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

Gómez, Moisés
Díaz, Alexis
Reyes, Paula
Yazdani-Pedram, Mehrdad
Bohrz Nachtigall, Sônia Marlí
Palza, Humberto
Quijada, Raúl

© 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