

Synthesis and Characterization of Ni-Rich Nano-Li(NiCoMn)O<sub>2</sub> Cathode Materials for Lithium Ion Batteries  
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Ni-rich nano-Li(Ni<sub>0.6</sub>Co<sub>0.10</sub>Mn<sub>0.075</sub>)O<sub>2</sub> cathode materials were prepared by sol-gel method using citric acid as chelating agent via three different synthesize routes namely sulphate, acetate and nitrate. The formed gel was dried at 90°C for 12-hours and decomposed at 350°C for 5-hours. The amorphous precursor was calcined at 750 and 850°C for 20-hours. To achieve better homogeneity and nano sized material the cathode material was ground in ball mill at 450 rpm for 20 h. The structure and electrochemical performance of the calcined cathode materials were characterized by field emission scanning electron microscopy (FESEM), X-ray diffraction (XRD), Fourier Transform Infra Red Spectroscopy (FTIR), Cyclic voltammograms (CV) and galvanostatic charge-discharge studies. The cathode materials demonstrate a homogeneously distributed nano particles and exhibit a good reversibility in the CV studies. The Ni-rich cathode material synthesized via acetate route at 850°C for 20-hours offered the highest initial discharge capacity compared with the cathode materials synthesized via nitrate and sulphate routes .