

Characteristic evaluation of $\text{Ce}_{0.8}\text{Sm}_{0.2}\text{O}_{1.9}$ electrolyte added with Li_2CO_3 as sintering aids

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20 mol. % samarium doped cerium oxide ($\text{Sm}_{0.2}\text{Ce}_{0.8}\text{O}_{1.9}$, SDC) has an excellent ionic conductivity than 8 mol% yttria stabilized zirconia ($\text{Y}_{0.08}\text{Zr}_{0.92}\text{O}_{1.96}$, YSZ) commercially available in Solid Oxide Fuel Cell (SOFC). To fabricate SDC electrolyte, however, requires high temperature sintering process with 1600°C or higher. This study aims to lower sintering temperature and to improve the electrolyte performance. Li_2CO_3 was used as a sintering aids to lower sintering temperature. To investigate the effects of Li^+ amounts, 0, 3, 6, 9, and 12 mol.% of Li^+ added SDC samples were prepared. The Li added-SDC electrolytes were sintered at 1400°C and compared to SDC electrolyte sintered at 1600°C. The electrochemical characteristics of the samples were investigated by relative densities, XRD, SEM, and EIS analysis. L06-SDC (Li^+ 6 mol.%) has a highest relative density (97.495%) of the SDC sintered at 1600°C and the grain boundary is very obvious comparing to the other samples. Due to the obvious grain boundary formation exhibited in L06-SDC, the ionic conductivity improved and internal resistance decreased showing 0.1836 Ω at 850°C in H_2 .