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Transport and rheology in block copolymer mesophases

XUSHENG ZHANG, JORGE VIÑALS, McGill University — Free energy functionals of an order parameter field are widely used to describe ordered phases and flows in block copolymer melts. We present a systematic derivation of the transport equations governing order parameter diffusion and hydrodynamic flows by considering the order parameter ϕ and the local deformation u as the two independent variables. By studying the static and dynamic response of the copolymer, we derive expressions for the reactive and dissipative components of the stresses. We finally use these equations to study the low frequency rheology of the copolymer under an applied oscillatory shear.

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