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EFFECT OF THE COMPATIBILIZATION ON THE PHOTOOXIDATION OF A PA6/LDPE BLEND AND THEIR CLAY NANOCOMPOSITES

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Photooxidation of polymer blends shows very interesting features because of the possible interactions between the two phases and between the radicals coming from the two components during UV irradiation [1]. On the other hand, nanocomposites with organomodified clays show, in turn, a photooxidation behaviour depending on the presence of the nanofiller and on the possible interaction between the polymer matrix and the degradation product of the clay [2]. Furthermore, both blends and nanocomposites need the presence of a third component as compatibilizing agent between the different phases. In this work, we investigated the effect of two functionalized polymers used to compatibilize both a PE/PA blend and a nanocomposite prepared by adding an organomodified clay to this blend.

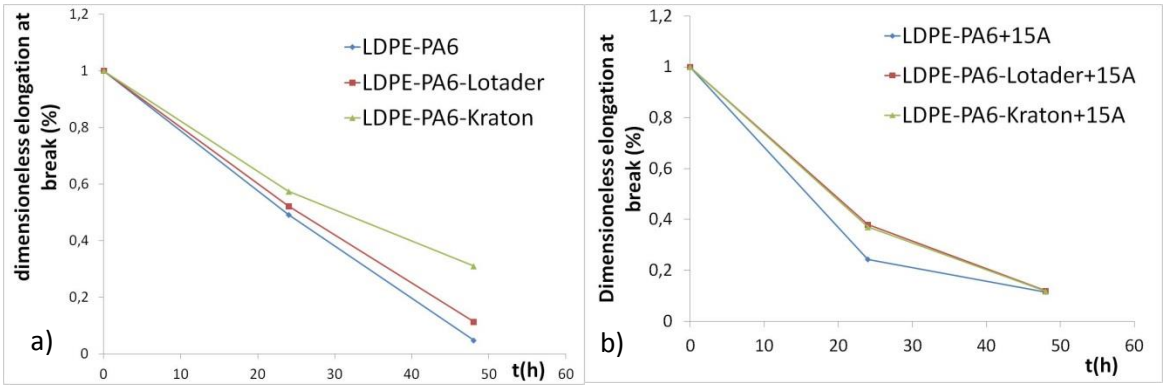

Fig. 1. Elongation at break as a function of UV irradiation time for blends(a) and their nanocomposite(b)

The dimensionless elongation at break as a function of the exposure time clearly suggests that the presence of the compatibilizer slows down the photooxidation kinetics of the uncompatibilized blend, while no significant effect is observed in the nanocomposites. This last feature could be attributed to a strong pro-oxidative effect of the iron present in the clay, while the protective effect in the blend could be interpreted in term of a better morphology achieved. Indeed the compatibilization gives rise to a better adhesion between the phases, with lesser defects and then with a lower oxygen permeability.

References

[1] Halim Hamid, S., Amin, M.B., Maadhah, A.G., eds. Handbook of Polymer Degradation. Marcel Dekker, INC, 1992.

[2] Mistretta, M.C., Morreale, M., La Mantia, F.P., Thermomechanical degradation of polyethylene/polyamide 6 blend-clay nanocomposites, Polymer degradation and stability, 99, 2014.