S Selladurai, J Material Sci Eng 2016, 5:7 (Suppl)
http://dx.doi.org/10.4172/2169-0022.C1.046



6th International Conference and Exhibition on
Materials Science and Engineering
September 12-14, 2016 Atlanta, USA

## Energy storage material

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In order to overcome current energy deficit, alternative efficient energy production, storage and transportation is required. Batteries and capacitors are widely used to store electrical energy. Introduction of electrochemical capacitor (EC) or supercapacitors has revolutionized energy storage devices. EC's are superior to batteries in terms of power density and conventional capacitors in terms of energy density. Owing to their fast charge-discharge capabilities, long cycle life, flexibility, safety, etc. they attract wide researchers. Specific capacitance of the capacitor can be substantially increased by using suitable nanomaterials as electrode material. Materials like metal oxides and conducting polymers are used as electrodes in EC's that store electrical energy by faradaic redox process. On the other hand carbon based materials store electrical energy by forming double layer at the electrode-electrolyte interface. Generally, pseudocapacitance originating from redox process is much higher compared to electric double layer capacitance. Transition metal oxides exhibit excellent capacitive performance. Especially, $RuO_2$ and $IrO_2$ shows ideal performance but their application is hindered by toxicity and cost effectiveness. Spinel oxides of cobalt like $Co_3O_4$, $NiCo_2O_4$, $MnCo_2O_4$, etc. are class of materials that possess high theoretical capacitance. Nickel cobaltites were prepared by combustion technique. Phase and structural details were obtained from X-ray diffraction studies. Functional groups attached to the compound were analyzed using FTIR spectroscopy. XPS technique was utilized to determine the oxidation state of constituent elements. Surface morphology of the prepared samples was examined using FESEM imaging technique. Capacitive property of the material was investigated by employing cyclic voltammetry (CV), chronopotentiometry (CP) and electrochemical impedance spectroscopy (EIS) studies. Pseudocapacitive nature of the samples was revealed from the redox peaks observed in the CV curve. Large area under the CV curve depicts the increase in specific capacitance. CP curves also illustrate the pseudocapacitive behaviour of the samples. Impedance study indicates the low charge transfer resistance in the prepared material. Linear portion of the spectrum in the low frequency region demonstrates the low diffusion resistance offered by the electrode material owing to its porous morphology.

### Biography

S Selladurai has completed his PhD from Anna University and Post-doctoral studies from Marie Curie University, France. He is the Additional Registrar of premier Anna University. He has published more than 85 papers in reputed journals and has been serving as guest Editor in Ionics.

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