Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Electroactive Properties of Potentially Ferroelectric Cyanopolymer Systems MATT POULSEN, STEPHEN DUCHARME, Department of Physics and Astronomy, JAMES TAKACS, SAHADEVA REDDY, Department of Chemistry; Nebraska Center for Materials and Nanoscience, University of Nebraska, V.M. FRIDKIN, Institute of Crystallography, Russian Academy of Sciences — Piezoelectric, pyroelectric, and potentially ferroelectric behavior have been observed in newly synthesized cyanopolymer systems. These systems are chemical analogs to the well known ferroelectric polymer poly(vinylidene fluoride), PVDF. Various chemical groups have been used to replace the electronegative fluorine and electropositive hydrogen atoms found in PVDF. This substitution maintains the polar nature of the all-trans conformation while increasing the amphiphilic nature of the said polymers. The increased amphiphilic nature of the polymers allows for the employment of the Langmuir-Blodgett technique in the fabrication of ultra-thin (less than 10 nm) polymer films. These cyanopolymers include poly(methyl vinylidene cyanide) and several of its copolymers. Piezoelectricity and pyroelectricity have been clearly observed in several of these systems. In addition, evidence for polarization reversal suggests that some members of this family of polymers may be ferroelectric in nature. Piezoelectric, pyroelectric, and ferroelectric properties make these cyanopolymers a promising new class of materials for use in electromechanical transducers, nonvolatile memories, and infrared imaging.

Matthew Poulsen
Department of Physics and Astronomy

Date submitted: 20 Nov 2006 Electronic form version 1.4