The Electrochemical Properties of $\text{Li}_2\text{Ni}_x\text{Mn}_{1-x}\text{SiO}_4$ Cathode Material for Lithium Batteries

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$\text{Li}_2\text{Ni}_x\text{Mn}_{1-x}\text{SiO}_4$ ($x = 0, 0.2, 0.4, 0.6, 0.8$ and 1) samples were prepared by solid state process. The structure of prepared samples of $\text{Li}_2\text{Ni}_x\text{Mn}_{1-x}\text{SiO}_4$ is characterized by XRD. The crystal structure of the samples is orthorhombic having space group $\text{Pmn}2_1$. SEM investigations are carried out explaining the morphology of powders of these samples. Furthermore, electrochemical impedance spectra measurements are applied. The highest conductivity is achieved with the cell prepared from $\text{Li}_2\text{Ni}_{0.2}\text{Mn}_{0.8}\text{SiO}_4$ compound. Cyclic voltammetric measurements are carried out for $\text{Li}_2\text{Ni}_x\text{Mn}_{1-x}\text{SiO}_4$ material between 0.1 and 4.5 V vs. Li^+ with scan rate 0.1 mVs^{-1} . It is observed that $\text{Li}/\text{Li}_2\text{Ni}_{0.2}\text{Mn}_{0.8}\text{SiO}_4$ cell has initial capacity of 160 mAhg^{-1} . The cycle life performance is carried out for $\text{Li}_2\text{Ni}_x\text{Mn}_{1-x}\text{SiO}_4$ cells. The prepared cells gave average capacities between 100 and 150 mAhg^{-1} .

Keywords: Lithium battery; lithium transition metal silicates.

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