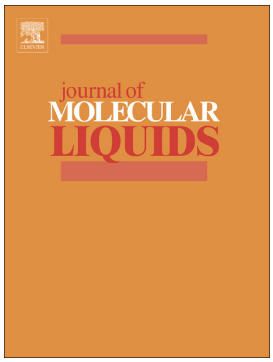

Influence of polyvinylpyrrolidone on optical, electrical and dielectric properties of poly(2-ethyl-2-oxazoline)-polyvinylpyrrolidone blends

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Influence of polyvinylpyrrolidone on optical, electrical and dielectric properties of poly(2-ethyl-2-oxazoline)-polyvinylpyrrolidone blends

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Abstract

Poly(2-ethyl-2-oxazoline) [PEOX] is blended with polyvinylpyrrolidone [PVP] having a relatively high dielectric constant to improve the optical and electrical properties of the material. PEOX-PVP polymer blends with 0, 20, 40, 60, and 80 wt% PVP are characterized by their structural, optical, electrical and dielectric properties. SEM images and XRD spectra show that PEOX and PVP have a good miscibility and compatibility. XRD also confirms the amorphous structure of the samples. FTIR spectra indicate the presence of hydrogen bonding between PEOX and PVP. The optical energy band gap, E_g^{opt}, and the width of the band tail of localized states in the forbidden band gap, ΔE, as determined by UV-Vis spectroscopy, are changing with PVP content. Electrical and dielectric properties are measured at frequencies from 10 Hz to 8 MHz using an LCR meter. The dielectric constant, the dielectric loss, and the loss tangent (tanδ) decrease, whereas the AC conductivity increases with increasing frequency. PEOX:PVP (80:20 wt%) is an optimum blend with superior properties as compared with pure PEOX. This flexible and high-dielectric-constant polymer blend may have potential application in energy storage.

Keywords: poly(2-ethyl-2-oxazoline), polyvinylpyrrolidone, polymer blend, optical properties, electrical properties, dielectric properties

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