

All solid state flexible and miniaturized microsupercapacitor based on conductive ink using penlithography : its effect of gel electrolytes

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The flexibility and miniaturization of energy storage devices becomes important as the demands of wearable and flexible devices increase. In particular, electrochemical microsupercapacitor (MSC) has been widely studied because it features higher energy density, power outputs and variety of application than conventional battery. However, most of manufacturing process for flexible and miniaturized MSC has been carried out in a clean room with complex and expensive devices. In this work, MSC for the flexibility and miniaturization with a fabricated graphene/polyethylenedioxythiophene(PEDOT) using pen lithography is introduced. Graphene/PEDOT composite ink is layered and polymerized on a very small area of polyethylene terephthalate film without complex process. Furthermore, all solid state three different gel polymer electrolytes which show good ionic conductivity in the MSC are investigated to obtain high power density. As a result, Graphene/PEDOT MSC with PVA/H<sub>2</sub>SO<sub>4</sub> gel electrolyte shows best electrochemical properties such as maximum operating potential window(1.2V), specific capacitance of 37.08 mFcm<sup>-2</sup>, and energy density of 6.4 mWhcm<sup>-2</sup>.