Stability effect of metallic traces in the degradation of extension of materials

T. Zaharescu[1,2*], T. Borbath[2], I. Blanco[3], I. Borbath[2]
[1] *INCDIE ICPE CA, Radiochemistry Center, 313 Splaiul Unirii, 030138 Bucharest, Romania*
[2] *ROSEAL SA, 5A Nicolae Bălcescu, 535600 Odorheiu Secuiesc, Romania*
[3] *University of Catania, 6 Viale Andrea Doria, 95125 Catania, Italy*

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Abstract
The durability of organic materials depends not only by the chemical structure, the crystallinity degree or the presence of oxidation protector, but also by the pre-existing impurities in the new manufacture product. On the former stage of material life, the metallic impurities, which appear in manufactured materials, have the origin in the used catalyst. They are involved in the degradation process that takes place during long term storage or operation. A new way for studying the durability of organic material is the investigation of effects induced by impurities in the hybrid products [1]. The electronic density, the abundancy and the population distribution of free radicals playing the trap role or the extension of contact range between the filler particles and organic material are the main factors that influence the degradation rate.
The previous investigations on the stabilization effect induced by the metallic trace in polymer filler was reported [2], when the protection against oxidation could be demonstrated. The formation and the decay of hydroperoxides, the propagators of oxidation, are influenced by the action of metallic traces existing in the materials filler. The life time of hybrid organic materials depends on the nature of impurities. The chemiluminescence determinations of oxidation resistance alkyd resin reveal the differences in the oxidation kinetics in the presence of $PbTiO_3$ particles modified with various doping atoms: Mn, In, Gd, Nb, Pr, Nd. The activation energies required for oxidative degradation were calculated from onset oxidation temperatures of nonisothermal experiments.

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