Mechanical and electrical properties of bio-based PA410/CNT nanocomposites modified with a bio-TPE

Nora Aranburu[1]
Itziar Otaegi[2], Gonzalo Guerrica-Echevarría[3]

[1,2,3] Department of Polymer Science and Technology and POLYMAT, Faculty of Chemistry, University of the Basque Country UPV/EHU, Paseo Manuel de Lardizabal 3, 20018 San Sebastian, Spain

nora.aramburu@ehu.eus

Bio-based polymeric nanocomposites (NCs) were obtained by melt mixing a polyamide 4,10 (PA410) and a thermoplastic elastomer (impact modifier), both commercially available and partially bio-based, with two different commercially available multi-walled carbon nanotubes (CNTs), namely Nanocyl NC7000™ and Plasticyl™ PA 1503 (a masterbatch based on PA6 and Nanocyl NC7000™ CNTs). Mechanical and electrical properties of the resulting NC systems –i.e. PA410/PEBAX/CNT and PA410/PA6/PEBAX/CNT, respectively– were studied. Deformation properties –i.e. ductility and impact resistance– were improved after TPE addition as expected [1], with respect to the unmodified NC systems (Figure 1). A reduction in the percolation concentration (p_c) was also observed in both systems (Figure 2), probably due to a double percolation effect [1, 2].

References

[1] Gonzalez, I., Eguiazabal, J.I., and Nazabal, J. Composites, Part A, 2012. **43**(9): p. 1482-1489.
[2] Sumita, M., et al. Colloid and Polymer Science, 1992. **270**(2): p. 134-139.

Figures

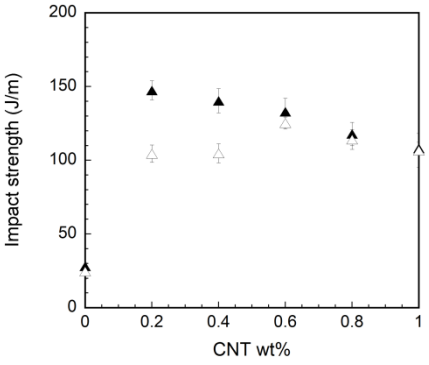

Figure 1. Impact strength of PA410/PEBAX/CNT (open triangles) and PA410/PA6/PEBAX/CNT (filled triangles) NCs.

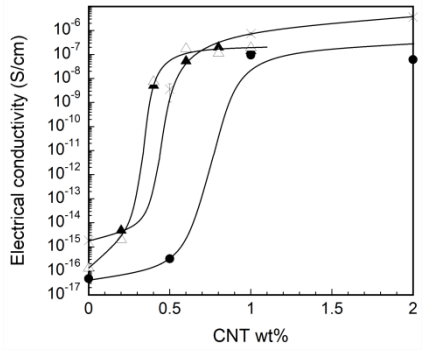

Figure 2. Electrical conductivity of unmodified PA410/CNT (x) and PA410/PA6/CNT (●) and modified PA410/PEBAX/CNT (open triangle) and PA410/PA6/PEBAX/CNT (filled triangle) NCs.