

The association between polycarbonate photoageing and oxygen permeability

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Abstract:

Polycarbonate (PC) is an amorphous thermoplastic polymer which is used in several applications such as CD protection. As a material, PC may be photodegraded through an oxidative chain radical process. This leads to a change of its optical, mechanical and barrier properties [1]. Despite the importance of the latter in various uses, the effect of photooxidation on oxygen permeability has been scarcely reported so far, and this work aims to relate photoageing and change in oxygen transport properties for PC.

Permeation coefficient for oxygen in PC films were obtained upon UV light exposure in relation with photoageing kinetics (Figure 1). The clear decrease of this parameter shows that photoinduced cross-linking is likely involved. This conclusion was further strengthened by micro-hardness and gel fraction experiments. Moreover, the effect of sequential photoageing of the PC films (on one side first, then on the other side) on the permeability process is reported and discussed.

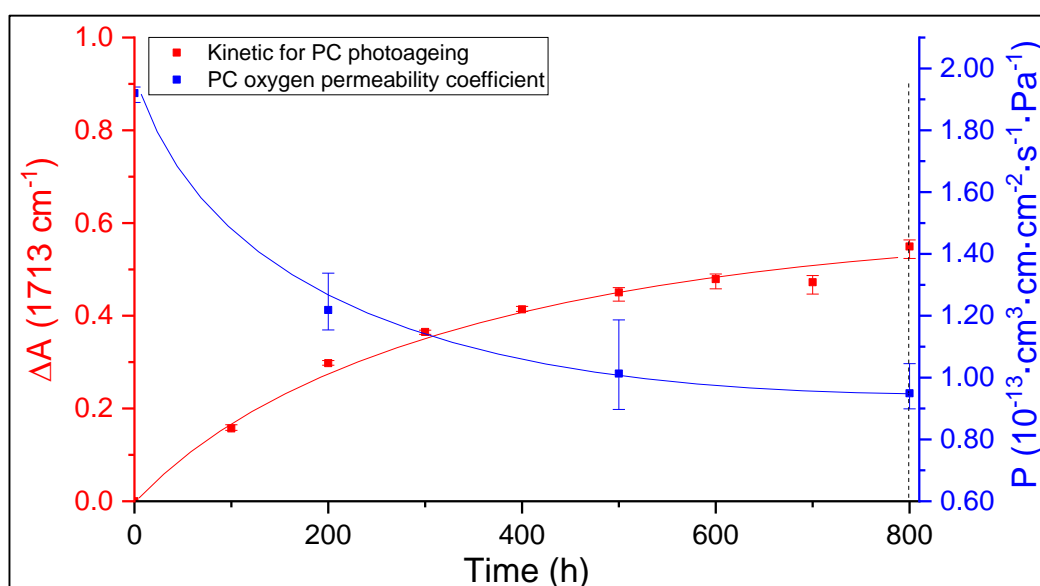


Figure 1: Oxygen permeation coefficient and the absorbance change at 1713 cm^{-1} upon PC photoageing

Références :

[1] Collin, S., Bussière, P. O., Therias, S., Lambert, J. M., Perdereau, J., & Gardette, J. L., Polymer degradation and stability 97.11 (2012): 2284-2293.