

Abstract Submitted  
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**Template-guided highly aligned, nano-scale wrinkle structure on a large-area**<sup>1</sup> JONGCHEON LIM, PILNAM KIM, KAIST — This study presents a novel technique to induce aligned, nano-scale wrinkle on a polysiloxane-based UV curable resin. There have been studies on generating randomized sub-micron wrinkle using oxygen plasma treatment which causes equibiaxial compressive stress on the film surface. Few works have been reported on how to control the surface wrinkle orientation. Currently available approaches for regulating the wrinkle pattern typically require polydimethylsiloxane (PDMS)-based bilayer system under uniaxial stress condition which hampers various technological applications. Here, we demonstrate a method to generate aligned wrinkle with UV curable polymers. Highly regular array of nanoscale wrinkles were formed by elastic buckling of bilayered UV curable resin, resulting from a combination of confinement effect and anchor-guided propagation of structure. The wrinkle tends to align uniformly lateral to the template pattern as the resin filled in the pattern forms more convex meniscus. The wavelength of the wrinkle was controlled by UV exposure time yielding as small as 170nm. From our results, we suggest the confinement provided by the template pattern may have affected the direction of thin film's expansion yielding unidirectional compressive stress.

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