

A study of the structural and electrochemical properties of li3po4-mmt-pvdf composites for solid electrolytes

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Abstrak

Batteries on the market

today still use liquid-type electrolytes, which can result in safety issues caused by electrolyte leakage. Therefore, studies that search for solid-state electrolytes are important for resolving these issues. In this research, a composite of lithium phosphate-montmorillonite-polyvinylidene fluoride (Li3PO4-MMT-PVDF) has been characterized with the aim of detecting the electrochemical performance of Li3PO4 with the addition of MMT. Li3PO4 samples were prepared through a solid-state reaction, which was then mixed with MMT, which had a composition ranging from 5 wt% to 20 wt%, and 1 wt% PVDF as a binder. This characterization was conducted with structural, morphological, and electrochemical aspects. The structural test showed that the X-ray diffraction (XRD) pattern was dominated by Li3PO4 peaks and MMT aluminosilicates. The electrochemical characterization indicated that the conductivity value of the composites was greater than that of Li3PO4. The highest conductivity was achieved with a 15 wt% MMT addition, with a dielectric-constant value of 74.9 at a frequency of 10 kHz.