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Mean Field Theory of Aggregation and Symmetry-Breaking in Ionomer Melts ERICA SALTZMAN, SANAT KUMAR, Columbia University, IGAL SZLEIFER, Northwestern University — Solutions and melts of charged polymers are studied with Single Chain Mean Field Theory, which preserves intramolecular correlations. System parameters include temperature, chain length, and monomer density. The thermodynamics of the equilibrium system are calculated, including electrostatic energy and polymer and counterion entropy. Phenomenology of interest include the association-dissociation transition of counterions and cooperative conformational and morphological transitions which are expected to dominate the macroscale temperature variations. Theoretical results are compared to simulation findings of low temperature condensation of chains to form ordered sheets. This study provides a basis for future stochastic models of the temporal evolution of such large-scale structures, with immediate relevance to measurable dynamic properties.

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