Abstract Submitted
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Giant flexoelectricity of bent-core nematic liquid crystals[1] JOHN HARDEN, BADEL MBANGA, Chemical Physics Interdisciplinary Program and Liquid Crystal Institute, Kent State University, NANDOR EBER, KATALIN FODOR-CSORBA, Research Institute for Solid State Physics and Optics, Budapest, Hungary, SAMUEL SPRUNT, JAMES GLEESON, Department of Physics, Kent State University, ANTAL JAKLI, Chemical Physics Interdisciplinary Program and Liquid Crystal Institute, Kent State University — Flexoelectricity is a coupling between orientational deformation and electric polarization. We present a direct method for measuring the flexoelectric coefficients of nematic liquid crystals via the electric current produced by periodic mechanical flexing of the NLC's bounding surfaces. This method is suitable for measuring the response of bent-core liquid crystals, which are expected to demonstrate a much larger flexoelectric effect than traditional, calamitic liquid crystals. Our results reveal that not only is the bend flexoelectric coefficient of bent-core NLC's gigantic (more than three orders of magnitude larger than in calamitics) but also it is much larger than would be expected from microscopic models based on molecular geometry. Thus, bent-core nematic (BCN) materials can form the basis of a technological breakthrough for conversion between mechanical and electrical energy.

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