CDS solutions

APPLICATIONS INFORMATION USING ADVANCED SAMPLE HANDLING TECHNOLOGY

Thermal Desorption of Aliphatic Hydrocarbons and PAHs from Soil

As an alternative to solvent extraction, hydrocarbons, even PAHs, can be thermally desorbed from soils using a Pyrex thermal desorption tube in the interface zone of a Pyroprobe 5200. The samples are heated and purged to the trap of the Pyroprobe, after which the collected hydrocarbons are thermally desorbed from the trap and transferred to the GC. Since no solvents are used, the analytes are not diluted and the senitivity of the analysis is consequently enhanced. In addition, sample preparation involves only the time required to place the sample into the tube and heat it for ten minutes.

In this example, samples were first dried at room temperature, then ground to a powder. 500 mg of the powdered soil was placed into the Pyrex desorption tube and heated sequentially to determine the effectiveness of various temperatures. Figure 1 shows a soil heated first to 200°C and then to 250°C. Ion 57 was displayed for normal hydrocarbons, and it is clear that, although some compounds are desorbed at 200°, the recovery at 250°C is significantly better.

Almost no PAHs were detected under these conditions, so the same sample was heated again to 350°C for 10 minutes. Figure 2 shows the total ion chromatogram for this run at the top, and then selected ions for specific PAHs. Standards were used to confirm the retention time and spectra of the PAHs, which range from naphthalene to benzopyrene.

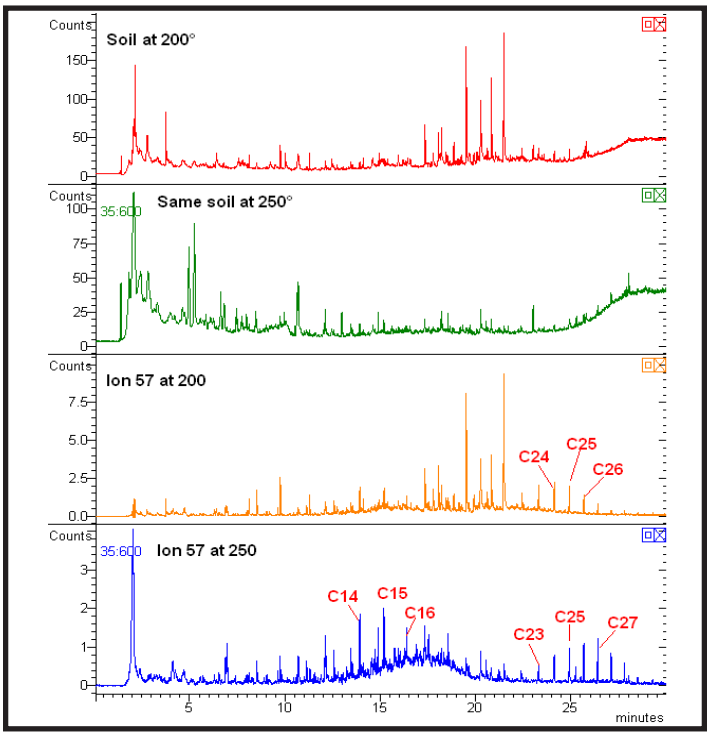

Figure 1. Soil heated to 200° and then 250°C.

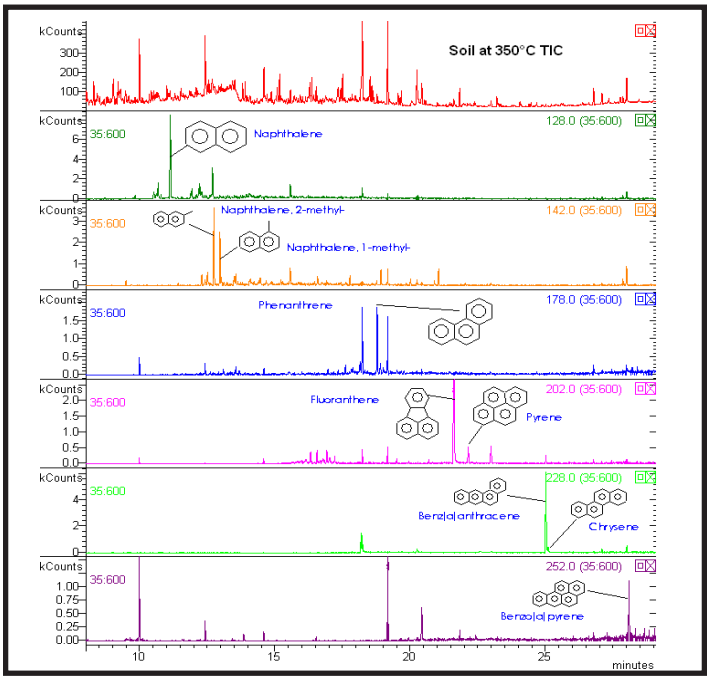

Figure 2. Soil heated to 350°C for 10 minutes.

Experimental Parameters

All samples were analyzed using a CDS Analytical Pyroprobe 5200 equipped with a Pyrex thermal desorption tube and a Tenax trap.

Pyroprobe

Sample:	500 mg in Pyrex tube
Interface:	200°, 250° for 5 minutes, 350°C for 10 minutes
Carrier flow:	30 ml/min
Trap initial:	40°C
Trap desorption:	325°C for 4 minutes

GC/MS

Column:	30 m x 0.25 mm 5% phenyl MS
Carrier:	Helium
Split:	50:1

Oven program:
40°C for 2 minutes
10°C/minute to 325°C

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

D. White et al., Characterizing soil organic matter quality in arctic soil by cover type and depth, Cold Regions Sci. and Tech. 38 (2004) 63-73

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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