

Nanocomposites of Poly(Vinyl Chloride) with Nanosilica

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Abstract:

The nanocomposites of poly(vinyl chloride) (PVC) with nanosilica in a form of nanopowder has been prepared by melt processing in the kneading chamber. The suspension PVC with a K value = 61, $M_w / M_n = 2.25$ was applied in our investigations. The PVC dry blend containing the organotin stabilizer and Mark 17 MOK (produced by Crompton) and 1 part by weight of paraffin wax Loxiol G22 2 (produced by Henkel) was applied as the matrix of investigated nanocomposites. The nanosilica powder with an average diameter of about 5- 15 nm (Aldrich Chemistry) was introduced into the PVC matrix. The nanofiller concentration was 1 wt.%, 2 wt.% and 4 wt.%.

Several properties were determined with the aim to characterize the application possibilities of such modified composite materials. By means of thermogravimetric measurement as well as by Congo test an increase of thermal stability with increasing nanosilica concentration was ascertained. A certain degradation of the macromolecular structure of PVC was determined by means of MFR measurements, where an increase of the MFR value as a function of reprocessing was found.