

Oral Presentation

Improving the Oxygen Barrier Properties of Polyethylene Terephthalate by Graphite Nanoplatelets

Ahmad Al-Jabareen

*Assistant Professor - Al-Quds University / Department of Materials Engineering
Bethlehem/ Palestine
ajabareen@science.alquds.edu*

Abstract

Enhancement of the oxygen gas barrier properties of polyethylene terephthalate (PET), used in the packaging industry, is the main objective here. For this purpose, nanocomposites of PET containing graphite nanoplatelets (GNPs) were prepared by melt compounding. The effects of the nanocomposites' structural morphology on oxygen gas permeability were analyzed using a range of thermal, microscopic, and mechanical characterization techniques. The investigated nanocomposite films exhibited GNP exfoliated morphology and good mixing with PET, as well as uniform dispersion within the polymer. All nanocomposite films were shown to possess superior oxygen barrier properties and improved thermal and dimensional stability compared with the plain PET films. In the best case, for 1.5 wt % GNP, the oxygen permeation was reduced by more than 99%. The improved barrier properties are attributed to the direct effect of the GNPs and to their induced increase of degree of crystallinity.