

# Determination of the Phase Diagram of Biologically Relevant Liquid Crystals

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## CHE-0353662 Research Experience for Undergraduates

*n*-octyl- $\beta$ -D-thioglucoside ( $\beta$ C8SG1) is an environmentally safe nonionic surfactant. When mixed with water in different proportions at different temperatures,  $\beta$ C8SG1 forms different liquid crystal phases, specifically micellar, cubic, lamellar and gel phases. Fluorescence spectroscopy with a prodan probe offers a highly sensitive method for detecting the phases in liquid crystal systems. It is a simple method for determining phase diagrams by a single process, and allows for more accurate detection of two phase regions.

**Undergraduate student Kristen Chellis (HMC)** used fluorescence spectroscopy with a prodan probe to determine the binary phase diagram of the thioglucoside and water system. The fluorescence spectrometer uses a 340 nm excitation and measures the resulting fluorescence emission. Prodan in each phase will emit a characteristic wavelength between 350 and 650 nm. The phases that are present can be determined by noting the peak maximum and shoulders of the fluorescence spectra. The lamellar

and micellar phases have high peak wavelengths (480-500nm), while the cubic and gel phases have low peak wavelengths (400-440nm).

