Response and Applications 8: 2:45 - 3:05 p.m.

Elasticity of polydomain elastomers

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Unless special precautions are taken, liquid crystal elastomers always form in a macroscopically isotropic polydomain state. I will discuss the equilibrium stress-strain behavior of polydomain liquid crystal elastomers, modeling the elastomers with spatially varying versions of the neo-clasical free energies used with great success to describe monodomains. This approach predicts a fundamental difference between elastomers crosslinked in the high temperature isotropic and low temperature aligned states. Elastomers crosslinked in the isotropic state then cooled to an aligned state will exhibit extremely soft elasticity (confirmed by very recent experiments) and ordered director patterns characteristic of textured deformations. Elastomers crosslinked in the aligned state will be mechanically much harder and characterized by schlieren disclination textures.