

Fabrication of Uniform Wrinkle Structure on Hydrogel Films by Diffused UV Light-Mediated Photopolymerization

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Wrinkled hydrogel films have a high potential value in a wide range of applications including sensors, responsive coatings and adhesives. In this study, we develop a method to reversibly fabricate the desired shape of wrinkles. We irradiate the monomer solution with diffused UV lamp light via a pinhole array photomask (< 10 μm). As a result, a hydrogel film with a rugged surface can be obtained. Hydrogel film made of pH-responsive material, poly(2-hydroxyl methacrylate-co-acrylic acid) (p(HEMA-co-AA)) is swell depending on pH. Subsequently, a wrinkled structure is formed on the surface of the hydrogel film reversibly in accordance pH. It is possible to obtain wrinkles of various patterns such as a square or a hexagon in keeping with the photomask pattern. Eventually, we observe that *Escherichia coli* on wrinkled hydrogel film are grown followed by wrinkle patterns which can be used for positioning individual cells for bioapplications.