Visco-Poroelastic Polymer Ion Pump for Multimodal Sensor Skins

김도환[†]
한양대학교
(dhkim76@hanyang.ac.kr[†])

Creating artificial sensor skins that shows the tactile- and chemical-sensing capability of human skin has been a big challenge in wearable sensor research. In particular, biomimetics has emerged as a burgeoning area in the field of deformable tactile sensor skins that has led innovations in material designing and device structure manipulation with the aim of imitating multimodal sensing features of human skin. In this talk, inspired by the sophisticated physiological sensing mechanism of living cells, we describe a uniquely designed visco-poroelastic, iontronic pump consisting of artificial ions confined into polymeric network matrix. Novel bottom-up strategy employed here resulted into supramolecular polymer networks through non-covalent interactions between poroelastic artificial ions and viscoelastic polymer chains, which endows effective iontronic pumping under mechanical stimuli and electronic field, simultaneously. This design for visco-poroelastic, iontronic, tactile sensor skin allows for highly sensitive mechanosensing over a wide spectrum of pressure (Pa~150kPa) and ultrastable chemosensing under harsh external stress beyond capabilities of human skin.