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Title of the Abstract: Effect of nanoclays with different hydrophobicity on the rheological behavior of PDLLA

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Abstract:

In this work the rheological properties of the nanocomposites of PDLLA were investigated by shear induced crystallization, dynamic oscillatory shear and structural recovery tests. PDLLA Ingeo 4042D (Natureworks) was used. The nanocomposites were prepared by melting with 5% of clay: Cloisite 30B and 20A (Southern Clay). The dynamic rheological properties were analyzed in a rheometer (parallel plates). For the isothermal flow-Induced crystallization the material was melted at 180°C/5 min and quenched down to 110 °C. After that a shear rate of 0.01 s^{-1} was imposed to the sample and the shear tension was monitored as a function of time. For structural recovery: the initial storage modulus was detected under low-amplitude oscillatory shear mode; a steady shear deformation was exerted on the samples at an interval of 600 s; the linear storage modulus was recorded as a function of quiescent time under the same conditions in the first step; and the G' at plateau was examined at the end of structural recovery. The rheological behavior of PDLLA is modified by the presence of clays and the flow-induced crystallization was faster for the nanocomposites than for PDLLA. Structural recovery experiments showed that the PDLLA presented no variation of G' over time - the recovery is very fast. The PDLLA+ 30B exhibited a time required for the recovery of 7 minutes, the PDLLA+20A showed the longest time, 22 minutes. The Cloisite 20A, which contains a hydrophobic surfactant, hinder the mobility of polymer chains causing the system to present a pseudosolid behavior.

Biography of presenting author:

Dr. Ana Rita Morales is a professor of Materials Science in School of Chemical Engineering, State University of Campinas – UNICAMP – Brazil. Her research area is biodegradable polymers, their applications, interactions and effects on the environment. She has publications in the area of materials and environment, nanocomposites and blends. She is doctor in Materials Science by the Federal University of São Carlos – Brazil when studied the miscibility of a ternary blend of PEEK, PEI and a LCP. She worked for many years in the polymer modification and processing industry.

Research Interests: biodegradable polymers, nanocomposites

References:

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Suggestions of Sessions to the conference (if any)