

عنوان مقاله:

Synthesis, characterization and optical band gap of Lithium cathode materials: $\text{Li}_2\text{Ni}_2\text{O}_7$ and LiMn_2O_4 nanoparticles

محل انتشار:

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خلاصه مقاله:

$\text{Li}_2\text{Ni}_2\text{O}_7$ and LiMn_2O_4 Nanoparticles as cathode materials of lithium ion battery, were successfully synthesized using lithium acetate, nickel and manganese acetate as Li, Ni and Mn sources and stearic acid as a complexing reagent. The structure of the obtained products were characterized by FT-IR and XRD. The shape, size and distribution of the $\text{Li}_2\text{Ni}_2\text{O}_7$ and LiMn_2O_4 nanoparticles were observed by SEM. Optical band gap and magnetic properties were determined by Diffuse Reflectance Spectroscopy (DRS) and Vibrating Sample Magnetometer (VSM). $\text{Li}_2\text{Ni}_2\text{O}_7$ and LiMn_2O_4 spinels were identified as the main crystalline phases. The particles size of both, $\text{Li}_2\text{Ni}_2\text{O}_7$ and LiMn_2O_4 nanoparticles, is around 24 to 32 nm. Optical band gap of $\text{Li}_2\text{Ni}_2\text{O}_7$ and LiMn_2O_4 are 1.40 eV and 1.16 eV, respectively. Therefore, lithium nickel and lithium manganese oxide nanoparticles can be used as a semiconductor materials in electrical devices. VSM curve showed paramagnetic behaviour of LiMn_2O_4 nanoparticles. Moreover, color parameters were obtained by colorimetric analysis of LiMn_2O_4 indicating characteristic values of $L^*=25.82$, $a^*=1.607$ and $b^*=1.143$.

کلمات کلیدی:

$\text{Li}_2\text{Ni}_2\text{O}_7$, LiMn_2O_4 , nanoparticles, Optical band gap, Semiconductor

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