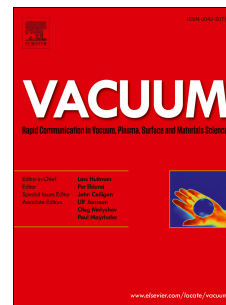


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An Investigation on the Half-Cell Production for Transparent Secondary Type Solid-State Batteries

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Abstract

In this research, the effects on battery characteristics of two different production methods were investigated. The $\text{Li}_3\text{PO}_4/\text{LiCoO}_2/\text{ITO}/\text{glass}$ half-cell designs have been produced and analyzed. The LiCoO_2 cathode layers are deposited on the ITO/glass substrates by using radio frequency magnetron sputtering method. The Li_3PO_4 electrolyte layers are coated on this structure by using radio frequency magnetron sputtering and thermionic vacuum arc afterward. The optical, morphological, and electrochemical properties of the produced half-cells are investigated by various analyzed methods. It is seen that the produced half-cells have high transmittance values and relevant optical band gap values. When the radio frequency power is increased from 100W to 125W, more rough structures are formed. The cell produced by the thermionic vacuum arc method has exhibited more porous structure in the production of the electrolyte layer. This conjuncture clearly influenced the ionic conductivity.

Keywords: LCO; LPO; solid-state battery; transparent battery; morphological properties; impedance analysis.

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