3D PRINTABLE, SELF-HEALING AND IONIC CONDUCTIVE HYDROGEL FOR SELF POWERED TACTILE SENSORS

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Smart sensors based on conductive hydrogels have shown a remarkable potential whenever a link between the "soft" human world and the "rigid" electronic one is required, in fields like wearables and soft robotics [1,2]. However, conventional manufacturing technologies, such as casting processes, limit the shapes obtainable and consequently the applications[3].

Here, a photocurable double network poly(vinyl alcohol)/Acrylic Acid (PVA/AAc)[4] hydrogel was doped with Sodium Chloride (NaCl) to improve its ionic conductivity. The resulting hydrogel (PVA/AAc/NaCl) exhibited high stretchability, electrical responsiveness to external mechanical stimuli and autonomous self-healing. In addition, formulation reactivity to UV light makes it an optimal choice for 3D printing. Indeed, complex structures that enhanced mechanical stress sensitivity were fabricated exploiting Digital Light Processing (DLP) 3D printing technique. Moreover, the application of PVA/AAc/NaCl hydrogel as electrolyte in a Laser Induced Graphene (LIG) based supercapacitor [5] expanded its versatility bringing to the production of customizable self-powered and self-healing multifunctional strain sensors.

References

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