

## **Abstract**

The aim of this work is to study the effects of calcium stearate ( $\text{CaSt}_2$ ) as pro-oxidant agent on the degradation of polypropylene (PP) under natural exposure. For that purpose, PP samples containing various amounts of  $\text{CaSt}_2$  were prepared and exposed in Boumerdes, Algeria (Mediterranean climate) for 12 months. Samples were taken off every 3 months and characterized. The evolution of mechanical properties was followed by tensile and hardness tests. The structural modifications of PP were investigated by Fourier transform infrared (FTIR) spectroscopy, whereas the changes in morphology were analyzed by optical microscopy. The results showed a sudden decrease of elongation at break since the 1st month of exposure and a progressive decrease of stress at break and hardness. FTIR analysis showed apparition of oxygen products (carbonyl and hydroperoxide groups) due to the degradation of PP and a significant increase of carbonyl index as a function of exposure time. Furthermore, formation of crazes and cracks occurred during natural aging of PP. All the considered properties were affected by the presence of  $\text{CaSt}_2$  as pro-oxidant agent, but the results showed that the level of calcium stearate does not have a significant influence and a concentration of 5 wt% was sufficient to initiate the process of degradation.