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Migration of chemical additives in a rubber under UV irradiation

LUDOVIC DEVANT, CNRS, ROLAND BENOIT, MARIE-LOUISE SABOUNGI, EMMANUEL GOMEZ, BENOIT LE ROSSIGNOL — The evolution of the chemical composition of a rubber, in particular that of its surface, is governed by several factors including temperature, oxidation and migration of additives. Oxidation mechanisms alone do not account for all the phenomena observed, for example the appearance of deposits on the surface. We have studied the effects of temperature and photo-oxidation on the migration of chemical additives on a rubber surface. The morphological and chemical evolution were followed by AFM and XPS, respectively. 3D reconstruction with time-of-flight secondary-ion mass spectrometry (TOF-SIMS) combined with the AFM and XPS results enabled us to establish a relation between the oxidizing degradation of the rubber and the surface migration of the additives. This finding is supported by a kinetic study of the surface evolution.

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