

## **Enhancement of pro-degradant performance in polyethylene/starch blends as a function of distribution**

### **Abstract**

The effect of pro-degradant distribution in polyethylene (PE)/starch blends on ultraviolet (UV) photo-oxidative degradation was investigated. Two kinds of pro-degradants, Fe and Co-based, were used in this study. The distribution of pro-degradants in the different phases was varied by a dual step process using a side-feed on a reactive extruder. The variation in mechanical properties and evaluation of carbonyl groups by FTIR were conducted to investigate the effect of degradation following exposure to UV photo-oxidative degradation. It was found that the variation in mechanical properties was higher when the pro-degradants were distributed in the PE phase. The concentration of carbonyl groups increased as a function of UV exposure, and the concentration of carbonyl groups was higher when the pro-degradants were distributed in the PE phase. Micro-cracking was observed on the interface between starch and PE after adding the pro-degradants. When the pro-degradants were distributed in high-density polyethylene (HDPE) phase, the micro-cracks mainly appeared in HDPE matrix, and the density of micro-crack was higher. In general, the function of the pro-degradants in PE/starch blends was enhanced when their distribution was varied within HDPE phase.