Comparison of Thermo Scientific TraceGOLD TG-WaxMT and Thermo Scientific TraceGOLD TG-WaxMS Columns Using a Standard Test Mix

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Key Words
Fused silica column TG-WaxMS, metal column TG-WaxMT, GC analysis, temperature cycling, high throughput

Abstract
This application note demonstrates the equivalent chromatographic performance of TraceGOLD fused silica and metal Wax phase GC columns using a standard test mix.

Introduction

In high throughput laboratories, column lifetime is of importance not only due to their cost, but also for the associated instrument downtime when frequently replacing columns. Conventional fused silica columns may become brittle as a consequence of continuous temperature cycling. The TraceGOLD™ TG-WAXMT metal GC column is more mechanically durable and robust with an increased column lifetime due to its metal support. This gives an added advantage for high throughput laboratories as the metal columns can better withstand the stress of elevated temperatures and repeated thermal cycling.

In addition to the TraceGOLD TG-WAXMT, Thermo Scientific also has available 100% dimethylpolysiloxane TG-1MT and 5% phenyl polysiloxane TG-5MT metal columns for applications requiring these bonded phases.

In this application note the chromatography of both the TraceGOLD TG-WAXMT and TGWAXMS were compared with varying analyte concentrations of a standard test mix.

Experimental Details

Sample Preparation

A standard solution prepared in hexane/acetone with varying concentrations of analytes listed in Table 1 was used for this analysis. 1 µL of this standard mixture was injected into the GC/FID.

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Separation Conditions		Part Number
Instrumentation:	Thermo Scientific TRACE GC Ultra	
Column(s):	TraceGOLD TG-WAXMS, 30 m x 0.25 mm x 0.25 µm	26088-1420
	TraceGOLD TG-WAXMT 30 m x 0.25 mm x 0.25 µm	26M88-1420
Septum:	BTO, 17 mm	31303211
Liner:	Focus Split liner, 5 x 8 mm	453T1905
Column ferrules:	100% Graphite ferrules for TRACE injector/detector	29053488
Injection syringe:	10 µL Fixed needle syringe for a TriPlus Autosampler	36500525
Carrier gas:	Helium	
Split flow:	36 mL/min	
Column flow:	1.2 mL/min (1 min) programmed flow	
Split ratio:	30:1	
Oven temperature:	40 °C (1 min), 2 °C/min, 150 °C, 20 °C/min, 250 °C (1 min)	
Injector type:	Split/Splitless	
Injector mode:	Split	
Injector temperature:	200 °C	
FID parameters:	Temperature: 240 °C Air flow: 300 mL/min Hydrogen flow: 30 mL/min Nitrogen makeup flow: 25 mL/min	

Results

Figures 1 and 2 show the chromatograms of the test mixture (Shown in Table 1) separated on a TraceGOLD TG-WAXMS and TG-WAXMT columns respectively. The chromatograms for the fused silica and metal Wax columns were similar. However, better resolution between 1-octanol and 2,6-dimethylphenol was observed using the TG-WaxMT GC column. This is due to the stationary phase of the metal column being bonded by a proprietary process which allows for increased inertness. The metal support is deactivated to minimize the breakdown of highly active compounds and consequently reduces peak tailing.

The peak widths for methyl caprate and dicyclohexyl-aniline were approximately 0.2 minutes on both columns giving a measured efficiency of 30000 plates/meter. Both columns have an equivalent efficiency and peak capacity.

Conclusion

The application demonstrates similar chromatography was observed between the TG-WAXMT metal GC column and TG-WAXMS fused silica GC column. The TG-WAXMT column can therefore complement the fused silica column by providing a more mechanically durable and robust product for use in high throughput laboratories.

References

Thermo Scientific reagents, solvents and accessories brochure (Ref: BR20535_E 06/12S). Available upon request.

Peak Number	Compound
1	2,3-Butanediol
2	Decane
3	1-Octanol
4	2,6-Dimethylphenol
5	2-Ethylhexanoic acid
6	2,6-Dimethylamine
7	Dodecane
8	Methyl caprate
9	Dicyclohexylaniline
10	Methyl undecanoate

Table 1: Test probe mixture used for the analysis

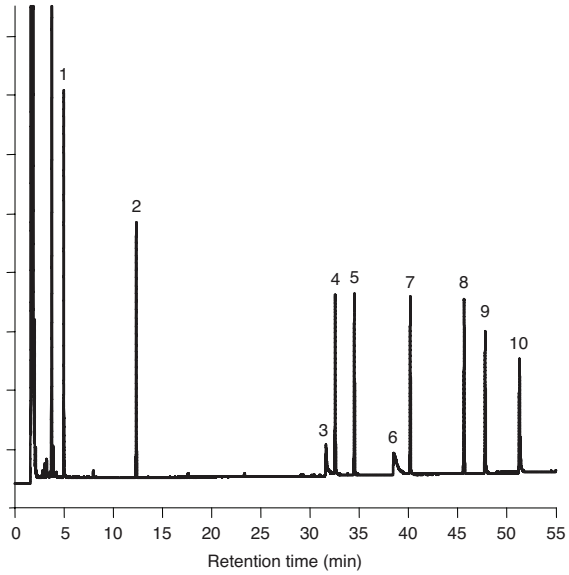

Figure 1: A standard test mixture separated on a TG-WaxMS capillary column

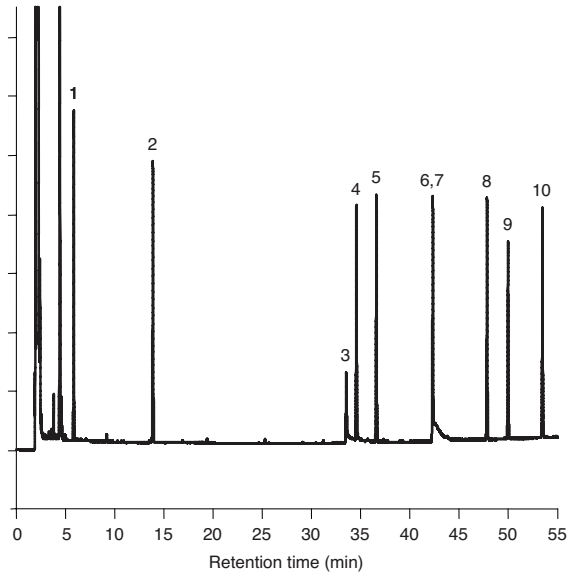

Figure 2: A standard test mixture separated on a TG-WaxMT metal column

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