Abstract Submitted
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Measurement of the Converse Flexoelectric Effect of a Bent-Core Nematic Liquid Crystal JOHN HARDEN, Chemical Physics Interdisciplinary Program and Liquid Crystal Institute, Kent State University, RICHELLE TEELING, 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 linear coupling between bend or splay distortions and electric polarization[1]. It is a unique property of orientationally ordered materials of which liquid crystals are the best known example. It has been shown that the bend flexoelectric coefficient in "banana" bent-core liquid crystals is three orders of magnitude higher than the effect found in calamitic liquid crystals[2]. Using a Mirau interferometer attached to the objective port of a microscope, we were able to measure the converse effect. This polarity dependent flexing of a thin cell yielded displacements of 100nm when 100V DC was applied to a 1cm x 2cm x 25μm cell filled with the bent-core nematic liquid crystal 4-chloro-1,3-phenylene bis 4-[4'-(9-decenyloxy) benzoyloxy] benzoate (ClPbis10BB). The substrates were 100μm thick Mylar with ITO as a conducting layer. These preliminary experiments show the promise of new types of soft actuators or beam steering devices. References: [1]Meyer R.B. (1969). Physical Review Letters **22**(18): 918-921. [2]Harden, J., B. Mbanga, et al. (2006). Physical Review Letters **97**(15). Acknowledgement: NSF DMR-0606160 and NSF REU-0649017

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