Capacitance improvement of activated carbon electrode by the surface modification with titania for application to the electrode of capacitive deionization

이윤지, 민병호, 최재환, 정경열†
공주대학교
(kyjung@kongju.ac.kr†)

Capacitive deionization (CDI) is known as as a potential desalination technology. The performance of CDI depends on the characteristics of electrode materials. Currently, activated carbon powders (ACPs) are most frequently used as the electrode materials due to their advantages such as high surface area, good electrical conductivity, and high stability in chemical and physical viewpoints. It was reported that the incorporation of several metal oxides (TiO2, SiO2, and ZrO2) into activated carbon cloth (ACC) is helpful to enhance the capacitance of electrodes. Also, the specific capacitance of activated carbon (AC) can be improved by mixing TiO2 nanoparticles due to a reduction of polarization of the ACs. Nevertheless, there are few studies on the titania coating effect on the CDI performance. In this work, the TiO2-coated ACPs were prepared by a sol-gel reaction to improve the specific capacitance as an electrode for CDI applications. Their electrochemical properties with changing the amount of titania were characterized by using electrochemical methods such as cyclic voltammetry (CV) and electrochemical impedance spectroscopy (EIS) analysis.