

Synthesis and characteristics of LASTP a solid state electrolyte for all solid batteries

정현우, 나 단, 윤백상, 임현수, 백지연, 서인석[†]

전북대학교

(isseo@jbnu.ac.kr[†])

In this study, we have researched NASICON type, lithium aluminum silicon titanium phosphate, (LASTP) synthesized by solution-based method. $\text{NH}_4\text{H}_2\text{PO}_4$, TiO_2 , $\text{Al}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$, SiO_2 and LiCl were mixed into deionized water under stirring. The mixture was annealed at 700 °C for 12h. The synthesized powder was pressed at 70MPa and sintered from 900 to 1100°C for 12h. The microstructure of the powder and pellet were characterized using a field-emission scanning electron microscope(FE-SEM). The crystal structure was characterized by x-ray diffraction(XRD). The XRD patterns of the LASTP powders were very closed to those of JCPDS data. Structural properties of LASTP pellet also were evaluated by x-ray photoelectron spectroscopy(XPS). In order to measure ionic conductivity of the LASTP pellet, Au electrodes with 100nm thickness were coated on both surface. Ionic conductivity was measured by using an electrochemical impedance spectroscopy(EIS). The ionic conductivity of the synthesized LASTP pellet was $4.0 \times 10^{-4} \text{ Scm}^{-1}$. Therefore, the LASTP electrolyte could be a promising material for solid state batteries