Fabrication of Black Matrix Patterns and RGB Arrays by Capillary Molding

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An unconventional method based on a capillary molding technique is presented for fabricating Black Matrix patterns for TFT-LCD. The method consists of three steps: placing an elastomeric mold with a bas-relief pattern onto a drop-dispensed photoresist solution, letting the mold and the solution undisturbed in contact until solvent evaporates completely, and leaving behind a polymer replica after mold removal. The Black Matrix microstructures were fabricated over a large area (4 inch wafer) essentially with no residual layer. It was found that a slow evaporation is required to provide enough time for the solution to diffuse with uniform pattern thickness. To demonstrate potential applications of the current unconventional patterning approach, RGB arrays were realized using an ink-jet method. No appreciable changes were observed with the conventional photolithographic approach.