Highly stretchable and electrically driven hydrogel actuators for biomedical soft robots

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Soft robots driven by stimuli-responsive materials have unique advantages over conventional rigid robots. Particularly, many efforts are being made to develop high-performance materials in smart wearable devices and nanosoft intelligent robots. Over the past several decades, stimuli-responsive hydrogels have studied extensively for biomedical applications. Hydrogel with high water contents and three-dimensional network structure can convert external stimuli into flexible mechanichal movement, and are similar to soft tissues. However, their poor mechanical properties and brittle nature severely hamper their practical applications for biosensor, biorobotics, smart devices. In this study, we produced highly stretchable hydrogel soft actuator that responds to electrical stimulus. The gel fraction, equilibrium water content, mechanical strength of hydrogel actuator were determined. We also investigated the electro-active properties of hydrogel under the electric field.