

LIQUID CRYSTAL ELASTOMERS: THEORY AND APPLICATIONS

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Liquid crystal elastomers (LCEs) are advanced multifunctional materials that combine elasticity with orientational order. Specifically, mechanical strains give rise to changes in liquid crystalline order and, conversely, changes in the orientational order generate mechanical stresses and strains. The quest for responsive materials with the ability to mimic living systems or to enable green energy production and conversion processes is one of the major challenges for modern materials design. Because of their large reversible deformations and complex material responses in the presence of natural stimuli like heat or light, and electric or magnetic fields, LCEs are suitable for a wide range of applications in science, manufacturing, and medical research. Moreover, biodegradable, recyclable and reprocessable LCEs can also be achieved. This talk will offer an introduction to core concepts in the mathematical modelling of LCEs by linking nonlinear elasticity with liquid crystal theory.