**Abstract**

 A battery type electrode material of LiNiPO4 electrodes were synthesized through different chelating agents such as citric acid, L-Ascorbic acid and D-sorbitol for the fabrication of aqueous type hybrid supercapacitors. The phase purity, homogeneity and the functional groups present in the synthesized LiNiPO4 are characterized through X-ray diffraction and FTIR measurements. Field emission scanning electron microscopy (FESEM) images show that there is a uniform and spherical shaped nano particles present in the compound synthesized from D-sorbitol than the remaining samples. The redox peaks and plateau regions in the cyclic voltammetry (CV) and Galvanostatic charge-discharge (GCD) profiles infer the dominance of battery-type charge process rather than a capacitive mechanism. As a result, LiNiPO4 exhibits a maximum specific capacitance of 417 F g-1 at 2 mV s-1 and 357 F g-1 at 1mA cm-2 in 1 M LiOH, which enables as a suitable cathode material for hybrid supercapacitor. Also, the assembled hybrid supercapacitor delivered a high energy density of 12.5 Wh kg-1 at 200 W kg-1 as well as a longer cycle life of 89% at a current density of 1 mA cm-2 over 2000 cycles is noticed. These results infer that LiNiPO4could be used as a novel electrode material for hybrid supercapacitor application.