

## Preparation and Characterization of Lanthanum Aluminate Electrolyte Material for Solid Oxide Fuel Cell

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**Abstract :** The perovskite type electrolyte material  $\text{LaAlO}_3$  was prepared by solution based auto-combustion method using  $\text{Al}(\text{NO}_3)_3 \cdot 6\text{H}_2\text{O}$ ,  $\text{La}_2\text{O}_3$  with dilute nitrate acid ( $\text{HNO}_3$ ) as precursors and citric acid ( $\text{C}_6\text{H}_8\text{O}_7 \cdot \text{H}_2\text{O}$ ) as a fuel. The synthesis protocol gave an easy processing of the  $\text{LaAlO}_3$  nano-particles. The XRD measurement revealed that the material has single phase with space group R-3c (rhombohedral). Thermal behavior was measured by simultaneous differential thermal analysis and thermo gravimetric analysis (DTA-TGA). The compact pellet density was determined. Also, the surface morphology was studied using scanning electron microscopy (SEM). The conductivity of  $\text{LaAlO}_3$  was measured employing LCR meter and found to increase with increasing temperature. This increase in conductivity may be attributed to increased mobility of oxide ion.

**Keywords :** perovskite,  $\text{LaAlO}_3$ , XRD, SEM, DTA-TGA, SOFC

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