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Riverbottom texture: Patterns of compressional stress in an SS-FLC cell CHRISTOPHER D. JONES, DAVID A. COLEMAN, NOEL A. CLARK, Liquid Crystal Materials Research Center and Department of Physics, University of Colorado, Boulder, CO 80309 USA, MICHAEL D. WAND, Displaytech, Inc., Longmont, CO 80503 USA — We have been studying the texture of remnant compressional stress in a bookshelf aligned SmA phase of the Displaytech mixture MDW8068. MDW8068 exhibits isotropic - nematic - SmA - SmC phases, and throughout the range of the SmA phase the layers show significant expansion on cooling. This layer expansion causes layer compression, which is relieved by dislocation formation and surface depinning events throughout the cell. The resulting SmA has essentially perfect alignment, but with a pattern of remnant stress that can be visualized near the SmA - SmC transition because of the divergent tilt susceptibility and resulting compression-induced tilt near the SmA - SmC transition. Low dislocation density areas are the areas of greatest layer compression, implying that the edge dislocations relieve the compressive stress. Temperature cycling shows the texture is set near the N - SmA transition, though x-ray diffraction data shows that the layer expansion occurs through the entire range of the SmA. X-ray diffraction from oriented samples has been done which shows that the texture is a result of competition between smectic ordering and surface pinning. Work supported by ED GAAN Fellowships P200A030179 and P200A000839, and NSF MRSEC Grant DMR-0213918.

Christopher Jones
University of Colorado

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