

## Flexible, All-Polymer Supercapacitors based on the Agarose/Activated Carbon Composite Hydrogels

김종식, 김민호, 조용현<sup>1</sup>, 심태섭<sup>†</sup>

아주대학교; <sup>1</sup>순천향대학교

(tsshim@ajou.ac.kr<sup>†</sup>)

Recently, a three-dimensional (3D) electrodes have been developed for high-capacity supercapacitor. In this study, we use agar/activated carbon (AC) composite gel as electrode materials supercapacitor. The agarose is a natural hydrophilic polymer and forms a hydrogel. It has a characteristic of thermal sol-gel transition which enables reversible shape configuration of materials. Using reversible thermal sol-gel transition of agar/AC composite gel, we make various shapes of agar/AC composite gels for demonstrating as a shape configurable agar/AC composite electrode. Quantative analysis for electrical properties as electrodes of Agar/AC composite hydrogel proves that conductivity of composite gels can be measured to  $5.12 \times 10^{-4}$  S/cm. Finally, we integrate agar/AC electrodes with agar-based solid electrolyte containing NaCl to demonstrate flexible, all-polymer supercapacitor which can be potentially applied for designing 3D electrodes in the future.