XRD and DMA Study of Thermoplastic Starch-Based Nanocomposites

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Abstract. Thermoplastic starch (TPS) -based nanocomposites with montmorillonite (MMT) as nanofiller were characterized using X-ray powder diffraction and dynamic-mechanical analysis (DMA) to evaluate the effect of MMT content on their structure and viscoelastic behavior. The XRD results confirmed that MMT is intercalated in all studied nanocomposites. DMA measurements showed inhomogeneity both in distribution of glycerol used as plasticizer in TPS preparation and in mobility of amylose and amylopectin chains in studied samples. In the starch-rich regions, smaller amount of MMT led to an increase in the glass transition temperature, while at higher MMT content the glass transition decreased. Increasing storage modulus with increasing MMT content was also observed.