

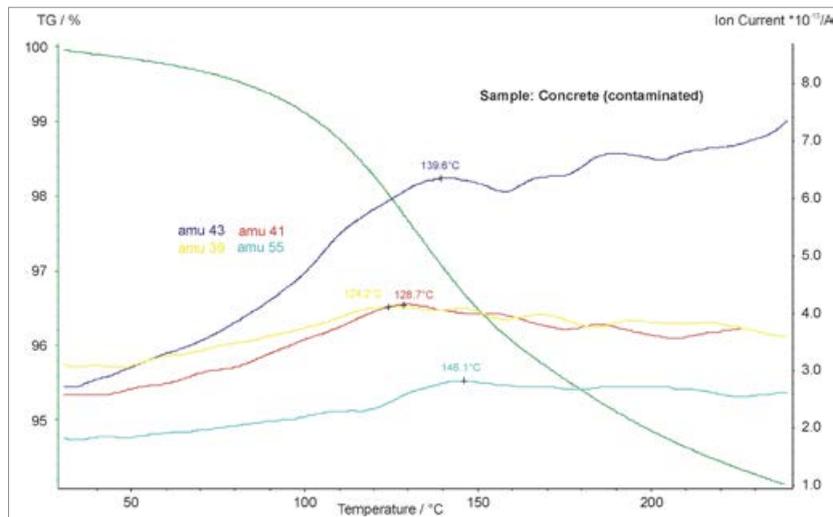
APPLICATION SHEET

INORGANICS – CHEMICALS

SOIL (CONCRETE) CONTAMINATION

Soil contamination is the presence of man-made chemicals or other alterations to the natural soil environment. This type of contamination typically arises from rupture of underground storage tanks, application of pesticides and herbicides, percolation of contaminated surface water to surface strata, leaching of wastes from landfills or direct discharge of industrial wastes to the soil. The most com-

mon chemicals involved are petroleum hydrocarbons, solvents, pesticides, herbicides, lead and other heavy metals. The occurrence of this phenomenon is correlated with the degree of industrialization and intensity of chemical usage. Thermogravimetry coupled with evolved gas analysis like mass spectroscopy is well able to trace such contaminations in soils or other sources.



Instrument

STA 449 C Jupiter® – QMS 403 Aeolos®

Test Conditions

Temperature range	RT ... 300°C
Heating/cooling rates	10 K/min
Atmosphere	Synthetic air at 70 ml/min
Sample mass	2159 mg
Crucible	Al ₂ O ₃ beaker
Sensor	TG type S

Results

A contaminated concrete sample was investigated by thermogravimetry (TG) and mass spectroscopy. For clarity, only particular mass numbers 39, 41, 43 and 55 are shown which are most probably due to the evaporation of diesel fuel contamination of the concrete sample (pure diesel fuel was measured in advance in order to get a fingerprint spectrum: mass numbers 39, 41, 43 and 55 were the strongest mass numbers). The intensity of the mass spectrometer signals is very small which reflects the low concentration of contamination in the ppm range and thus the high sensitivity of the mass spectrometer. The majority of the mass loss is due to the evaporation of humidity (the corresponding mass spectrometer signal of water is not displayed for clarity) which demonstrates the need for evolved gas analysis for the detection and identification of impurity traces.