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Surface Modification and Permeability Analytical Studies of Polylactic Acid Induced by HMDSO-PlasmaChanokporn Chaiwong¹, Pornchai Rachtanapun², Somrutai Tunma³, Rafael Auras⁴,
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Poly(lactic acid), PLA, has been increasingly used in packaging industry due to its biodegradability and attractive mechanical properties. In this work, we investigated the influence of hexamethyldisiloxane (HMDSO) plasma generated by an inductively-coupled discharge on the structural and barrier properties of PLA. It was found that HMDSO plasma enhanced the hydrophobicity of PLA as observed in the increase of the water contact angle. Energy-dispersive X-ray spectroscopy (EDX) showed the incorporation of silicon (Si) on the surface of PLA. Atomic force microscopy (AFM) revealed topographical modification after the plasma treatment. Elemental analysis of the surface using Fourier transform infrared spectroscopy (FTIR) and X-ray photoelectron spectroscopy (XPS) were performed to affirm the bonding of Si onto the surface structure of PLA. Water vapour permeability of PLA was studied in correlation with surface modification induced by the plasma treatment that could affect the transport properties.

Keywords

Poly(lactic) acid
Plasma treatment
Permeability
HMDSO
transport property