

Effect of thermally reduced graphene oxides obtained at different temperatures on the barrier and mechanical properties of polypropylene/TRGO and polyamide-6/TRGO nanocomposites

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© 2018 Society of Plastics Engineers Polypropylene (PP) and polyamide-6 (PA6) nanocomposites containing thermally reduced graphene oxide (TRGO), obtained either at 600°C (TRGO 600) or 800°C (TRGO 800), were prepared by melt mixing in order to study the effect of the thermal treatments on their barrier and mechanical properties. Transmission electron microscopy images of nanocomposites showed a relative good dispersion of TRGO in polymer matrices with some agglomerations. Differential scanning calorimetry analyses showed a slight reduction in crystallinity for both polymers in the presence of TRGO. The permeability to oxygen and water vapor was decreased in almost all nanocomposites due to a more tortuous path to gas permeation, being more evident for PP/TRGO 800 . Tensile stress-strain tests showed that all nanocomposites had higher elastic modulus, but PA6/TRGO 600 nanocomposites showed better mechanical properties. These findings indicated that TRGO obtained at a higher temperature