Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Bent Core Liquid Crystal Polymers and Elastomers[1] RAFAEL VERDUZCO, Rice University, SEUNG HO HONG, JOHN HARDEN, ANTAL JAKLI, SAM SPRUNT, JIM GLEESON — Bent-core liquid crystals (LCs) have a kinked, or bent, molecular shape in contrast to the more common rod-like LCs. Due to their bent molecular shape, bent-core LCs form locally polar clusters, which result in novel LC phases and potentially useful properties such as ferroelectricity. Polymeric bent-core LCs are of particular interest because they can lead to new nanostructured soft materials with confined bent-core LCs. In this work, we investigate the synthesis, nanoscale structure, and physical properties of a variety of bent-core LCs and polymeric bent-core LCs. SAXS reveals the presence of polar clusters over a wide temperature range in the nematic phase for all materials studied, including bent-core side-group LC polymers and bent-core LC elastomers. The presence of locally polar clusters can account for the unexpected physical properties in nematic bent-core LCs, such as enhanced flexoelectricity. Direct flexoelectric measurements on pure bent-core LCs and swollen LCEs show that nematic bent-core materials have a flexoelectric coupling three orders orders of magnitude larger than calamitic LCs. Nematic clusters in bent-core LCs represent an unexpected and potentially useful phenomenon for building responsive LC devices.

[1]We acknowledge the support and facilities at DOE's CNMS at ORNL

Rafael Verduzco
Rice University

Date submitted: 20 Nov 2009 Electronic form version 1.4