World Academy of Science, Engineering and Technology
International Journal of Environmental and Ecological Engineering
Vol:14, No:07, 2020

Synthesis and Characterization of Green Coke-Derived Activated Carbon by KOH Activation

Authors : Richard, Iyan Subiyanto, Chairul Hudaya

Abstract : Activated carbon has been playing a significant role for many applications, especially in energy storage devices. However, commercially activated carbons generally require complicated processes and high production costs. Therefore, in this study, an activated carbon originating from green coke waste, that is economically affordable will be used as a carbon source. To synthesize activated carbon, KOH as an activator was employed with variation of C:KOH in ratio of 1:2, 1:3, 1:4, and 1:5, respectively, with an activation temperature of 700°C. The characterizations of activated carbon are obtained from Scanning Electron Microscopy, Energy Dispersive X-Ray, Raman Spectroscopy, and Brunauer-Emmett-Teller. The optimal activated carbon sample with specific surface area of 2,024 m^2/g with high carbon content (> 80%) supported by the high porosity carbon image obtained by SEM was prepared at C:KOH ratio of 1:4. The result shows that the synthesized activated carbon would be an ideal choice for energy storage device applications. Therefore, this study is expected to reduce the costs of activated carbon production by expanding the utilization of petroleum waste.

Keywords : activated carbon, energy storage material, green coke, specific surface area
Conference Title : ICCPCC 2020 : International Conference on Carbon Pollution and Climate Change
Conference Location : Bali, Indonesia
Conference Dates : July 16-17, 2020