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Pro-Ecological Antioxidants for Polymeric Composites

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Abstract : In our studies, we propose the use of natural, pro-ecological substances such as polyphenols to protect polymers against ageing. In our studies, we plan to focus on the following compounds: polyphenols, gallic acid esters, flavonoides, carotenoids, curcumin and its derivatives, vitamin A, tocochromanoles, betalain. Phyto-compounds will be selected on the basis of available literature and our preliminary studies. So, we will select compounds with various contents of hydroxyl groups and colored substances capable of participating in color oxidation processes. The natural antioxidants which were added to ethylene-octene elastomer (polyolefin elastomer-Engage) and ethylene-nonbornene (TOPAS). Composites were then subjected to numerous ageing: weathering (climat of Floryda), UV (0,7 W/m2), thermo-oxidation ageing (1000C/10days) and thermal-shock (-600C/+1000C) as a function of the aging time. The efficiency of used anti-ageing agents was checked on the base of the changes after the degradation in deformation energy (tensile strength and elongation at the break), cross-link density, color (parameters L,a,b) and values of carbonyl index (based on the spectrum of infra red spectroscopy), OIT (induction oxygen time as performed in using differential scanning calorimeter -DSC) of the vulcanizates. Therefore polyphenols are considered to be the best stabilisers for polymeric composites against to oxidation processes.

Keywords : polymers, flavonoids, stabilization, ageing, oxidation
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