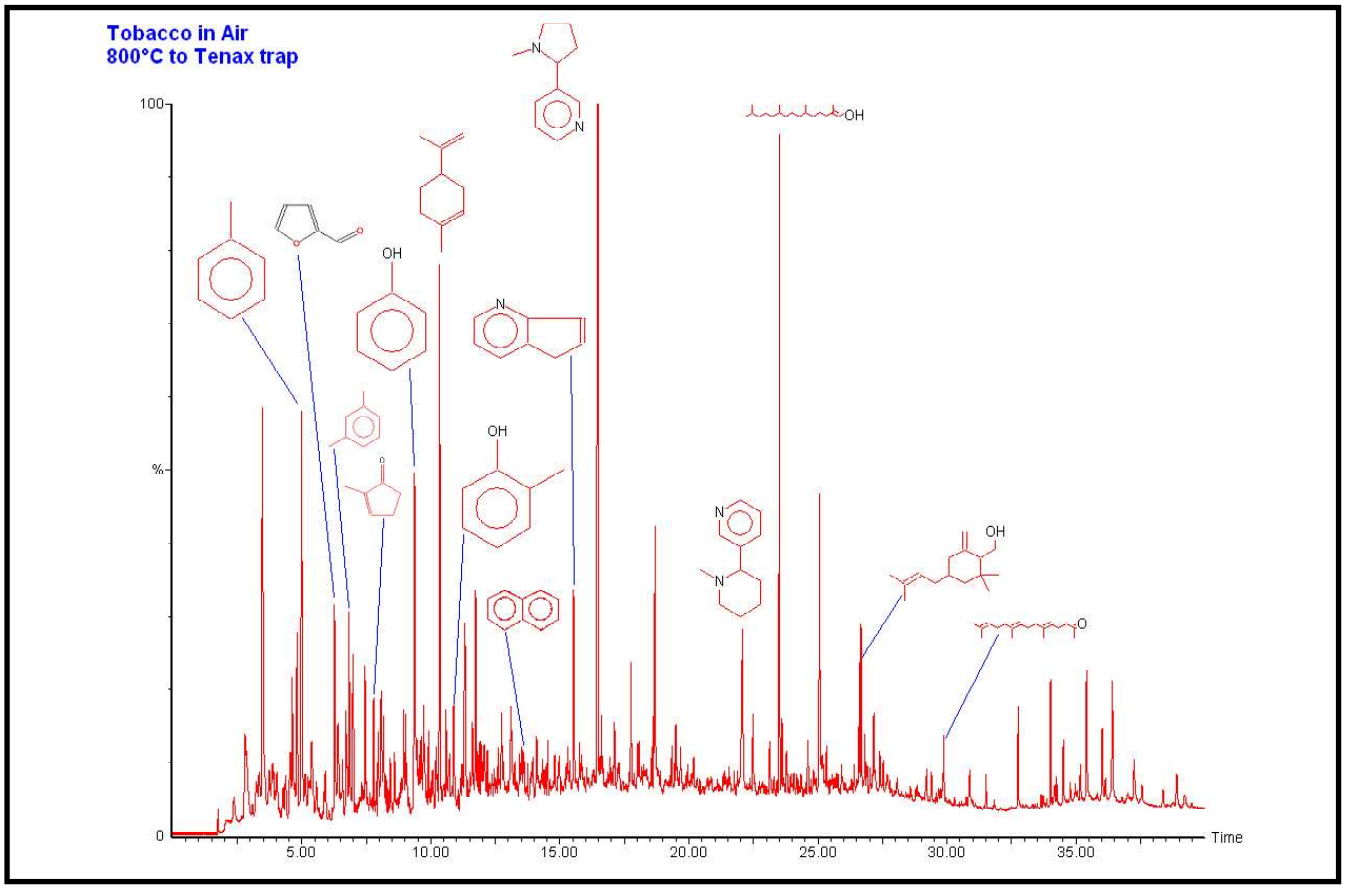
CDS solutions

APPLICATIONS INFORMATION USING ADVANCED SAMPLE HANDLING TECHNOLOGY

Pyrolysis of Tobacco in Air

When tobacco burns, the products include a wide range of compounds, some of which are pyrolysis products, some have been oxygenated, and some just desorbed. This may be studied analytically by pyrolyzing the tobacco in air, collecting the pyrolysate onto a trap and then desorbing the trap to the GC/MS. As seen below, the largest peak is nicotine, which is not a pyrolysis product, but is simply volatilized from the tobacco by heating. Some of the compounds are pyrolysis products of the cellulose, including furfural and methyl cyclopentenone. Aromatic hydrocarbons produced include toluene, xylene, naphthalene and many others, plus phenolic compounds including phenol and methyl phenol. Aliphatics, especially branched and unsaturated compounds are also generated, including limonene and long-chain alcohols.

Because the heating rate, temperature and time for pyrolysis with the CDS 5200 are all selectable, experiments may be designed to simulate the various burning processes involved when tobacco is smoked. The air flow rate is also controllable, and is always vented and the trap flushed with helium before it is placed on-line with the GC/MS.



Equipment

The CDS 5200 Pyroprobe was operated in the trapping mode, with reactant gas and a Tenax trap. The tobacco sample was placed inside a quartz tube and inserted into the coil filament of the Pyroprobe for pyrolysis. The Pyroprobe was interfaced to a GC/MS using a heated transfer line.

5200 Conditions

Interface:	300°C for 4 minutes
Pyrolysis:	800°C for 25 seconds
Valve oven:	325°C
Transfer line:	325°C
Trap rest:	40°C
Trap desorption:	325°C for 4 minutes
Reactant gas:	Air at 30 ml/minute

GC/MS Conditions

Column:	5% Phenyl methyl silicone 30m x 0.25 mm
Split:	50:1
Oven:	40°C for 2 minutes 8°C/minute to 300°C
Mass range:	35 to 600 AMU

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

Modeling of a smoldering cigarette, A. Rostami, J. Murthy, M. Hajaligol, J. Anal. Appl. Pyrolysis 66 (2003) 281-301.

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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