



Contribution ID: 45

Type: Poster Presentation

Activated carbon/Nickel-Aluminium double layer hydroxide composites for supercapacitor applications

Tuesday, 4 July 2017 17:10 (1h 50m)

In this study, a detailed analysis of the electrochemical performance of activated carbon/Nickel-Aluminium layered double hydroxide (AC/NiAl-LDH) composites were investigated as potential electrode materials for electrochemical capacitors. The activated carbon (AC) was prepared via optimization of the carbonization temperature and activating agent (potassium hydroxide) from a tree-bark biomass raw material. Subsequently, porous NiAl-LDH was also obtained using a solvothermal technique by varying the syntheses times. The optimized activated carbon sample was then added to the NiAl-LDH sample in different masses to produce an AC/NiAl-LDH composite material. The morphology revealed an interconnected framework of both the AC and LDH structures. The specific surface area (SSA) of the AC/NiAl-LDH composite was seen to improve with an increase in the amount of AC added to the NiAl-LDH material. This increase in SSA enabled a better charge transfer propagation and charge storage within the composite when adopted as electrodes for supercapacitor. A specific capacity of 18.90 mAh/g was obtained for the AC/NiAl-LDH composite material. The results obtained demonstrate the potential of this composite material as electrodes for energy storage devices.

Apply to be considered for a student award (Yes / No)?

Yes

Level for award (Hons, MSc, PhD, N/A)?

Msc

Main supervisor (name and email) and his / her institution

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Would you like to submit a short paper for the Conference Proceedings (Yes / No)?

No

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Session Classification: Poster Session 1

Track Classification: Track F - Applied Physics