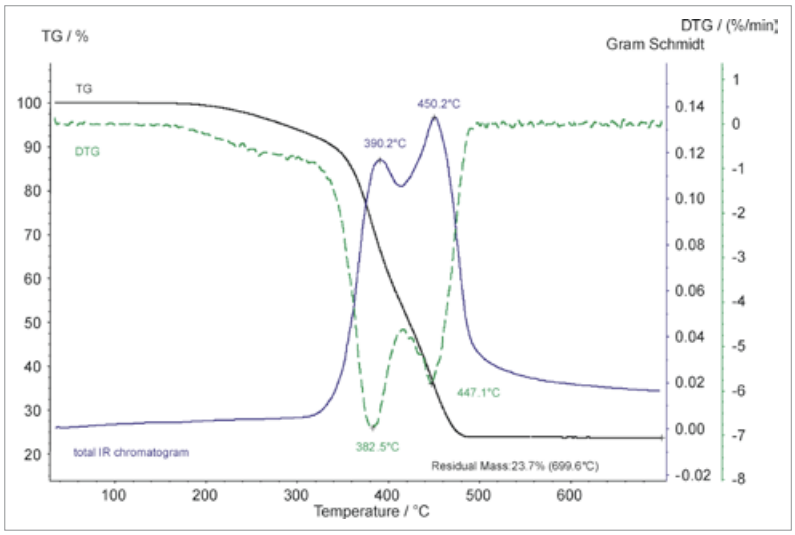
APPLICATION**SHEET**

POLYMERS – POLYMER MANUFACTURING

DECOMPOSITION BEHAVIOR OF AN NR/SBR MIXTURE

Aside from a few natural product impurities, natural rubber (NR) is essentially a polymer of isoprene units, a hydrocarbon diene monomer. Synthetic rubber can be made as a polymer of isoprene or various other monomers. Styrene-Butadiene (SBR) is an elastomeric copolymer consisting of styrene and butadiene. It has a good abrasion resistance and good aging stability. SBR is stable in mineral oils, fats, aliphatic, aromatic and chlorinated hydrocarbons.



Instrument

TG 209 ***F1*** *Iris*® – FT-IR

Test Conditions

Temperature range	RT ... 700°C
Heating/cooling rates	10 K/min
Atmosphere	Nitrogen
Sample mass	10.81 mg
Crucible	Aluminum oxide
Purge gas flow rate	40 ml/min

Results

The decomposition behavior of a rubber mixture is depicted in the figure. The relative mass loss is shown as a black closed line (TG), its first derivative (DTG, green dashed line) and the total IR chromatogram (Gram-Schmidt). The latter indicates changes in the absorbance intensities of the decomposition gases with the IR beam. It can be seen that the IR absorbance intensities increases as soon as mass a loss is detected. A three-dimensional view of all detected IR spectra is shown in figure 2. For further analysis, single spectra are extracted at 390 and 450°C (fig. 3a). The zoomed figure 3b shows the most significant difference of absorbance (wave number at 892 1/cm). At 390°C, decomposition products are detected that are related to NR while at 450°C, SBR decomposition products are observed which are due to the pyrolysis of SBR.

NGB · AS · 115-2006 · EN · 07/13 · Technical specifications are subject to change.

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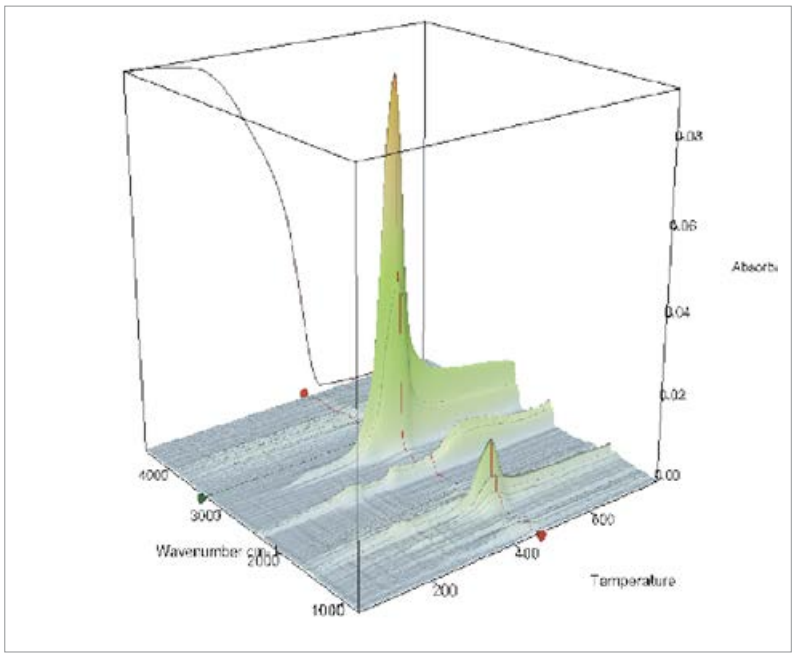

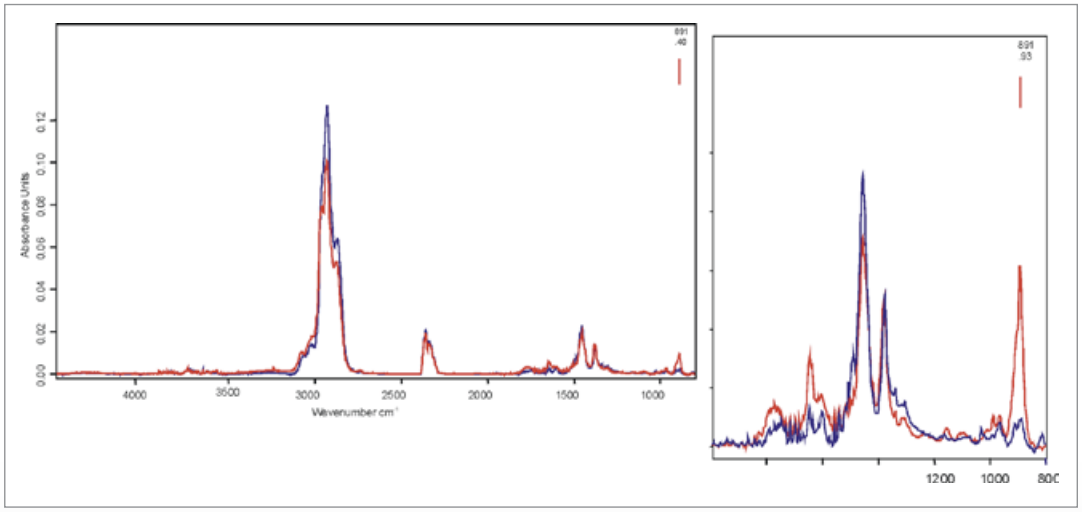

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