عنوان مقاله:

Surface, structural and optical investigation on Poly Vinyl Alcohol (PVA)/Bi۲WO۶ nanocomposite films

محل انتشار:

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خلاصه مقاله:

Bismuth tungstate (Bi۲WO۶) emerged as one of the most capable chromogenic compounds among transition metal oxide having wide opto-electronic applications. It is an n-type semiconducting material having bandgap around ~۲.۷eV. Conversely, NanoComposite (NC) materials have been investigated in order to tailor the properties polymers and also to widen the applications. In this context Poly (vinyl alcohol)/ Bismuth tungstate (PVA/Bi۲WO۳) NC films were prepared with various weight ratio of Bi۲WO۶ content viz.۰, ۰.۱, ۰.۲ ۰.۴, and ۰.۸ wt%. The solution combustion method was employed to prepare Bi۲WO۶ nanoparticles (NPs). Subsequently, synergistic effect of polymer matrix and Bi۲WO۶ NPs is characterized and analysed to estimate the enhanced properties. The surface morphology of the NC's films was explored by Scanning Electron Microscopy (SEM). Elemental analysis is carried out using EDAX. The formation of polymer NC and its microstructural properties were investigated by X-ray diffraction technique and it is revealed that there is formation of orthorhombic phase for Bi۲WO۶ NPs with an average size of ۳۵nm. Interaction of NP and PVA is studied using FT-IR spectrometer. The optical constants were evaluated by UV-visible spectrometer and it was found that NC films bandgap energy varied from ۵.۴ eV to ۲.۸۵eV for direct and from ۴.۵۷eV to ۲.۳۸eV for indirect bandgap. It is anticipated that these unique organic–inorganic NC materials are the emerging functional materials in the field of opto-electronics.

کلمات کلیدی:

Bandgap, Bismuth Tungstate, nanocomposite, nanoparticles, PVA