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pH actuating soft-hydrogel microparticles

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Materials that spontaneously transform into folded structures from two dimensional (2D) to three dimensional (3D) structures, in response to external stimuli, have been recently interested. Especially, stimuli-responsive materials are important as self-folding materials because these have high flexibility and responsive character to external stimuli, such as temperature, solvent, and pH. In this study, we investigate major factor of self-folding of hydrogel bilayers fabricated from simple micromolding technique with geometrical change of structures. Basically, the bilayered hydrogel microstructures are composed of responsive layer, which responses to external stimuli, and irresponsive layer. As expected, self-folding of hydrogel bilayers is driven by differential swelling property of each layer in environmental solutions. After these bilayers are exposed to specific environment, radius of curvature of self-bending curved structures shows a narrow size distribution. We characterize various parameters with respect to geometrical change of the soft-hydrogel microparticles. In conclusion, we envision that the self-actuating hydrogel materials have great potential in variety of application including actuators, drug delivery systems, tissue engineering scaffolds, valve and soft-robotic systems.

Biography

YoungShin Song completed her Bachelor's degree at the age of 24 years from Chungnam National Universty and studying Master's degree from Chungnam National University. Now, she is studying self-folding using stimuli-responsive materials.

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