

Electrical and Optical Dual-Output, Porous Gel-Based Versatile Sensory Platform

권진한, 김용민, 문홍철[†]

서울시립대학교

(hcmoon@uos.ac.kr[†])

Here, we propose porous ion gels for high-performance, functional ionic sensory platforms. The porous ion gels can be effectively deformed by closing pores even with small pressure, a large variation in the contact area of the gel and electrodes is induced, leading to a significant difference in electrical double layer capacitance. The porous ion gels are applied to ionoskins after adjusting mechanical characteristics by optimizing gel parameters. The device indicates high sensitivity of $\sim 152.8 \text{ kPa}^{-1}$, a broad sensory pressure range (up to 400 kPa), and excellent durability (> 6000 cycles). Successful monitoring of various human motions that produce a wide range of pressure are demonstrated with high precision. More interestingly, the functionality of the porous ion gel is extended to include electrochemiluminescence (ECL), resulting in the production of emissive ECL ionoskins. The ECL intensity from the emissive ionoskin is linearly correlated with the applied pressure, which can even be inferred by the naked eye.