558f Experimental Determination of Polar Anchoring Strength for a Hybrid Aligned Nematic Liquid Crystal Cell with a Boundary Continuously Varying in Its Surface Energy

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Birefringence is measured for a hybrid aligned nematic (HAN) cell of 5CB (4'-n-pentyl 4-cyanobiphenyl) confined between octadecyltriethoxysilane (OTES)-treated glass surfaces with one surface linearly varying in its surface energy. A transition in the polar alignment of the liquid crystal from uniformly homeotropic to tilted along the linearly varying surface is visualized using polarized light. Relative anchoring energies of the surfaces is determined by measuring the critical thickness of the HAN cell as observed by an anchoring transition from a bent-director to a uniform-director configuration. Furthermore subtle changes in liquid crystal alignment near the nematic to isotropic transition temperature are observed by the migration of birefringence bands at the homeotropic to tilted transition. Our experimental determination of birefringence in this HAN cell closely resembles that predicted by the Frank elasticity theory with a one constant approximation ($K_1 = K_3$).