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Simulation study of liquid crystal anchoring at a polymer surface[1]

MEHDI HAMANEH, PHILIP TAYLOR, Case Western Reserve University — The process of rubbing a polymer substrate to induce planar anchoring has two effects. It aligns the polymer chains and also creates grooves in the surface. We have investigated which one of these effects is more important by conducting a series of simulations of molecules of 5CB in contact with a poly(vinyl alcohol) surface. The polymer surface was constructed from a set of parallel straight chains. It was then distorted to mimic the effect of grooves in a direction perpendicular to the chain direction, thus causing two opposing anchoring effects. It was found that the 5CB molecules ordered preferentially along the chain direction when the depth of the grooves was less than 20 percent of the distance between grooves. For grooves whose walls were more steeply pitched, the nematic ordering aligned with the grooves.

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