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Reconstruction of the surface of freely suspended films of heptyloxybenzylidene heptylaniline DANIEL MARTINEZ ZAMBRANO, JEFFREY COLLETT, Lawrence University — Surfaces of freely suspended thick films of 4-n-heptyloxybenzylidene-4-n-heptylaniline (7O.7) in the crystalline-B phase have been imaged using non-contact mode atomic force microscopy. Steps are observed on the surface of the film with a height of 3.0 ± 0.1 nm corresponding to the upright molecular length of 7O.7. In addition, we find that the step width varies with temperature between 56°C and 59°C. The steps are many times wider than the molecular length suggesting that the steps are not on the surface, but instead originate from edge dislocations in the interior. Using a strain model for liquid crystalline layers above an edge dislocation to estimate the depth of the dislocation, we estimate that the number of reconstructed surface layers decreases from 50 to 4 layers as the temperature increases from 56°C to 59°C. This trend tracks the behavior of the phase boundary in the thickness dependent phase diagram of freely suspended films of 7O.7, suggesting that the surface may be reconstructed into a Smectic-F phase.

Jeffrey Collett
Lawrence University

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