

STRUCTURAL EVOLUTION OF POLYPROPYLENE FIBERS MODIFIED BY NANOCLAY AND NUCLEATING AGENTS

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In this paper the morphological and structural changes of polypropylene (PP) fibers produced with organically modified montmorillonite and sorbitol based nucleating agent were investigated. The structural hierarchy in each sample was investigated using birefringence, WAXD and AFM techniques. In the presence of nanoclay, blend of maleic anhydride modified polypropylene (PPgMA) and homo PP was used to improve the intercalation degree of the nanoparticles.

The results of WAXD show that the crystalline phase in fibers with nanoparticles presents higher orientation than for unfilled PP. On the other hand, sorbitol based (clarifier) agent addition significantly reduces the crystalline orientation of the spun-filament. The measurements indicate that nanoparticles or sorbitol based nucleating agents reduce the birefringence in samples with the same jet stretch. The negative contribution by the occurrence and orientation of the nanoparticles were suggested as the main cause of the birefringence decrease. Using atomic force microscopy, relationships between morphology, stretching ratio and additive content will be also presented in this work.