

Abstract Submitted
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Magnetic fields for the long-range ordering of amphiphilic block copolymers and surfactant mesophases¹ PAWEL MAJEWSKI, MANESH GOPINADHAN, CHINEDUM OSUJI, Yale University — We present a diamagnetic interactions-based approach to impose long range order in self-assembled soft materials. We discuss two chemically different systems which have been successfully aligned with the use of a magnetic field. The orientation and the degree of alignment are quantified by small-angle X-ray scattering, polarized optical microscopy and electrical impedance spectroscopy. We focus on Li ion-conducting liquid crystalline diblock copolymers. Our technique allows us to control the orientation of hexagonally packed PEO channels within a non-conducting liquid crystalline matrix that is responsive to the field. The electrical conductivity of the cylindrical samples with PEO domains aligned perpendicular to electrodes is an order of magnitude greater than for samples featuring randomly orientated domains. Our second system consists of non-ionic surfactants forming lamellar or cylindrical mesophase in water. The method which we term “rotational annealing”, is successfully used to obtain highly ordered mesophases which can be further utilized as a template for nanomaterials synthesis.

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