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PVDF homopolymer and copolymer coated surfaces for liquid crystal alignment HEMANG SHAH, ADAM FONTECCHIO, Drexel University — We report on the liquid crystal (LC) surface alignment induced by polymers of vinylidene fluoride (PVDF). Ferroelectric polymers based on PVDF can align LCs by virtue of an inherent polarization. The polarization can be manipulated using different techniques to align the LCs in preferred directions for ON and OFF states. This is a promising feature for a potential alignment layer for LCs in electro-optic devices including displays. We have used PVDF homopolymer and copolymers of VDF with Trifluoroethylene (TrFE), tetrafluoroethylene (TeFE) and hexafluoropropylene for our study. The films are prepared using different solvents, and are subsequently spin-coated and baked. Depending on the concentrations of the solvent, films with different morphologies are obtained. In addition, PVDF films can be poled by application of an electric filed during the baking process. The alignment of the LCs is due to both the surface morphology, and dipole-induced dipole interactions at the surface. The alignment variations of LC based on the substrate will be presented. Also, the effects of rubbed polymer layers on LC alignment will be discussed. This research thus provides an insight into electro-optical devices including displays, memory elements and sensors based on LCs and ferroelectric polymers.

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