Preparation of highly porous activated carbons from biomass precursors by chemical activation for electrical double layer capacitors

의상국, 심왕근, 박광현, 문 희*
전남대학교
(hmoon@jnu.ac.kr*)

In this work, novel highly porous activated carbons (ACs) were successfully prepared from biomass precursors (i.e., corn grain and beer lees) by chemical activation with KOH at temperature of 800 oC. The textural properties, energetic heterogeneities and surface functional groups of the prepared biomass ACs were evaluated using the nitrogen adsorption-desorption isotherm, adsorption energy distribution function (AED), X-ray photoelectric spectroscopy (XPS) and elemental analysis (EA). In addition, the biomass ACs were examined as an electrode in electrical double layer capacitors in 0.1 M H_2SO_4 electrolyte solutions. The BET surface area and the total pore volume of biomass ACs prepared ranged from 2000 to 3500 m^2/g and 0.5 to 1.5 cm^3/g, respectively. The experimental results also revealed that the prepared ACs had the relatively high specific capacitance of 100-300 F/g by using three-electrode cell. A linear relationship between the surface area and the specific capacitance was observed. In addition, the specific capacitance was well explained by the results of AED, which provide comparative important information of their surface energetic heterogeneity.