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Fabrication of thin film electrode for electric double layer capacitor by using slot die coating for activated carbon nanopowder

Recently, the interest in flexible electronics continues to grow and the spotlight is on the development of flexible energy storage devices such as lithium ion batteries and supercapacitors. They can be embedded in tiny and flexible electronic devices and also needed to exhibit excellent recyclability, high power and energy densities to be used on a daily basis. The main issue for a flexible energy storage devices are is manufacturing process of flexible and thin electrodes. In this study, activated carbon nanopowders were used as flexible electrode materials, which have smaller particle size distribution than activated carbon powder generally used in the most of electric double layer capacitor. Stainless foil were used as current collectors and very thin film activated carbon electrode was coated on the stainless foil by using slot die coating process. Due to the activated carbon nanopowder and thin film coating technology, very thin and flexible electrodes which have several micrometer thickness can be manufactured as comparing with conventional electrodes of EDLC (~100um). Electrochemical characteristics of the electrode were investigated by cyclic voltammetry and electrochemical impedance spectroscopy.