An Integrated Self-Healing Electronic Device

손동희†, 최희원
성균관대학교
(daniel3600@skku.edu†)

Self-healing chemistry has driven crucial advances in stretchable and modular electronics in recent years. Despite the advances, most studies on self-healable electrodes are based on bulk composites composed of highly viscoelastic polymers and conductive fillers, leading to poor mechanical robustness that limits their application in stretchable and wearable and even implantable electronics. Herein, we describe rational material design strategies and monolithic integration technologies for highly tough and self-healable electronic skin systems integrated with intrinsically stretchable interconnects, sensors, and display modules through an easy device assembly by transfer-printing via a self-bonding process. The skin system can also be used as a chronic bidirectional neural interface that is capable of minimizing pressure-induced immune response and neurosis owing to dynamic stress relaxation of the self-healing polymer. We demonstrate chronic peripheral bidirectional neural interfaces. Our self-healing technology proves the great potential of wearable and implantable bio-integrated electronics.