Activated Carbon Synthesized From Banana Peel as Electrodes in Li-Ion Capacitors

Arenst Andreas Arie[1*] and Joong Kee Lee[2]

[1]Department of Chemical Engineering, Parahyangan Catholic University, Ciumbuleuit 94 Bandung 40141 Indonesia

[2]Advanced Energy Materials Processing Laboratory, Advanced Battery Center, Korea Institute of Science and Technology, P.O.BOX 131, Cheongryang, Seoul 130-650, Korea

[*] E-mail address: arenst@unpar.ac.id

Abstract

A surface modified activated carbons with high consistency and large porosity was successfully synthesized by carbonization of banana peel and subsequent surface modification with HNO_3 solution. The pore properties of obtainedactivated carbon , including the BET surface area, pore volume, and pore size distribution of carbon samples were characterized by the N_2 adsorption isotherms. The surface functional groups were characterized by Fourier transform infrared spectroscopy and X-ray photoelectron spectroscopy (XPS). Surface morphology and microstructure were physically characterized by scanning electron microscopy (SEM) and transmission electron microscopy (TEM). The synthesized activated carbons was studied as electrodes for Li-ion capacitors. The effects of modification conditions on the electrochemical characteristics of Li-ion capacitors behavior were systematically investigated, a maximum specific capacitance of 125 F g^{-1} were obtained. Long-term cycling experiments showed excellent stability.

Keywords. Banana Peel, Li-ion Capacitor, Surface Modification, Specific capacitance