Accepted Manuscript

Effect of pore formers characteristics and melt infiltration parameters on microstructure and electrical properties of $BaCe_{0.7}Zr_{0.1}Y_{0.2}O_{3-\delta}$-carbonate composite electrolyte

S. Amiri, M.H. Paydar

PII: S0925-8388(17)33813-6

DOI: 10.1016/j.jallcom.2017.11.067

Reference: JALCOM 43760

To appear in: *Journal of Alloys and Compounds*

Received Date: 9 August 2017

Revised Date: 1 November 2017

Accepted Date: 6 November 2017

Please cite this article as: S. Amiri, M.H. Paydar, Effect of pore formers characteristics and melt infiltration parameters on microstructure and electrical properties of $BaCe_{0.7}Zr_{0.1}Y_{0.2}O_{3-\delta}$-carbonate composite electrolyte, *Journal of Alloys and Compounds* (2017), doi: 10.1016/j.jallcom.2017.11.067.

Effect of pore formers characteristics and melt infiltration parameters on microstructure and electrical properties of $BaCe_{0.7}Zr_{0.1}Y_{0.2}O_{3-\delta}$-carbonate composite electrolyte

S. Amiri, M.H. Paydar*

Department of Materials Science and Engineering, School of Engineering, Shiraz University, 7134851154 Shiraz, Iran

Abstract

In the present work, Ba $Zr_{0.1}Ce_{0.7}Y_{0.2}O_{3-\delta}$ (BZCY7)-$(Li/Na)_2CO_3$ composite electrolytes fabricated by infiltration of molten carbonate phase into porous based BZCY7 electrolytes, prepared by using different types of pore formers including graphite, active carbon and starch. The effect of pore formers sizes, morphologies and their amounts, was investigated on the volume fraction of porosities, which can be created during sintering of BZCY7 electrolytes and on the morphologies of the formed porosities. The effect of created pores morphologies, sizes, their volume fractions and also infiltration's temperature and time on the degree of infiltration and electrical conductivity of the fabricated composite electrolytes were also studied. The results proved that by using 20 wt% of each type of the used pore formers, same amount of porosities in the range of 40 to 45 vol.% would be created during sintering of BZCY7 compound at 1400 ^oC for 5 h. By using pore formers more than 20 wt%, the amount of created porosities did not change or just increased a little and soon after it nearly became saturated. Optimum temperature and time for infiltration of melt carbonate phase was determined in the range of 530 to 570 ^oC for