

Electrical Characteristics of Yttria-Doped Bismuth(YDB) Electrolyte for Intermediate Temperature Solid Oxide Fuel Cells

이진구, 설용건*, 이기천, 조용일, 박정호
연세대학교
(shulyg@yonsei.ac.kr*)

Yttria-doped bismuth (YDB) powders were synthesized by ammonium carbonate coprecipitation for the preparation of electrolytes of an intermediate temperature solid oxide fuel cell (IT-SOFC). The starting materials were yttrium and bismuth nitrate. The crystal structures and the morphological characteristics of the particles were analyzed by XRD and SEM, respectively. An electrochemical impedance analyzer was utilized to measure the ionic conductivity of the sintered pellets. The size of the calcined YDB powders were in the range of about 50 nm by SEM images. The YDB pellets after sintering process completely had a face-centered cubic structure, and their crystallite size was approximately 60nm. The ionic conductivity of the YDB pellets sintered at 800°C was detected to be $2.7 \times 10^{-1} \text{ Scm}^{-1}$ at 700°C. It was considered that the ball-milling of the YDB powder was not required probably because of a good sinterability of the YDB powders prepared via the ammonium carbonate coprecipitation method. The results showed that the ammonium carbonate coprecipitation process could be used as the cost-efficient method of producing YDB electrolytes for IT-SOFC.