Comparative study for $BaZr_{0.8}Y_{0.2}O_3$, $BaCe_{0.8}Gd_{0.2}O_3$ and $BaZr_{0.4}Ce_{0.4}Y_{0.1}Gd_{0.1}O_{3-\delta}$ electrolyte materials

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The class of perovskites $ABO_3$of barium cerates and zirconates are the most used and studied for protonic conduction, but they have high chemical instability, such as $BaCe_{0.9}Y_{0.1}O_{3-\delta}$, which is highly unstable in environments with $CO_2$and H_2O, whereas the zirconates have low sinterability but high tolerance to CO_2. The combination of properties of cerates with doped zirconates show a good compatibility of properties where the presence of Ce increases proton conductivity while Zr increases chemical stability[1,2]. One of the major challenges for doped zirconate cerates is their chemical stability and high sintering temperature. Several researches seek to study the effects of different dopants on the structure of BaZrCe, there are still no publications related to double doping with $Y^{3+}$and Gd^{3+}. In this work the aim is to synthesize and characterize by X-ray diffraction (XRD), scanning electron microscopy (SEM) and impedance spectroscopy (EIS), sintered pellets at 1500°C for 5h of three electrolyte compositions to evaluate the effect of double doping.

References:

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