CDS solutions

APPLICATIONS INFORMATION USING ADVANCED SAMPLE HANDLING TECHNOLOGY

Multi-Step Analysis of Packaging Tape

Thermal sampling techniques may replace more complex and time consuming analytical procedures such as solvent extractions by transferring volatile and semivolatile compounds directly to the GC for analysis. By selecting the appropriate temperature, or sequence of temperatures, various classes of compounds may be separated for easier analysis.

The Pyroprobe 5150 may be programmed to take the same sample material to a variety of temperatures automatically, starting the GC each time to produce a series of runs at different temperatures. In this example, a 1.25 mm circle of clear packing tape was heated first to 200°C, then 400°C and finally to 650°C.

Figure 1 shows that at 200°C only a few small peaks are produced, but these include phthalate plasticisers from the tape film. At 400°C, the largest peak is for 2-ethyl hexanol, a breakdown product from one of the acrylics used to in the adhesive. Earlier eluters include acetic acid, butanol, 3-methylene heptane and butyl acetate. Most of the compounds released from the sample at 400°C may be associated with the adhesive and not with the polymer film used for the tape itself.

In Figure 3 the remaining sample is pyrolyzed to identify the polymer film used for the tape itself. The largest peak is dimethyl heptene, the trimer of propylene, revealing that the tape is polypropylene. Other oligomers of propylene, as well as acrylic monomers from the adhesive are also seen in the pyrolysis run.

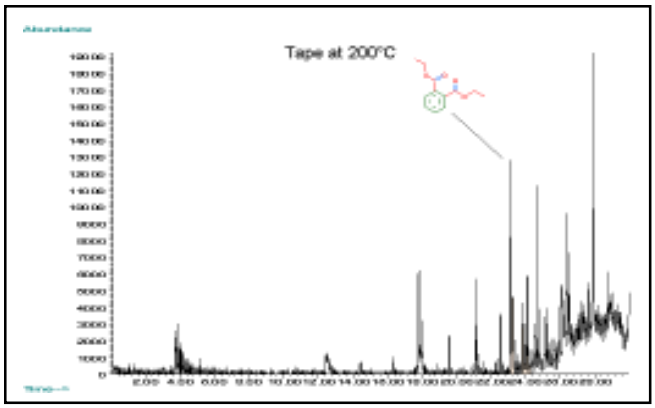

Figure 1.

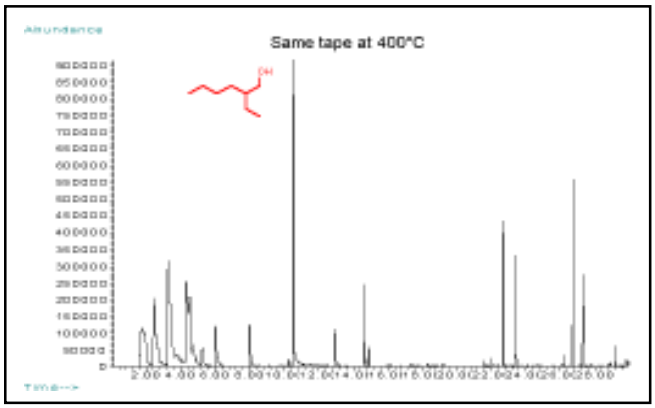

Figure 2.

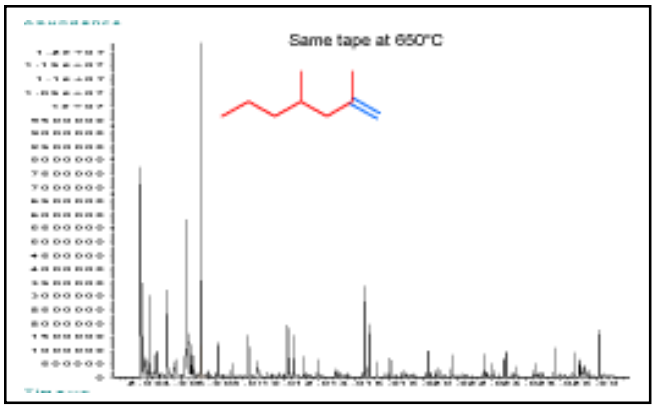

Figure 3.

Equipment

A 1.25 mm circle was punched out of the whole tape sample, placed into a quartz tube, and then analyzed using a CDS Model 5150 Pyroprobe with a coil filament. The Pyroprobe was interfaced to an Agilent 6890 gas chromatograph which was equipped with an HP5973 MSD as the detector.

Pyroprobe 5150 Conditions

Interface:	200°C, 300°C
Transfer Line:	275°C
Valve Oven:	275°C
Temperature:	200°, 400°, 650°C
Time:	10 seconds

GC Conditions

Carrier:	Helium
Split:	50:1
Column:	HP-5 (30m X 0.25 mm)
Detector:	MSD

GC Program:

Initial:	40°C for 2 minutes
Ramp:	10°C/min.
Final:	295°C

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

Introduction to Pyrolysis-Capillary Gas Chromatography, T. P. Wampler, Journal of Chromatography A, 842 (1999) 207-220.

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.

CDS Analytical, Inc.

CDS Analytical, Inc. has been a leader in the design and manufacture of laboratory instruments for sample preparation and analysis since 1969. We are dedicated to providing the best possible instruments for both research and routine analysis. Well known in the field of pyrolysis, CDS manufactures the Pyroprobe® 1000, 2000 and 2500 autosampler for the introduction and analysis of solid materials by GC, MS and FT-IR. CDS offers a complete line of dynamic headspace instruments for the analysis of volatile organic compounds in environmental, pharmaceutical and food applications, including the model 6500 16 position autosampler for complex, multicomponent materials investigation. Our customers, their requirements and applications are important to us. To help meet your needs, we offer a wide range of analytical information and the services of our applications laboratory. If you would like additional information, please contact us at the address below, call us at 1 800 541 6593, or log onto **www.cdsanalytical.com.**

CDS Analytical, Inc. 465 Limestone Road, P.O. Box 277, Oxford, PA USA 19363-0277 PH: 610 932 3636 FX: 610 932 4158