

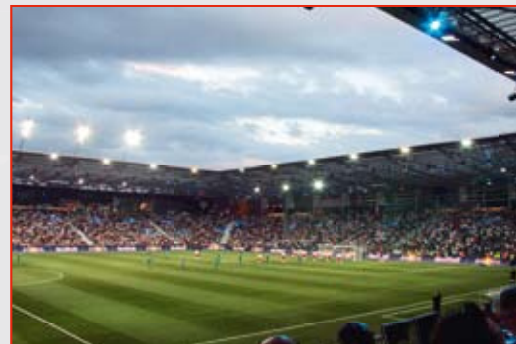
Determination of light stabilizers by HPLC

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Abstract

Synthetic materials such as artificial turf often suffer from photo-oxidation, the combined action of light and oxygen. The most visible result of this phenomena is deterioration in the appearance of the materials. In addition, mechanical and physico-chemicals are altered too. Therefore UV stabilizers, which interfere with the chemical and physical processes of light-induced polymer degradation, have been developed. They protect the synthetic products from embrittlement and colour change during their outdoor service life. Typical UV systems are hindered amine light stabilizers (HALS). The stabilizers are added during the production process. The production process and the resulting product are continuously tested for the amount of stabilizers, in order to guarantee a certain life time. In the following, the quantitative recovery and chromatographic determination of Chimassorb 944 and Cyasorb 3529 from polyolefins are presented.



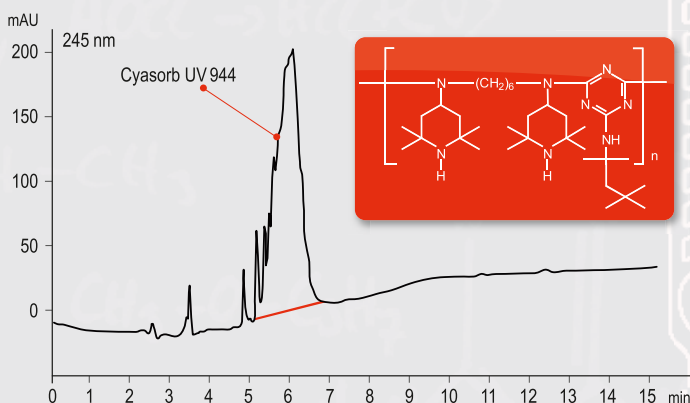
Sample treatment

- Decomposition of pellets in boiling toluene
- Cooling to about 60°C and precipitation with methanol
- Filtration of the suspension through a Büchner funnel
- Careful washing of the filter cake with toluene
- Evaporation of the filtrate to dryness
- Dissolution in tetrahydrofuran

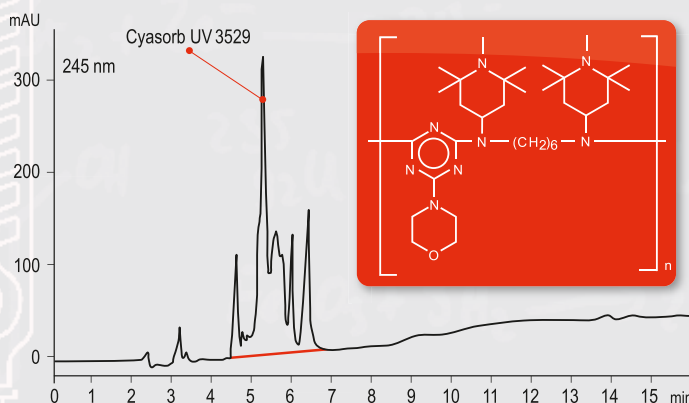
Testing Procedure

- Dilution of an aliquot of the tetrahydrofuran solution in a mixture of 30% of acetonitrile, 70% of water and 0,1% of trifluoroacetic acid
- Purification of the solution with a PET cartridge
- Measurement by means of HPLC with a gradient at a wavelength of 254nm using a C8 column
- Quantification with external standards

Chromatogram of Chimassorb 944



Chromatogram of Cyasorb 3529



Quantitative Determination of Cyasorb 3529

Definite amounts of the stabilizer are added to Polyethylene granulate in order to test whether the method works quantitatively or not. 1.1 and 2.2 w/w are added to granulate, decomposed in the manner described above and quantified by HPLC. The results are given in the table below and illustrated on the right.

Sample	Integrated Area [mAu]
1.1 without addition	03356
1.2 without addition	03318
2.1 +1,1 %	07837
2.2 +1,1 %	07757
3.1 +2,2 %	11597
3.2 +2,2 %	12485

