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Surface Dipole Control of Liquid Crystal Alignment JEFFREY SCHWARTZ, Department of Physics & Astronomy, University of California, Los Angeles, YUXI ZHAO, ALEXANDRA MENDOZA, NATCHA WATTANATORN, Department of Chemistry & Biochemistry, University of California, Los Angeles, PAUL WEISS, Departments of Chemistry & Biochemistry and Materials Science & Engineering, University of California, Los Angeles — We investigate the influence of surface dipoles on the alignment of liquid crystals (LCs). Carboranethiol self-assembled monolayers (SAMs) are shown to induce planar anchoring in 4-cyano-4'-pentylbiphenyl LCs at the SAM/nematic interface. We exploit the different dipole moments of carboranethiol structural isomers in order to deconvolve the influence of SAM-LC dipolar coupling from variations in molecular geometry, tilt, and order. The LC director orientation and anchoring energy are measured for devices employing varying caboranethiol isomer alignment layers. By using LC orientation as a probe of interaction strength, we demonstrate that dipolar coupling of SAMs to their environment plays a key role in determining molecular orientations. This understanding may advance the engineering of molecular interactions at the nanoscale.

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