

**PHOTODEGRADATION OF ABS FOR TECHNOLOGICAL
APPLICATIONS- INFLUENCE OF HINDERED AMINE
STABILIZERS (HALS) AND ULTRAVIOLET ABSORBERS (UVA)
ON COPOLYMER STABILIZATION**

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Abstract

Acrylonitrile-butadiene-styrene (ABS) is an elastomeric copolymer with a wide range of technological applications due to their outstanding combination between cost, optimal manufacturing conditions and attractive properties. Nevertheless, ABS copolymers present higher weathering susceptibility in the presence of UV radiation, oxygen, temperature and humidity; which is related with polybutadiene that acts as a photoactivator, inducing oxidation of the polystyrene in the styrene-acrylonitrile macrophase [1].

ABS photodegradation can be detected by chemical modifications and formation of new compounds. Color changes and drastic loss in mechanical properties can also be noticed [2].

Light stabilizers, such as HALS and UVA, are included in ABS formulations to extend polymer lifetime, and this stabilization is made on empiric acknowledgment. In the present work, a systematic stabilization study will be performed in ABS copolymer. Stabilized ABS samples were exposed to accelerated and natural weathering. Artificial weathering was performed according to standard methods (ISO 4892-2). The natural weathering was carried out in Lisbon during 9 months, where the samples were placed in a wood support, according to the ASTM D1435.

During weathering, specimens were removed periodically and characterized by ATR-FTIR; yellowness index (Y.I.); mechanical, thermal and rheological properties.

Samples submitted to natural (Fig. a) and accelerated weathering (Fig. b) shows that stabilized ABS have lower Y.I., meaning that there are no significant structural modifications and, consequently, mechanical properties remained approximately constant. A synergism between HALS and UVA was observed, which is important for optimization of ABS performance against UV radiation.

A good correlation was found between natural and accelerated weathering experiments.

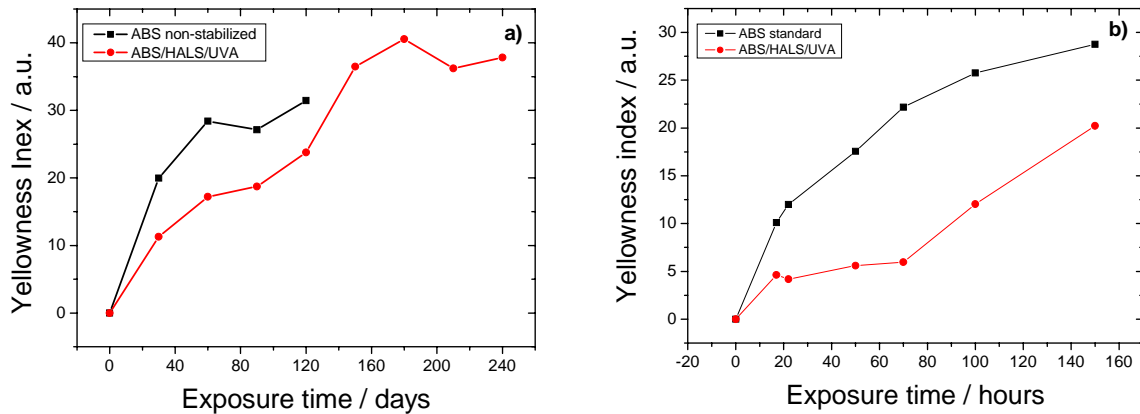


Figure 1 – Evolution of Y.I. for samples submitted natural (a) and accelerated (b) weathering.

References

- [1]. M. Piton and A. Rivaton, Polym. Degrad. Sta., 1996,147-157.
- [2]. R. Santos, G. Botelho, A. Machado, J. Conduto, P. Jorge, Polymer Degradation and Stability, in press.