

Characterization of Lithium-CO₂ batteries applied LATP as a solid electrolyte

나단, 정현우, 백지연, 김영범, 임현수, 서인석[†]

전북대학교

(isseo@jbnu.ac.kr[†])

In this study, we suggest a Li-CO₂ battery applied lithium aluminum titanium phosphate (LATP) as a solid electrolyte and a carbon sheet with a multi-walled carbon nanotube (MWCNT). The structural properties of LATP were evaluated using X-ray diffraction (XRD). Ionic conductivity of the LATP pellet was conducted by Electrochemical impedance spectroscopy (EIS), and that of the LATP pellet was $\sim 5.4 \times 10^{-4}$ S / cm. The morphology of carbon cathodes with MWCNT was examined by field emission scanning electron microscope (FESEM). The discharge products for the Li-CO₂ electrochemistry were characterized by Raman spectroscopy and X-ray photoelectron spectroscopy (XPS). The electrochemical performance was figured out by a charge-discharge test at a current density of 60 mA / g at the fixed capacity of 600 mAh/g for 30 cycles. This battery's discharge and charge profiles did not change significantly, which means that the Li-CO₂ battery applied a LATP pellet shows high stability.

This work provides a new structure of Li-CO₂ batteries applied LATP as the solid electrolyte, and this battery could be promising batteries for all-solid-state batteries in the future.