

Biodegradation Behavior of Cellulose Acetate with DS 2.5 in Simulated Soil

Authors : Roberta Ranielle M. de Freitas, Vagner R. Botaro

Abstract : The relationship between biodegradation and mechanical behavior is fundamental for studies of the application of cellulose acetate films as a possible material for biodegradable packaging. In this work, the biodegradation of cellulose acetate (CA) with DS 2.5 was analyzed in simulated soil. CA films were prepared by casting and buried in the simulated soil. Samples were taken monthly and analyzed, the total time of biodegradation was 6 months. To characterize the biodegradable CA, the DMA technique was employed. The main result showed that the time of exposure to the simulated soil affects the mechanical properties of the films and the values of crystallinity. By DMA analysis, it was possible to conclude that as the CA is biodegraded, its mechanical properties were altered, for example, storage modulus has increased with biodegradation and the modulus of loss has decreased. Analyzes of DSC, XRD, and FTIR were also carried out to characterize the biodegradation of CA, which corroborated with the results of DMA. The observation of the carbonyl band by FTIR and crystalline indices obtained by XRD were important to evaluate the degradation of CA during the exposure time.

Keywords : biodegradation, cellulose acetate, DMA, simulated soil

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