CDS olutions

APPLICATIONS INFORMATION USING ADVANCED SAMPLE HANDLING TECHNOLOGY

Brominated Flame Retardant in PET

Brominated flame retardants, including tetrabromo bisphenol A (TBBPA), polybrominated diphenyl ethers (PBDE) and polybrominated biphenyls (PBB) are frequently found in the plastics used to make electronic components. There is now concern about the accumulation of these brominated compounds in the environment and their effects on organisms. Consequently, these materials are are now highly regulated especially in the European Union under RoHS and WEEE compliance.

Determination of these compounds can be facilitated by using thermal sampling techniques to liberate the flame retardant from the polymer matrix. In this example, a small piece of polyethylne terephthalate (PET) known to contain bromainated flame retardant, was heated directly to the GC/MS for rapid determinated of brominated compounds.

Figure 1 shows the chromatogram produced by heating a piece of the plastic to 300°C for 15 seconds, using the coil of the Pyroprobe 5250 Autosampler. If mass 486 is displayed (for tetrabromo diphenyl ether), a peak is seen at about 23 minutes. In Figure 2, the area between 20 and 25 minutes is expanded, making the peak more evident. The mass spectrum of the peak is shown above it. The groupings of peaks in the mass spectrum are typical for brominated compounds, reflecting the principal isomers of brimine. In this case, the spectrum indicates fragments with one, two, three and four bromines.

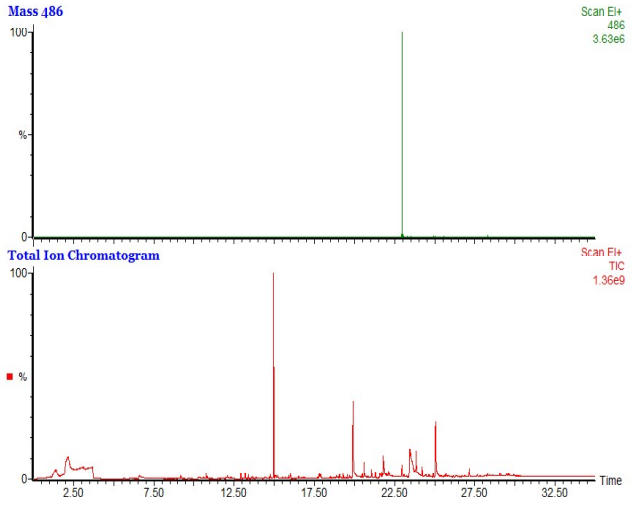

Figure 1. TIC (bottom) and mass 486 (top) for desorption of polymer.

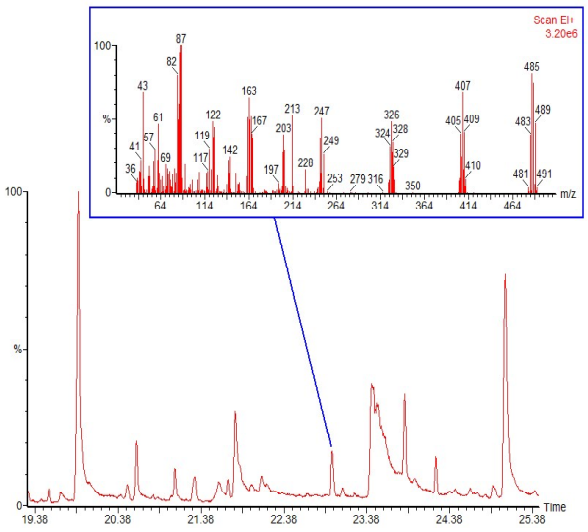

Figure 2. Mass spectrum of peak at 23 minutes.

Equipment

These samples were analyzed using a CDS Model 5200 Pyroprobe, interfaced to a Clarus 500 gas chromatograph/mass spectrometer.

Model 5200 Conditions

Valve Oven:	300°C
Transfer Line:	325°C
Temperature:	400°
Time:	15 seconds

GC Conditions

Carrier:	Helium
Column:	Rxi-5ms (30m X 0.25mm)
Detector:	Clarus 500 MS

GC Program:

Initial:	40°C for 2 minutes
Ramp:	10°C/min.
Final:	300°C

FOR MORE INFORMATION CONCERNING THIS APPLICATION, WE RECOMMEND THE FOLLOWING READING:

M. P. Di Cortemiglia, G. Camino and L. Costa, Mechanism of action and pyrolysis of brominated fire retardants in acrylonitrile-butadiene-styrene polymers, J. Anal. Appl. Pyrolysis, 11 (1987) 511-526.

Additional literature on this and related applications may be obtained by contacting your local CDS Analytical representative, or directly from CDS at the address below.

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