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HIGH THERMAL RESISTANT NANODIAMOND BASED PP/EPDM THERMOPLASTIC OLEFIN (TPO) NANOCOMPOSITES

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Nanoscale diamond is a valuable additive to be used in multifunctional polymer composites especially in applications where a combination of mechanical, thermal and dielectric properties is required. In the present work, nanocomposites based on nanodiamond (adamantine) and PP/EPDM blend have been prepared via melt mixing process. The role of various parameters upon the dispersion of nanodiamond particles in either PP or EPDM phases has been investigated. Results revealed that incorporation of nanodiamond into the blend composition leads to the significant reduction of the size of EPDM droplets, leading to the increase in impact strength. Moreover, nanodiamond based nanocomposites exhibited high thermal resistivity and low weight loss under high temperature conditions. This is attributed to the thermal shielding behavior of nanodiamond particles. Scratch test performed on the samples showed that by using ND despite reducing the friction coefficient, higher crash resistance can be achieved. Indent test showed the higher hardness and stiffness for the composite by using nanodiamond. The surface energy of the PP/EPDM thermoplastic olefin samples showed not to be affected by nanodiamond particles, therefore surface hydrophobicity was retained.