

Abstract Submitted  
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**Nano-Patterns in Gels of Charged Chains with Self-Attracting Interactions** MONICA OLVERA DE LA CRUZ, Northwestern University, JUAN J. DE PABLO, University of Wisconsin-Madison — Gels of weakly charged chains have large swelling capabilities that depend on pH and/or salt concentration. In the presence of attractions among elastic units, such as poor-solvent conditions, stable nano-patterns are observed. These systems are ideal actuators, since they undergo large volume changes at the nanophase transition. We find that the nanophases are due to the entropy of the counterions, and are stabilized as the monomer density decreases and as the salt concentration increases by hard-core interactions and network heterogeneities. Our model is constructed with results from a non-linear Poisson Boltzmann approach in the limits when it is applicable (low ionic densities) and a grand canonical Monte Carlo method simulation with Donnan partitioning of counterions and co-ions between the gel and reservoir phases. Our theory and simulations are in close agreement with experiments.

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