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Charge correlations in multicomponent ionic crystalline membranes CREIGHTON THOMAS, MONICA OLVERA DE LA CRUZ, Northwestern University — We investigate the dissociation state of a polyelectrolyte membrane with charged head groups in solution. This state depends on the salt concentration and pH of the solution, but spatial correlations also highly influence it. Spatial correlations are typically neglected in these systems, as they are difficult to treat analytically, but they can qualitatively alter the results. We numerically incorporate charge correlations on both flat and curved membranes by simulating a multicomponent system on a fluctuating network with electrostatic interactions, using the replica exchange Monte Carlo approach. The salt-induced screening effects are modeled within the Debye-Huckel theory. For weak enough screening, we find a strong suppression of dissociation regardless of pH, and the membrane may exhibit a reentrant structural phase transition as pH is varied.

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