

## **PREPARATION OF $\text{LiMn}_2\text{O}_4$ - SPINEL STRUCTURE BY THE HYDROTHERMAL METHOD**

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Mixed oxides form one of the most important types of modern materials. These represent only a small, but important and diversified part of the entire family of inorganic compounds. Lithium manganese oxide ( $\text{LiMn}_2\text{O}_4$ ) is one of the most popular cathode materials used in lithium-ion batteries. These batteries are currently the state of the art of commercial cells used in consumer electronics.

$\text{LiMn}_2\text{O}_4$  shows interesting chemical properties such as ion exchange, intercalation, and catalysis, together with physical properties such as conductivity, magnetism and adsorption. Therefore,  $\text{LiMn}_2\text{O}_4$  is used as ion-sieves, molecular sieves, catalysts, cathodic materials in  $\text{Li}^+$  ion batteries, and as precursors for the synthesis of organic and inorganic composites and new compounds.

Conventionally, these oxide materials are prepared by the solid state reaction method. Recently, soft chemistry methods such as the sol-gel method involving metal-inorganic/organic precursors, ion-exchange reactions, and hydrothermal methods have been attempted.

$\text{LiMn}_2\text{O}_4$  - spinel structure was synthesized under the laboratory conditions by the hydrothermal method, which is an environmentally friendly and a low-cost synthetic method. The phase formation and composition of  $\text{LiMn}_2\text{O}_4$  were characterized by X-ray diffraction measurements.

X-ray powder diffraction pattern of the prepared sample indicated the formation of face-centre cubic structured  $\text{LiMn}_2\text{O}_4$  - spinel type. This method proved to be very economical compared to the conventional methods.