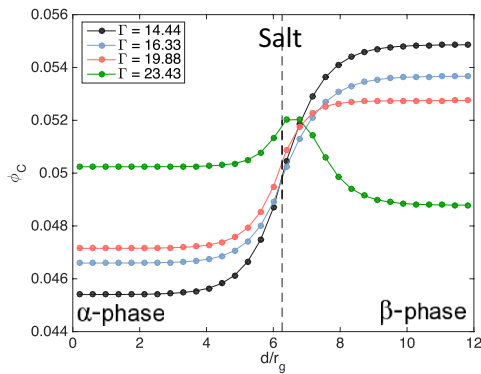
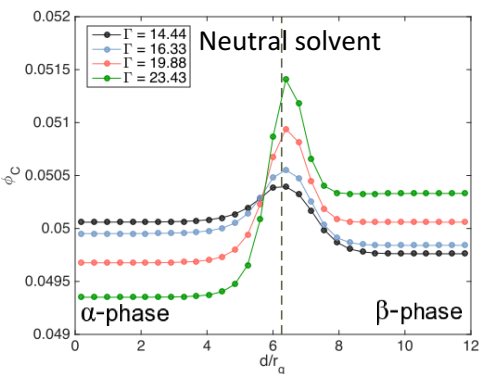
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## Significance

- The addition of a third component to a polyelectrolyte blend in the form of a plasticizer or salt can drastically change the bulk phase and interfacial behavior of the blend
- This study investigates the changes in the interfacial salt adsorption, interfacial width, and interfacial energy using a hybrid method of liquid state and self-consistent field theories.

## Findings

- At low values of correlation strength  $\Gamma$ , the selectivity of the salt is driven by the translational entropy of the ions, and the salt is preferentially solubilized in the charge-dilute phase. Increasing the correlation strength can trigger a switch in the selectivity of the salt for the charge-dense phase. For neutral solvents, increasing  $\Gamma$  results in an opposite trend, from charge-dense phase to charge-dilute phase.
- Selectivity induced by ionic correlations is cannot be modeled using conventional Flory-Huggins type selectivity; in some cases, ionic correlations can completely reverse the effects of Flory-Huggins type selectivity.



*Distribution of neutral solvent (left) and salt (right) across the  $\alpha$  –  $\beta$  interface. Selectivity of the solvent switches from  $\alpha$ -selective (charge-dense) to  $\beta$ -selective (charge-dilute) as  $\Gamma$  is increased, while salt switches from  $\beta$ -selective to  $\alpha$ -selective as  $\Gamma$  is increased*

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