Response and Applications 3: 11:05 - 11:25 a.m.

First Bent-Core Nematic Liquid Crystal Elastomer: Characterization and Giant Flexoelectric Response

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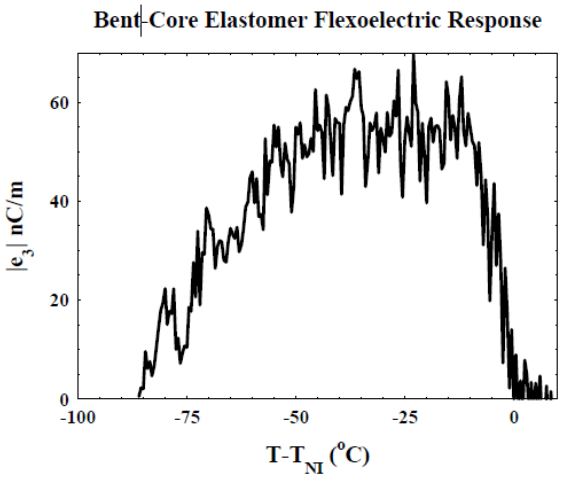
The flexoelectric effect is an electromechanical phenomenon that arises in liquid crystals (LCs) whereby an electric polarization develops in response to a bend or splay of the liquid crystal director [1]. Recently, it has been shown that nematic bent core LCs exhibit a flexoelectric coefficient more than three orders of magnitude larger than in previously studied calamitic nematic LCs, paving the way for electromechanical devices that utilize the flexoelectric effect [2]. In order to develop practical, viable flexoelectric materials, it is necessary to incorporate the bent core nematic LC between flexible substrates or in a polymer matrix. While previous studies have focused on reactive bentcore mesogens and bent-core LC networks that display smectic phases [3], we focus on and introduce the first nematic bent core liquid crystal elastomer. Monofunctional bentcore LCs with a reactive alkene group were used to make aligned side chain nematic elastomers using the method as described by Finkelmann [4]. The flexoelectric coefficient e3 was measured by direct flexing to be 60nC/m. This is comparable to similar fluid bent core nematic liquid crystals [2].



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