

Title Thermal and barrier characterisation of polyethylene film as food packaging material
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Abstract

In this work, low density polyethylene film (PE-LD) samples (75 μ m thickness), used for food packaging, have been investigated. Prior to the measurement, samples were exposed to the ethanol model solution for a different period of time at different temperatures. The impact of the model solution, which represents a stimulant of an alcoholic beverage, on the thermal (glass transition temperatures, melting points, degree of crystallinity) and barrier (water vapour transmission rate, WVTR) behaviour of PE-LD samples is investigated. The results have shown that the period of 2 days exposure is not sufficient to generate measurable changes in the thermal behaviour of polyethylene films, regardless of the exposure temperature. During the prolonged exposure (28 days), glass transition temperature increases at the higher exposure temperatures and the amount of crystal phase slightly decreases, which is particularly expressed for the sample being exposed at the temperature of 40°C. It is further indicated that the exposure of the samples to the model solution at the temperature of 20°C (room temperature), regardless of the period of exposure, shows no changes in the phase behaviour of the samples. Generally with decreasing T_g values WVTR increases. Furthermore, lower crystallinity results in higher WVTR of PE-LD samples.