عنوان مقاله:

The Effect of Polymer Molecular Weight on Ion Mobility in Polymethylmetacrylate Based Electrolyte for Lithium Ion Batteries

محل انتشار:

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خلاصه مقاله:

Gel polymer electrolyte (GPE) is neither liquid nor solid. Gels possess both cohesive properties of solids and the diffusive property liquids. This unique characteristic makes the gel to find various important applications including polymer electrolytes. polymethylmetacrylate (PMMA) is an amorphous polymer has a good compatibility with the non-aqueous electrolytes. It can absorb much electrolyte leading to high conductivity. To this end, in the present study gel polymer electrolytes containing two different molecular weight (120000 and 135000) of PMMA as polymer matrix, LiClO4 and dimethylformamide (DMF) as plasticizer were prepared by solution casting method. The comparison between ionic conductivity of these electrolytes has been determined by electrochemical impedance studies. Electrochemical stability of the prepared electrolytes has been examined using linear sweep voltammetry (LSV). DC Polarization has been performed for the electrolyte films to study their ionic transference number. It was observed that polymer electrolyte which prepared with lower molecular weight polymer has higher ionic transference number (2% increment) and as a result it shows higher ionic conductivity (48% increment).

کلمات کلیدی:

component; lithium ion battery, gel polymer electrolyte, polymethylmetacrylate, molecular weight, conductivity