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## EPR Study of the Activation of Antioxidants in PP Irradiated with Gamma Rays

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The behavior of different formulations of Polypropylene (PP) with stabilizers such as buthyl-hydroxy-toluene (BHT), Chimisorb 944 (Hals) (CHIM), both from Ciba, and a copolymer of styrene-butadiene-styrene (SBS) were studied using electron paramagnetic resonance (EPR). In all the cases but the sample of PP-Hals, a characteristic spectra for PP irradiated in air in the recently-irradiated condition was obtained [1]. The lineshape of the signal was changed to that of a pure PP EPR signal as time elapsed and the alkyl radical concentration decreased up to its total disappearance. At that stage, the polyenil radical signal could be visualized better [2,3]. The total free radical concentration decayed until approximately 800 hours in the PP-Hals and until around 2000 hours in all other cases. At those points, the total free radical concentrations began to increase in all the cases, except in the PP-BHT case. The lineshape was transformed into the lineshape of the Chimisorb radical in all the cases, except for the PP-BHT. In this last case, the EPR signal was not detectable. The BHT and the SBS diluted the free radical concentrations, being them smaller when they are present. The observed behavior in all the samples is consistent with the activation of the Chimisorb radical by gamma radiation.

[1] P. Silva, C. Albano, R. Perera, J. González, M. Ichazo, Nucl. Instr. & Meth. B226 (2004) 320.

[2] T. S. Dunn, J. L. Williams, H. Sugg, V. T. Stannet, in: D. Allara, W. Hawkins (EDS.), and Degrad. Polym., 169 (1978) p. 151.

[3] P. Silva, C. Albano, D. Lovera, R. Perera, Rev. Mex. Fis. 49 (S3) (2002) 192.