عنوان مقاله:

Experimental Study of Polyvinyl Alcohol Nanocomposite Film Reinforced by Cellulose Nanofibers from Agave Cantala

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خلاصه مقاله:

This paper presents an experimental study of addition of cellulose nanofibers (CNF) extracted by the chemical-ultrasonication process from agave cantala leaf plants in the matrix of polyvinyl alcohol (PVA). Combining these materials produce the nanocomposite film with a thickness of ۳۰ μm. The nanocomposite characteristic was investigated by the addition of CNF (۰, ۲, ۵, ۸, and ۱۰ wt%) in PVA suspension (۳ wt.%). PVA/CNF nanocomposite films were prepared by a casting solution method. The fibrillation of fibers to CNF was analyzed using Scanning Electron Microscopy and Transmission Electron Microscopy. The nanocomposite film functional group's molecular chemical bond and structural analysis were tested using Fourier Transform Infrared and X-ray diffraction. The PVA/CNF nanocomposite film has significant advantages on the ultraviolet barrier, thermal stability tested by Differential Scanning Calorimetry and Thermogravimetric Analyzer, and tensile strength. Overall, the optimal addition of CNF is ۸ wt.% in matrix, resulting in the highest crystallinity index (۳۷.۵%), the tensile strength and elongation at break was an increase of ۷۹% and ۱۳۸%, respectively. It has good absorbing ultraviolet rays (۸۲.۴%) and high thermal stability (۳۶۵oC).

کلمات کلیدی:

polyvinyl alcohol, cellulose nanofibers, Nanocomposite film