

Patterning Transparent Polymer Thin Films with Photosensitizers using Marangoni Flow

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The Marangoni effect causes liquids to flow toward localized regions of higher surface tension. In thin polymer films, it may represent a practically useful route to manufacture topographically patterned surfaces. A judicious selection of the photosensitizing compounds in an otherwise transparent polymer expands the use of this method to many classes of polymers and also to more readily available light sources. It further enables significant increases in feature aspect ratio. For example, 9,10-dibromo-anthracene sensitizer in polystyrene enabled formation of 500% larger features compared to the sensitizer-free polystyrene film. We believe this patterning methodology will be potentially useful for high throughput fabrication environments that can exploit contact-free and solvent-free topography development. Such patterned films would especially be useful for controlling adhesion, improving photonic device efficiency, and directing cellular alignment, among other applications.