

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

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Abstract : The perovskite type electrolyte material LaAlO_3 was prepared by solution based auto-combustion method using $\text{Al}(\text{NO}_3)_3 \cdot 6\text{H}_2\text{O}$, La_2O_3 with dilute nitrate acid (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 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 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, LaAlO_3 , XRD, SEM, DTA-TGA, SOFC

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