

Accepted Manuscript

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PII: S0167-7322(18)30108-9
DOI: doi:[10.1016/j.molliq.2018.03.084](https://doi.org/10.1016/j.molliq.2018.03.084)
Reference: MOLLIQ 8858

To appear in: *Journal of Molecular Liquids*

Received date: 7 January 2018
Revised date: 15 March 2018
Accepted date: 20 March 2018

Please cite this article as: Emad M. Masoud, A.-A. El-Bellihi, Wafaa A. Bayoumy, Eman A. Mohamed , Polymer composite containing nano magnesium oxide filler and lithiumtriflate salt: An efficient polymer electrolyte for lithium ion batteries application. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Molliq(2017), doi:[10.1016/j.molliq.2018.03.084](https://doi.org/10.1016/j.molliq.2018.03.084)

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Polymer composite containing nano magnesium oxide filler and lithiumtriflate salt: an efficient polymer electrolyte for lithium ion batteries application

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Abstract

Polymer (PVdF-CO-HFP) composites containing nano MgO filler and lithiumtriflate salt were prepared using a solution cast technique. All samples were characterized using different techniques such as X-ray diffraction (XRD), thermal analysis (TG, DSC), Fourier transform infra –red spectroscopy (FT-IR) and scanning electron microscopy (SEM). Structural investigation of all samples were conducted in a well – sequence; firstly, in presence of nano filler, and secondly in presence of LTF salt to study the structural changes (crystallinity), and their effects on melting, morphology and thermal stability behavior. In presence of definite filler and salt concentrations, the basic polymer matrix exhibited suitable structure, followed by good conductivity properties. A sample containing 6 wt. % MgO and 25 wt. % LTF, showed AC- ionic conductivity value of about $8.78 \times 10^{-5} \text{ ohm}^{-1}.\text{cm}^{-1}$ at room temperature. The same sample exhibited good thermal stability behavior ($T_d = 402.99 \text{ }^\circ\text{C}$). To further investigate the stability of this sample, electrochemical and mechanical stability properties were also studied.

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