

MICROSCOPIC EVALUATION OF THE HALLOYSITE NANOTUBES DISPERSION IN THE POLYETHYLENE MATRIX

Lukasz Majewski^a, Ján Kamenický^b

^aLublin University of Technology, Faculty of Mechanical Engineering, 38D Nadbystrzycka str., 20-618 Lublin, l.majewski@pollub.pl

^bSEZ Krompachy a.s., 1 Hornádska str., Krompachy 053 42, sez@sez-krompachy.sk

The rapid development in the field of material engineering makes it necessary to control material structure in the nanometric scale when modifying composite properties. In order to bring about the desired properties, the reinforcement phase must be dispersed properly in the matrix with the appropriate adhesion at the matrix-filler interface. To achieve that, various attempts to increase the specific surface of filler grains are made by activating the surface chemically or by covering with an intermediate, a compatibilizer. The aim of this study was to test the impact of a compatibilizer on the dispersion level of a nanofiller in the form of halloysite nanotubes (HNTs) in a low density polyethylene (LDPE) matrix. The content of halloysite nanotubes varied from 2 to 6 wt%. Compatibilizer used in this study is polyethylene grafted with maleic anhydride (PE-graft-MA). After sputtering samples with a thin layer of gold the homogenization analysis was carried out on the basis of photographs taken on a Scanning Electron Microscope (SEM), at a magnification of up to 3500 times. During the microscopic examination, the occurrence of agglomerates of halloysite nanotubes, which size reached several dozen micrometers, was observed (Figure 1). Despite the occurrence of agglomerates, the distribution of nanotubes can be described as good and even [1]. We may assume that the presence of agglomerates during the halloysite nanotubes manufacturing of nanocomposites is not unusual, according to the results presented in other papers [1-3].

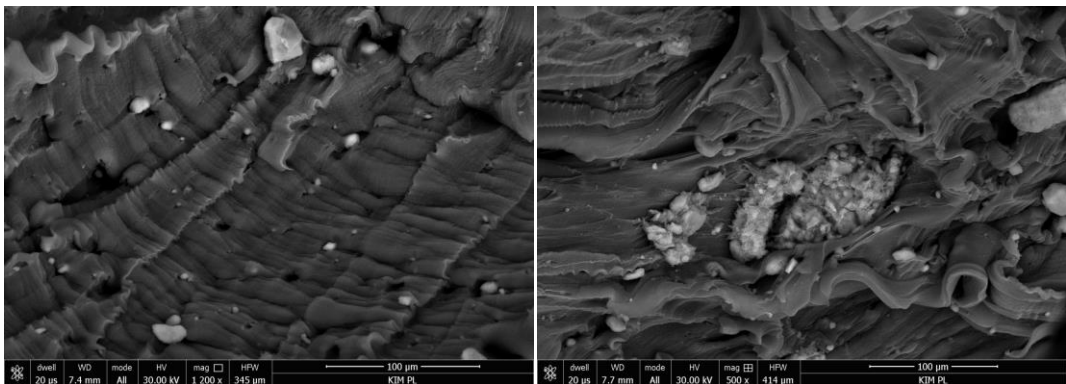


Figure 1. Distribution of HNTs in a LDPE matrix, content of 4 wt% (left) and 6 wt% (right)

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References:

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