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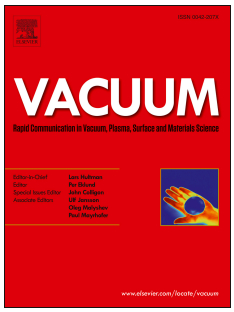

Optical, chemical and dielectric properties of PPCIN films derived from essential oil using RF plasma polymerisation

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Optical, chemical and dielectric properties of PPCIN films derived from essential oil using RF plasma polymerisation

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Abstract:

Polymer based nanostructured-films were produced on various substrates using Radio Frequency (RF) plasma polymerization technique from Cinnamaldehyde monomer which is an organic compound. For thin film deposition, the pressure, the deposition time and RF power were set to 480 mTorr, 30 minutes and 15, 20 and 30 W, respectively. The effect of RF energy on the optical, morphological and chemical properties of thin films were investigated. The optical, morphological and chemical properties were determined by using UV-Vis spectroscopy, AFM and FTIR spectroscopy, respectively. The average surface roughness of thin films was detected as 5.7 nm, 3.9 nm and 11.7 nm nm using AFM depending on the increase in RF energy. The chemical structure of the polymer materials was compared with the monomer material by FTIR spectroscopy and it was understood that the chemical structure of the monomer was protected for polymer thin films. Optical band gap of thin films increased with RF energy and these values were determined as 2.83, 3.05 and 2.98 eV, respectively. The extinction coefficients and refractive indices of the thin films were measured at a wavelength of 500 nm in the range of 0.00183-0.00522 and 2.40-2.78, respectively.

Keywords: PPCIN, organic semiconductors, Plasma polymerization, RF, essential oil.

1. Introduction

In recent years, polymer thin films obtained from organic materials have attracted considerable interest, especially because of their potential for use in organic electronics [1-5] . These polymer thin films have the potential to be applied to many electrical, optical and biomedical fields besides organo-electronics [6]. The most common areas of application of