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Fabrication and characterization of poly (ethylene oxide) for photo-electronic devices (Article)

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Abstract

Ionic conducting polymer thin films consist of poly (ethylene oxide)-chitosan blend, ammonium iodide NH_4I and iodine crystal I_2 were prepared by solution cast technique at room temperature. To improve the mechanical properties of the polymer thin film, chitosan ($\text{C}_6\text{H}_{11}\text{NO}_4$) is added to the electrolyte, ammonium iodide (NH_4I) is added to supply charge carrier and iodine crystal (I_2) added to provide redox couple. From the complex impedance plot, the bulk resistance R_b was determined and the conductivity of the thin film was calculated. The highest conductivity was observed for the polymer blend containing, 45 wt % ammonium iodide which yield at $(1.18 \pm 0.7) \times 10^{-5} \text{ S cm}^{-1}$ by Impedance spectroscopy. Optical characterization of the highest conducting PEO and chitosan ionic conductor shows at the corresponding wavelength, 330 nm that the thin film has a band gap of 3.7 eV. The polymer thin films were smooth, flexible and transparent. Thin film polymers are more favourable for photo-electronic applications. © 2006-2015 Asian Research Publishing Network (ARPN).

Author keywords

Ionic conductivity; Photo-electronic; Polymer; Semiconductor; Thin film

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