

## **Abstract**

[This study was designed as a comparative analysis between CoHCF and its hybrid composites (CoHCF/MnO<sub>2</sub> and CoHCF/MnO<sub>2</sub>/MWCNTs) prepared via hydrothermal synthesis, without any use of surfactant or catalyst to maintain high purity of prepared materials and in effort to strengthen the basic morphology and structure of the analytes. Results of scanning electron microscope revealed that CoHCF and MnO<sub>2</sub> managed to retain their original morphologies in CoHCF/MnO<sub>2</sub> composite meanwhile X-ray diffraction confirmed its successful fabrication which highlights the efficiency of preparation method. CoHCF/MnO<sub>2</sub>/MWCNTs was fashioned with addition of Multi-walled Carbon nanotubes to CoHCF/MnO<sub>2</sub> in order to enhance the outcomes of designed supercapacitor. High capacitance values of 371, 684 and 2836 Fg<sup>-1</sup> were delivered by CoHCF, CoHCF/MnO<sub>2</sub> and CoHCF/MnO<sub>2</sub>/MWCNTs, respectively at 1 Ag<sup>-1</sup> current density in 0.5 M Na<sub>2</sub>SO<sub>4</sub> aqueous electrolyte. Furthermore, improved energy density of 98.47 Wh/kg at power density of 125 W/kg was achieved by CoHCF/MnO<sub>2</sub>/MWCNTs at 1.0V cell voltage showing its potential as an impressive contender for the supercapacitor's electrode material.