



PROCESS DESIGN FOR POLYETHYLENE-LDH-NANOCOMPOSITES

A. Leuteritz^{*}, D. Hung, J. Meinel, H. Brünig, B. Kretzschmar

Leibniz Institut für Polymerforschung Dresden e.V., Hohe Str. 6, 01069 Dresden, Germany

**Corresponding author: Leuteritz@ipfdd.de*

In order to prepare nanocomposites based on layered double hydroxides (LDH), much attention is given to the organic modification of the inorganic particles in order to make them compatible with the organic phase. For this purpose mostly long chain alkyl sulfonates are used and organomodified LDH is subsequently dispersed in polymer matrices. Organomodification with such ions is especially necessary in unpolar matrices like polyethylene. In our investigations the influence on the state of dispersion of LDH in polyethylene using different process designs is explored with two differently modified LDH, one with a long alkyl chain and one with a rather short alkyl chain in order to pronounce the effect of processing. First, one step route mixing organomodified LDH with compatibilizer and polyethylene in small scale compounding is compared to two step route using master batch of maleic anhydride grafted polyethylene and organo-LDH followed by dilution with polyethylene. Second, results of small scale compounding with 15 ccm X-plore microcompounder relative to setup using Buss Cokneader as well as Leistritz twin screw extruder in masterbatch preparation followed by dilution on twin screw extrusion are compared, using X-ray scattering, TEM/SEM as well as rheological methods.