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# Low cost and facile preparation of $\text{Al}(\text{NO}_3)_3$ doped PVA-PEG polymer electrolyte films for electrochemical applications

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**Abstract :** Polymer electrolyte films based on PVA-PEG with  $\text{Al}(\text{NO}_3)_3$  as the dopant at different concentrations were prepared using solution casting technique. The structural properties of the samples were examined by optical microscope and FTIR studies. FTIR spectra confirm the complexation of the dopant with the polymer blend. AC conductivity and complex impedance of the samples were performed in the frequency range of 100 Hz to 1 MHz at different temperatures. The ionic conductivity increases with the  $\text{Al}(\text{NO}_3)_3$  content and the maximum value at room temperature is found to be  $1.0706 \times 10^{-5}$  S/cm for 5 mol%  $\text{Al}(\text{NO}_3)_3$  doped PVA-PEG film. This value is three or four orders of magnitude greater than those obtained in the certain representative polymer-salt complexes as reported earlier. The results suggest that the  $\text{Al}(\text{NO}_3)_3$  doped PVA-PEG polymer blend electrolytes are good candidates for future electrochemical devices.

**Keywords :** amorphous phase, ionic conductivity, optical properties, polymer blend, Solid polymer electrolyte.

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