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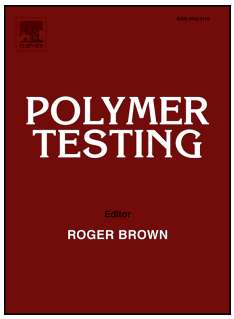

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Characterization of PLA-Talc Films Using NIR Chemical Imaging and Multivariate Image Analysis Techniques

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Abstract

A fast and non-invasive near-infrared (NIR) imaging system is proposed to characterize biodegradable polylactic acid (PLA) films containing talc, and produced by extrusion film-blowing for packaging applications. The ultimate goal is to use the system on-line for quality control and after a post-processing thermal treatment (annealing). A set of PLA-talc films with different talc contents (0-3% wt.) were produced and annealed under different conditions. NIR images of the films were collected after which the samples were characterized for their physical, mechanical, and gas barrier properties. Multivariate imaging techniques were then applied on the hyperspectral images. The results showed that the films with various talc loadings can be discriminated, and the information contained in the NIR spectra allowed predicting the annealed film crystallinity and O_2 permeability with good accuracy.

Keywords: Hyperspectral NIR Imaging, Multivariate Image Analysis (MIA), Multivariate Image Regression (MIR), Polylactic Acid (PLA), Talc, Films, Annealing.