**Electrochemical Properties of Al-doped LiMn2O4 Thin Films Fabricated by**

**Chemical Spray Pyrolysis Technique**

Jasmine Agnal A \*, Dr. E. Ashlyn Kirupa\*\*

\*Doctoral Research Scholar, Register No: 21123112132019, Department of Physics & Research Centre, Nesamony Memorial Christian College, Marthandam, Affiliated to Manonmaniam Sundaranar University, Tirunelveli

\*\*Assistant Professor, Department of Physics & Research Centre, Nesamony Memorial Christian College, Marthandam

**ABSTRACT**

LiMn2O4 is a safer, cheaper, abundant and environment-friendly material suitable for green Lithium-ion batteries. Al-doped LiMn2O4 thin film was synthesized by cost effective Spray pyrolysis technique using Lithium Acetate, Manganese (II) Acetate Tetrahydrate and doping agent Aluminium Nitrate Nanohydrate as precursors, dissolved in a mixture of 1:1(v/v) methanol and distilled water to obtain 50 ml homogeneous precursor solution of 0.1 M. The phase composition, morphological and electrochemical properties of the synthesized Al-doped LiMn2O4 thin films were investigated by X-ray diffraction (XRD), scanning electron microscopy (SEM), EDAX and cyclic voltammetry (CV). The XRD pattern of Al-doped LiMn2O4 thin films confirmed the formation of cubic spinel structured film. The (111) plane diffraction peaks of LiAlxMn2-xO4 (x = 0.02 and 0.05) thin films shift towards higher 2θ values confirmed that the Al ions substitute the Mn ions in the lattice. SEM micrograph of Al-doped LiMn2O4 thin films exhibit the formation of porous structure with smaller crystallites and EDAX spectrum gives the elemental insight of the prepared samples. The cyclic voltammetry results record that the Al-doped LiMn2O4 thin film possess more specific capacitance at lower scan rate.

**Keywords:** Al-dopedLiMn2O4, Spray pyrolysis, XRD, SEM, EDAX, Electrochemical properties