Ionic Conductivity studies of polymer electrolyte by addition of PDMAEMA, $LiN(CF_3SO_3)_2$ and various plasticizers.

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Abstract

Polymer electrolytes which were based on Poly (N, N'-dimethylamino-ethyl-methacrylate) (PDMAEMA), PEO, $LiN(CF_3SO_2)_2$ (LITFSI) and tetraethylene glycol dimethyl ether(tetraglyme), EC+PC and DEP as plasticizers were examined their ionic conductivities and thermal analysis. Ionic conductivity of the PDMAEMA/PEO/LITFSI/tetraglyme(EC+PC and DEP) complexes was investigated as a function of temperature, various concentrations of LiTFSI, plasticizers and PDMAEMA.

Impedance spectroscopy and Differential Scanning Calorimeter (DSC) were used to characterize these samples. The higher conductivity was exhibited when 0.6mole/Kg PDMAEMA and 1.5mole/kg tetraglyme as a plasticizer was added ($4.74*10^{-4}Scm^{-1}$at 25^oC).

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Experimental

The compositions of polymer electrolytes are PDMAEMA (20%)/ PEO (10%)/LiTFSI (0, 0.3, 0.6, 0.9, 1.2,1.5mole/kg)/tetraglyme(70%)(S1),EC+PC(70%)(S2), .DEP(70%) (S3), PDMAEMA (0, 10, 20, 23%) PEO/ LiTFSI (1.5 mole/kg)/ tetraglyme (70%) (S4),

Result & Discussion

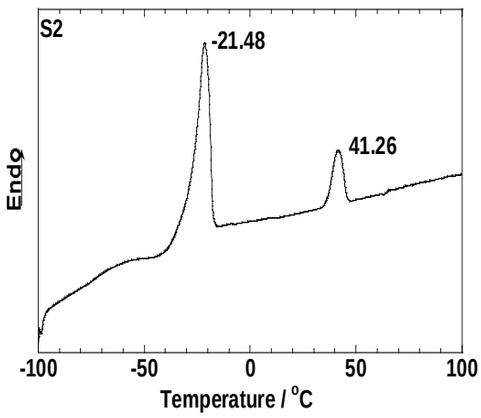

Fig.1 Thermal analysis of S1

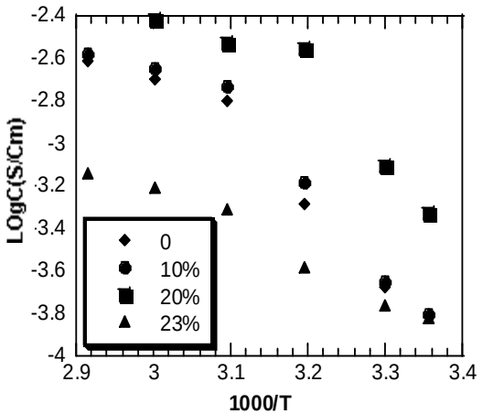

Fig.2 Conductivity of S4 by addition of the PDMAEMA

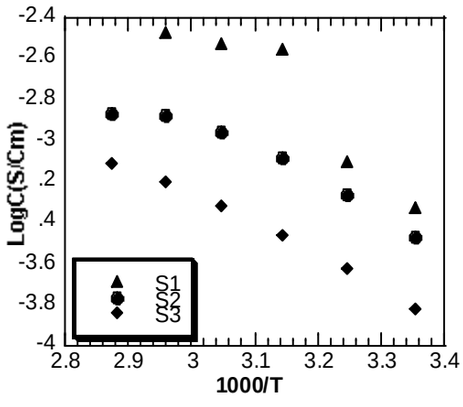

Fig.3 Conductivity of S1/S2/S3