Concentration dependent Structural and Spectroscopic studies of $La_2Mo_2O_9$ thin film deposited by spray pyrolysis method

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Abstract: The $La_2Mo_2O_9$ (LAMOX) thin film were prepared by using chemical spray pyrolysis method and annealing at 1000 ºC for two hours and characterized by thickness of film, XPS and EDAX. XRD study shows that deposited and annealed LAMOX shows the monoclinic and cubic crystal structure respectively. Thickness measurement revealed the increase in thickness of thin film with temperature up to 400 ºC above this again fall in thickness of thin films observed. XPS study was revealed the surface chemical structure for deposited and annealed LAMOX thin film. It was found that the 3+ and 6+ valance state observed for La and Mo respectively. EDAX study revealed that the purity of deposited and annealed LAMOX thin films.

Keywords: LAMOX, XRD, XPS, EDAX etc.

Introduction:

The planet requires electrical energy, or a green energy source, in order to sustain favourable environmental circumstances. Solid oxide fuel cells have a high conversion efficiency and directly transform chemical energy into electrical energy, with water and oxygen being additional essential outputs [1-4]. The kind of electrolyte employed in the fuel cells determines its classification. High oxide ion conductivity electrolytes are necessary for solid oxide fuel cells. Materials for oxide ion conductors are crucial for solid oxide fuel cells [5-7]. With good ionic conductivity, SOFC made of yttria-stabilized zirconia has been operated at temperatures close to 1000 ºC. The low ionic conductivity of yttria-stabilized zirconia below 1000 ºC is one of the primary limiting variables involved [8]. Research on the discovery of the rapid oxide ion conductor, which can function at low temperatures, has been the focus for many years. Oxide ion conductors have been identified in a few structural families, including brown millerites, pyrochlores, perovskites, and fluorites [9]. In 2000, Lacorreet al. found a novel electrolyte material called Lanthanum Molybdenum Oxide $La_2Mo_2O_9$ (LAMOX), which has higher ionic conduction than yttria-stabilized zirconia and can