

Abstract Submitted
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Light-directed Control of Macromolecule Organization on a Surface¹ GREGORY CARROLL, Columbia University, Department of Chemistry, JEFFREY KOBERSTEIN, Columbia University, Department of Chemical Engineering, NICHOLAS TURRO, Columbia University, Department of Chemistry — This report describes a versatile method to photo-generate and control self-organized polymer patterns on a surface within a larger pattern. Thin polymer films are cross-linked by irradiation with UV light. Crosslinked thin polymer films resist dewetting when heated above the glass transition temperature. Combining pattern formation via instability with pattern formation via photolithography allows the dewetting patterns to be localized to specific areas of a surface, resulting in a self-organized pattern within a light-directed pattern. By confining the uncrosslinked polymer to an area that approaches the size of the equilibrium dewetting morphology, new mesoscopic features result. For thicker films, the polymer organizes into ribbons at the interface between crosslinked and uncrosslinked polymer. When the width of the uncrosslinked area is large enough, droplets form between the ribbons. As the width gets larger, droplet organization evolves from incomplete to complete polygons. In addition, the structure of the dewetting morphologies changes as the thickness of the film changes.

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