

Influence of Surface Treatment of MCM-41 on Electrochemical Characteristics of Polymeric Electrolytes

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In this work, the single ion conducting polymer electrolytes were made in poly(ethylene oxide) (PEO), mesoporous MCM-41 molecular sieves, and lithium salts. The MCM-41 was synthesized by using a solution of sodium silicate as silica source and cetyltrimethylammonium chloride (CTMACl) as template. The effect of acidically or basically surface treatments of the MCM-41 was investigated in the pH, acid-base values, FT-IR, and XRD measurements. The influence of MCM-41 on ionic conductivities and interfacial characteristics was determined by the frequency response analyzer (FRA), DSC, NMR, and FT-IR. The ionic conductivity of the cross-linked single ion conductor showed maximum behaviors at the base MCM-41 due to the intermolecular interaction between the lithium cation of the lithium salt and MCM-41. Also, the interfacial stability between the cross-linked nanocomposite single ion conductor and the lithium electrode was improved in the presence of MCM-41.