

Abstract Submitted
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Biosensing using smectic and cholesteric liquid crystals PIOTR POPOV, ELIZABETH MANN, Kent State University, ANTAL JAKLI, Liquid Crystal Institute — Liquid-crystal-based biosensors utilize liquid crystal alignment's high sensitivity to the presence of lipids and proteins self-assembled at the liquid crystal/aqueous solution interface. The optical response of the bulk liquid crystal to the interface offers inexpensive, easy optical detection of such biologically relevant molecules. Present technique uses nematic liquid crystal phase state that typically has a planar-to-homeotropic response only. Here we show that smectic and cholesteric phase states of liquid crystals can be used as new sensing modes that can provide additional information or improve the characteristics of a potential biosensor device. Smectic-A phase extends the detection range both toward the lower and higher concentration. Cholesteric phase (nematic with a chiral dopant) may be sensitive to the chirality of biological surface-active molecules such as phospholipids. Additionally, the “finger-print” texture of a cholesteric phase may show the differences between biomolecule homologues, thus providing a promising way of distinguishing between subtle differences of hydrocarbon chain or head-group size and structure.

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