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Preparation and electrochemical investigation of the cobalt hydroxide carbonate/activated carbon nanocomposite for supercapacitor applications

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Abstract content
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Cobalt hydroxide carbonate/Activated carbon (AC) composites were successfully synthesized by the hydrothermal method. Morphological characterization of the composites was performed by scanning electron microscopy (SEM), and the results show that AC (activated carbon) was well dispersed in the loosely packed cobalt hydroxide nanorods. The structure and the optical characteristics of the composites were further characterized by XRD and FTIR respectively. Because of the synergistic effects coming from cobalt hydroxide carbonate nanorods and AC, the electrochemical performances of pure cobalt hydroxide carbonate material were significantly improved by adding AC. The cobalt hydroxide carbonate/activated carbon composites showed a specific capacitance of 273.43 F g⁻¹ at a current density of 1 A g⁻¹ in 6 M KOH electrolyte. Furthermore, these composites exhibited good cycling stability and lifetime. Therefore, based on the above investigation, such cobalt hydroxide carbonate/activated carbon composites could be a potential candidate for supercapacitors.

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Main supervisor (name and email)
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Prof N Manyala, manyalancholu@gmail.com, University of Pretoria

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Primary author: Ms MASIKHWA, Tshifhiwa Moureen (University of Pretoria)

Co-authors: Mr BELLO, Abdulhakeem (university of pretoria); Mr MOMODU, Damilola. Y. (university of pretoria); Mr BARZEGAR, Farshad (university of pretoria); Mr DANGBEGNON, Julien. K. (university of pretoria); Mr MADITO, Moshawe J (university of pretoria); Mr MANYALA, Ncholu. (university of pretoria)

Presenter: Ms MASIKHWA, Tshifhiwa Moureen (University of Pretoria)

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