Improve the energy storage capacity of NiPBA by the interaction between framework and mesoporous carbon.

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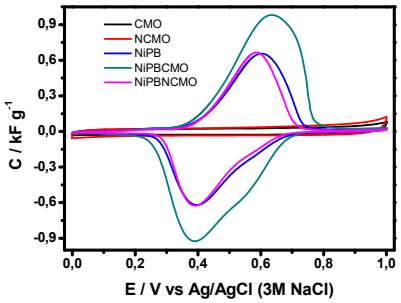
Metal hexacyanoferrates (MHCFs), known as the Prussian blue analogues, are very promising materials for charge-storage and sensor applications due to their unique structural characteristics such as three-dimensional (3D) network with a distinct tunnel and pore structures with the general chemical formula of $A^hM^k[Fe(CN)_6]_r \cdot nH_2O$ (where A = alkali metal cation, M = transition metal cation) [1]. It is well known that MHCF can exhibit the solid state redox reactions associated with electrochemical insertion/extraction of various ions (Li^+, Na^+, K^+, NH_4^+, Mg^{2+}, etc.). Prussian blue analogues have been investigated as the battery electrode materials and their potentials for supercapacitive energy storage [2]. In this work, the nickel(II) hexacyanoferrate(III) (NiPBA) /carbon mesoporous composites were synthesized by co-precipitation method. Their structural characterization was carried out from powder X-ray diffraction data, FT-IR and Raman. The cyclic voltammetry results shows (Figure 1) only one faradic process associated to $[Fe^{III}(CN)_6]$/ $[Fe^{II}(CN)_6]$ redox couple which is accompanied by K^+ ion ingress in and out of the cyanobridged metallic framework for maintaining local charge neutrality. The NiPBACMO composite exhibited higher specific capacitance and capacitive properties in 1M KNO3 solution within the potential range from 0 to 1 V.



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Reference to a chapter in an edited book: