Paper No: PU-SOE- Mech – 19

Fabrication of carbonized flakes epoxy electrode using lemon rind for supercapacitor applications

Satish Babu Boppana[9]
Mechanical Engineering, School of Engineering, Presidency University, Bangalore, 560064, Karnataka, India

Abstract

The present study confirms the application of phytochemicals of Lemon rind (LR) towards the synthesis of activated carbon using a low temperature carbonization method. The structural, morphological, and electrochemical properties of the prepared carbonized flakes epoxy (CFE) electrode has been analyzed using various characterization techniques. The electrochemical double layer capacitance (EDLC) behavior of the LR-activated carbon has been evaluated. The synthesized LR-activated carbon material exhibited flake like structure along with hydroxyl groups as confirmed by studies by scanning electron microscope (SEM), X-ray diffractometer (XRD), and Fourier transform infrared (FTIR) spectroscope. In addition, the band gap energy (Eg) has been estimated using diffused reflectance spectroscopy (DRS-UV-Vis) and found to be 2.06 eV. The electrochemical property of CFE-electrode was studied utilizing cyclic voltammetric (CV) and electrochemical impedance spectroscopic (EIS) techniques. The galvanostatic charge–discharge tests for this prepared carbon flake electrode demonstrated excellent capacitance performance, making it favorable for the fabrication of supercapacitors. These progressive results could be considered for the enlargement of novel assets to scale for power-storage utility using low-cost carbon materials in various energy storage applications as well.

Keywords:

Lemon rind, Activated carbon, Carbonized Flakes Epoxy (CFE) Electrode, Capacitance, Supercapacitor

Publication Details:

Journal Name	Vol.	Month & Year	Page No.	Publisher	Scimago Ranking
Case Studies in Chemical and Environmental Engineering	3	June, 2021	NA	Elsevier	Q1