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Electromechanical Energy Conversion using a Bent-Core Nematic Liquid Crystaline Elastomer and the Giant Flexoelectric Effect JOHN HARDEN, Kent State University , RAFAEL VERDUZCO, Rice University, PAUL LUCHETTE, JAMES GLEESON, SAMUEL SPRUNT, ANTAL JAKLI, Kent State University — The flexoelectric effect is an electro-mechanical phenomenon that arises in liquid crystals where an electric polarization develops in response to a bend or splay of the liquid crystal director. 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 electro-mechanical devices that utilize the flexoelectric effect. 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. Here we present and introduce the first nematic bent core liquid crystal elastomer. Monofunctional bent-core LCs with a reactive alkene group are used to make aligned side chain nematic elastomers using the method of Finkelmann. The flexoelectric coefficient e_3 was found by direct flexing to be 30nC/m. This is comparable to similar fluid bent core nematic liquid crystals. The work is supported by the ONR under grant N00014-07-1-0440) and NSF under DMR-0606160. The Elastomer provided the *New Liquid Crystal Materials Facility*, http://nlcmf.lci.kent.edu, supported by the NSF DMR 0606357.

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