



**COMPARATIVE EFFECT OF DIFFERENT NANOPARTICLES ON STRUCTURAL, THERMAL AND BARRIER PROPERTIES OF POLY(ETHYLENE TEREPHTHALATE) IN FOOD PACKAGING SECTOR**

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**ABSTRACT**

In the present study, the effect of nanoclay and nanomica on the structural, thermal and barrier properties of poly (ethylene terephthalate) was investigated. The morphology of the papered nanocomposites (Clay and Mica) was illustrated by X-Ray Diffraction (XRD), Transmission electron microscopy (TEM) and Atomic force microscopy (AFM). According to Dynamic Mechanical Thermal Analyzer (DMTA) results, the samples'  $\tan\delta$  values ranged from 0.4 to 0.6. The results of Differential scanning calorimetry (DSC) revealed that the incorporation of nanoparticles increased both the crystallization temperature ( $T_c$ ) and the degree of crystallization ( $X_c$ ). Then, the higher aspect ratio of nanomica compared to nanoclay led to higher levels of  $X_c$ . A significant water vapor permeability decrease (maximum reduction at 1% loading level of nanomica) of nanocomposites was attributed to an increase in the tortuosity of water vapor molecules path diffusing into the nanocomposites. PET/mica nanocomposites presented larger tortuosity factors compared to PET/clay. As a result, improved barrier properties of nanocomposites were obtained in the case of food packaging.