

### Capillary Force Lithography by Modulus- and Permeability- Tunable Mold

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A permeability- and surface energy-controllable polyurethane acrylate (PUA) mold, a “capillary force material (CFM)” mold, is introduced for capillary force lithography (CFL). In CFL, the surface energy and gas permeability of the mold are crucial. However, modulation of these two main factors at a time is difficult. Here, we introduce new CFM molds in which the surface energy and permeability can be modified by controlling the degree of crosslinking of the CFM. As the degree of crosslinking of the CFM mold increases, the surface tension and air-permeability decrease. The high average functionality of the mold material makes it possible to pattern relatively finely and rapidly due to the high rate of capillary rise and stiffness, and the low functionality allows for patterns to form on a curved surface with conformal contact. CFMs with different functionality and controllable-interfacial properties will extend the capabilities of capillary force lithography to overcome the geometric limitations of sub-100-nm-scale patterning and micro/nanopatterning on curved region.