

Abstract Submitted
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Theoretical Study of Polyelectrolyte/homopolymer blends

YOUHAI SUN, ASHKAN DEGHAN, AN-CHANG SHI, McMaster University, MCMASTER SOFT MATTER THEORY TEAM — The phase behaviour of polyelectrolyte/homopolymer blends is studied using self-consistent field theory (SCFT). The blends are composed of charged and neutral polymers plus counter ions dissociated from the polyelectrolytes. The phase diagram of the system is constructed as a function of blend composition, charge density and polymer-polymer interactions. Besides the usual macrophase separation behaviour, the SCFT predicts that under appropriate conditions the system undergoes microphase separation, forming various ordered morphologies similar to block copolymers. The formation of ordered phases in the system is due to the competition between the polymer-polymer interaction, electrostatics and the mixing entropy of the counter ions. In particular, the length-scale of the ordered phases is not limited by the polymer size, thus opening the door for the engineering of microphases with large domain spacings.

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