



ACCELERATED WEATHERING TEST OF HMS-PP

Washington L. Oliani*, **Duclerc F. Parra (Dr)*** and **Ademar B. Lugão (Dr)***

Nuclear Energy Research Institute – IPEN-CNEN/SP, Chemical and Environmental Centre (CQMA), Av. Prof. Lineu Prestes, 2242, 05508-900, São Paulo, Brazil

** dfparra@ipen.br*

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This method is meant to simulate the deterioration caused by sunlight and dew by means of artificial ultraviolet light and condensation apparatus.

In this study HMS-PP was obtained by the irradiation in atmosphere of acetylene as crosslinker agent the isotactic polypropylene. It was employed doses of 12.5 kGy and 20 kGy of gamma radiation¹. Thermal treatment was used as a post irradiation in order to effectuate the annihilation of the remaining radicals².

UV light is the prime cause of breakdown and produces effects which are similar to thermal degradation. These involve the breaking of chemical bonds, giving rise to free radical which result in permanent chain scission in this case to HMS-PP. Some of the groups formed may be chromophores. Unlike thermal degradation, UV degradation does not occur uniformly throughout the polymer, but particularly with opaque materials, the effects are felt on or near the surface.

The photo-oxidation, by the formation of free radicals, leads to molecule scissions by consequence, it has a large influence on the physical and mechanical properties of HMS-PP.

This kind of ageing leads to an embrittlement of polymer materials. It causes a dramatic effect on the mechanical properties and fracture behaviour. Polypropylene exposed to UV for long time, brutally passes from ductile behaviour to a fragile behaviour.

Differential scanning calorimetry (DSC), Thermogravimetric analysis (TGA), Infrared spectroscopy (FTIR), Elongation at rate and Rupture strength were used to study the degradation accelerated of HMS-PP (Spheres).

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References

¹ Lugão, A.B., *U.S. Patent 0171712, 2004*; Process for preparing high melt strength polypropylene and crosslinked prepared therewith.

² Lugão, A.B., *Tese de Doutorado: Estudos da síntese por irradiação, da estrutura e do mecanismo de formação de polipropileno com alta resistência do fundido, 2004*.