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Ivan Kelnar, Ümitcan Bal, Alexander Zhigunov, Ludmila Kaprálková, Ivan Fortelný, Sabina Krejčíková, Jana Kredatusová

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Ivan Kelnar*, Ümitcan Bal, Alexander Zhigunov, Ludmila Kaprálková, Ivan Fortelný, Sabina Krejčíková, Jana Kredatusová

Institute of Macromolecular Chemistry, Academy of Sciences of the Czech Republic, Heyrovského nám. 2, 162 06 Praha, Czech Republic

*Corresponding author: kelnar@imc.cas.cz

ABSTRACT

The effect of nanofillers (NF) on parameters of polymer blends in microfibrillar composites (MFC) is complex due the effect of NF on melt drawing. This work concerns HDPE/PA66 modified with graphite nanoplatelets (GNP) prepared by different mixing protocols. GNP influence the dispersed phase size in the original blend negligibly and mostly lead to finer high-aspect ratio fibrils, i.e. GNP rather support elongation of inclusions than coalescence in the course of drawing. Favourable mechanical behaviour, exceeding predicted one, was found with low GNP content using the PA66 masterbatch. MFC with similar structure and GNP localization in PA66 show marked differences in properties depending on mixing protocol. Antagonistic effects found for the HDPE masterbatch indicate high effect of GNP migration between the components which affects the interphase by variation of crystallinity. The results confirm complex effect of GNP and dominancy of other GNP-induced effects over dual reinforcement with GNP and PA66 microfibrils.

Keywords: Polymer-matrix composites; Interface/Interphase; Mechanical testing; Extrusion