

Abstract Submitted
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Fabrication of thermo-responsive microfluidic membrane using photopolymerization patterning¹ HYEJEONG KIM, SANG JOON LEE, Center for Biofluid and Biomimic Research, Department of Mechanical Engineering, Pohang University of Science and Technology, Pohang, 790-784 — The programmed manipulation of responsive functional hydrogels is receiving large attention because of its unique functions and wide range of engineering applications. In this study, we developed an innovative stomata-inspired membrane (SIM) by fabricating a temperature-responsive hydrogel with a simple, cost effective, and high-throughput photopolymerization patterning process. Polymerization-induced diffusion on the macro-scale surface gives rise to form a multi-parted polymer membrane with fine pores by simple UV irradiation. After heating the SIM, the less deformable thick frame supports the whole structure, and the highly deformable thin base regulates the size of pores. The morphological configuration of the SIM can be easily changed by varying the solution composition or selecting a suitable photomask with different pattern. The developed SIM has the special sensing-to-actuation functions of stimuli-responsive hydrogels. This membrane with temperature-responsive pores would be potentially utilized in numerous practical applications, such as filter membranes with self-adjustable pores, membrane-based sensors, membrane-based actuators, and multi-functional membranes etc.

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Hyejeong Kim
Center for Biofluid and Biomimic Research,
Department of Mechanical Engineering,
Pohang University of Science and Technology, Pohang, 790-784

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