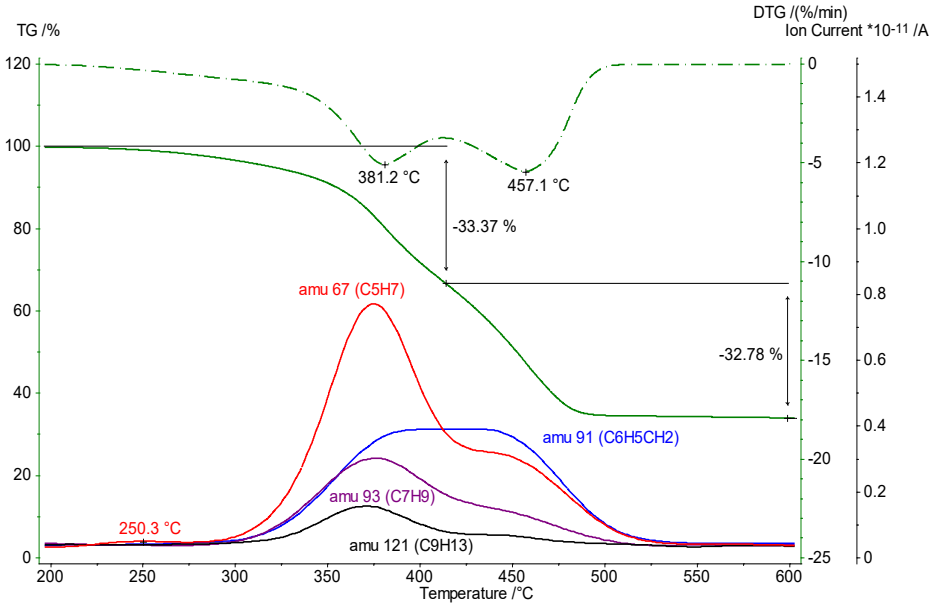
APPLICATION**SHEET**

Polymers · Automotive
STA 449 *Jupiter*® - QMS 403 *Aëolos*®

Rubber

Introduction

Rubbers are used in a large amount of products and applications such as car tyres, sealings, O-rings gloves, boots, toys, cable insulation, etc. Synthetic rubbers consist of cross-linked polymers which are reinforced, for example, by silica, carbon and carbonates. Rubbers contain furthermore plasticizers which result in a better flexibility of the rubber. Thermal analysis is typically used for the study of the temperature stability and decomposition of rubber. One important question for example is: At which temperature is the plasticizer released? In addition, coupling of thermal analysis instruments with gas analyzers like mass spectrometers allows for the chemical identification of the evolved gases: Does the rubber, for example, release polycyclic highly aromatic hydrocarbons (PAHs) which are potentially cancerous?



Test Conditions

Temperature range:	RT ... 600°C
Heating rate:	10 K/min
Atmosphere:	Argon at 70 ml/min
Sample mass:	12.52 mg
Crucible:	Pt with piered lid
Sensor:	TGA type S

Test Results

By means of simultaneous thermogravimetry (TGA) and mass spectroscopy (MS), the pyrolytic decomposition of a rubber sample was investigated. Upon heating the sample to 600°C, two mass-loss steps of 33.4% and 32.8% were observed. Maxima in the rate of mass change occurred at 381°C and 457°C. From the mass spectrometer signals (only a few exemplary mass numbers are shown), it can be concluded which organic molecules were evolved at which temperature. For example at 250°C, mass number 67 (most probably due to C_5H_7) indicates the release of the plasticizer. PAHs could be no detected.

NGB · Application Sheet 021 · E · 0621 · Technical specifications are subject to change.

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