

Fabrication of LiNbO₃ Based Conspicuous Nanomaterials for Renewable Energy Devices

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Abstract : Optical and dielectric properties of lithium niobates have made them the fascinating materials to be used in optical industry for device formation such as Q and optical switching. Synthesis of lithium niobates was carried out by solvothermal process with and without temperature fluctuation at 200°C for 4 hrs, and behavior of properties for different durations was also examined. Prepared samples of LiNbO₃ were examined in a way as crystallographic phases by using XRD diffractometer, morphology by scanning electron microscope (SEM), absorption by UV-Visible Spectroscopy and dielectric measurement by impedance analyzer. A structural change from trigonal to spherical shape was observed by changing the time of reaction. Crystallite size decreases by the temperature fluctuation and increasing reaction time. Band gap decreases whereas dielectric constant and dielectric loss was increased with increasing time of reaction. Trend of AC conductivity is explained by Joschner's power law. Due to these significant properties, it finds its applications in devices, such as cells, Q switching and optical switching for laser and gigahertz frequencies, respectively and these applications depend on the industrial demands.

Keywords : lithium niobates, renewable energy devices, controlled structure, temperature fluctuations

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