

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Dielectric Relaxation in Liquid Crystals 4'-Octyl-4-Cyanobiphenyl (8-CB) and C-16 Fluorescent Dipyrinone

CHLOE RENFROE, ANDREIY KONDRAT'YEV, CALEB MORTON, Undergraduate, PREEYAL GUPTA, Pensacola High School, AARON WADE, CHANDRA PRAYAGA, MICHEAL HUGGINS, Faculty Advisor, AMY RENAUD, REBECCA CHANDLER, Undergraduate — This paper reports the study of the dielectric relaxation time of the liquid crystal 4'-octyl-4-cyanobiphenyl (8-CB) in the smetic, nematic, and isotropic phases. The time constant of the decay was studied using a 10 mV square wave input signal. Large changes in the relaxation time were observed near the phase transitions. 8-CB was injected into a commercially available liquid crystal capacitor cell to act as a dielectric. The cell was housed in a temperature controlled environment constructed in the lab and an RC circuit was assembled using the 8-CB capacitor. The temperature of the capacitor was varied over the range 25°C to 43°C, covering all three phases. The sample was held at each temperature with a precision of 1mK using a temperature controller before measuring the voltage across the resistor with a digital oscilloscope. The input resistance (50Ω) of the oscilloscope was the resistance in the RC circuit. The recorded data was fitted to an exponential decay. These results give insight into the behavior of the time constant in the different phases and near the phase transitions. This method is used to study the dielectric relaxation of the new liquid crystal C-16 fluorescent dipyrinone, synthesized in the Department of Chemistry, University of West Florida.

Chloe Renfro
Undergraduate

Date submitted: 15 Nov 2012

Electronic form version 1.4