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Diffusion-Controlled, Self-Organized Growth of Symmetric Wrinkling Patterns CHRISTOPHER M. STAFFORD, JUN YOUNG CHUNG, ADAM J. NOLTE, Polymers Division, National Institute of Standards and Technology, POLYMERS DIVISION, NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY TEAM — The formation of self-organized wrinkling patterns is a potential route for generating such tunable ordered patterns on surfaces across many length scales. Here, we demonstrate that surface wrinkling of ultraviolet/ozone (UVO) treated polymer films through osmotically driven swelling by solvent vapor sorption leads to unique and intriguing patterns, some of which have not been previously reported. The type of pattern and speed of its growth is coupled to the degree of UVO crosslinking and the rate of solvent diffusion into the film from a localized defect. This simple yet novel approach could serve as a test-bed for studying topography-driven phenomena such as wettability and adhesion and diffusion related processes, as well as facilitate a better understanding of dynamic self-assembly.

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