

Abstract Submitted  
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**Preparation and electrochemical characterization of Sm and Gd co-doped ceria/carbonate composite electrolytes for IT-SOFC applications**<sup>1</sup> SIBEL DIKMEN, RABIA OZSAKARYA, Suleyman Demirel University, Chemistry, 32260, Isparta, Turkey, ERDAL DIKMEN, Suleyman Demirel University, Physics, 32260, Isparta, Turkey — Sm and Gd co-doped ceria based composite electrolytes were prepared by mixing nanosized powders of  $\text{Ce}_{0.8}\text{Sm}_{0.1}\text{Gd}_{0.1}\text{O}_{2-\delta}$  (SGDC) and alkaline carbonates  $(\text{Na-Li})_2\text{CO}_3$ ,  $(\text{Li-K})_2\text{CO}_3$ , and  $(\text{Na-K})_2\text{CO}_3$  at a weight ratio of 4:1. Structure of the samples was characterized by powder X-ray diffraction. The microstructure and morphology were examined by SEM. Impedance spectroscopy was used to perform electrochemical characterization. The conductivities of the samples increase as the temperature increases and for the composite electrolytes SGDC $(\text{Na-Li})_2\text{CO}_3$ , and SGDC $(\text{Li-K})_2\text{CO}_3$ , there is a sharp increase in conductivity at around 475 and 450°C, respectively. This sudden change in the conductivity refers to superionic phase transition in the interfaces between SGDC phase and salt phase. The single cell power density reached a maximum of 1056, 826, and 565  $\text{mWcm}^{-2}$  for SGDC/  $(\text{Na-Li})_2\text{CO}_3$ , SGDC/ $(\text{Li-K})_2\text{CO}_3$ , and SGDC/ $(\text{Na-K})_2\text{CO}_3$  as the electrolytes, respectively.

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