

Improved Performance From The New Thermo Scientific TraceGOLD 5 Series GC Columns

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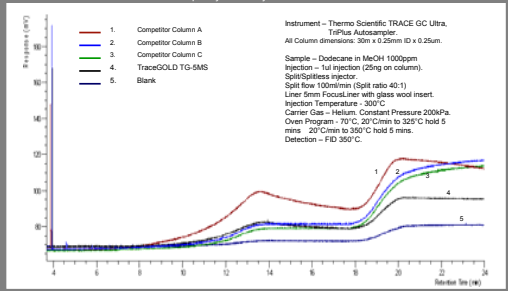
Introduction

The development of durable and inert stationary phases for GC has substantial benefits for the analysis of all compounds as it improves the sensitivity and reproducibility of the assay and increases the overall robustness of analysis. The introduction of the Thermo Scientific TraceGOLD range of capillary GC columns substantially reduces column bleed, increases inertness and offers unparalleled reproducibility from both injection to injection and batch to batch.

The improved column performance of the TraceGOLD™ TG-5MS is seen in the following test results and exemplified by the highly inert characteristics displayed by the base deactivated TG-5MS AMINE.

Results

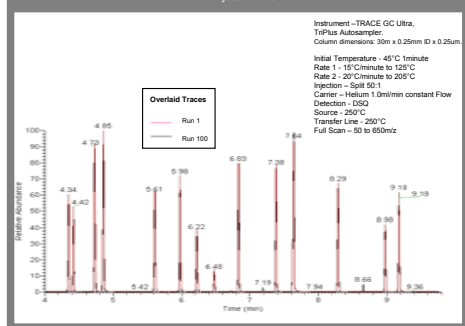
FIGURE 1. TraceGOLD TG-5MS. Comparison of Bleed With 3 Commercially Available 5% Diphenyl/95% Polysiloxane Phase Columns



The column bleed test (Figure 1.) is a comparison of the bleed characteristics of a range of different 5% diphenyl/95% dimethyl polysiloxane columns under identical run conditions. A blank deactivated silica column of the same proportions is included for reference purposes.

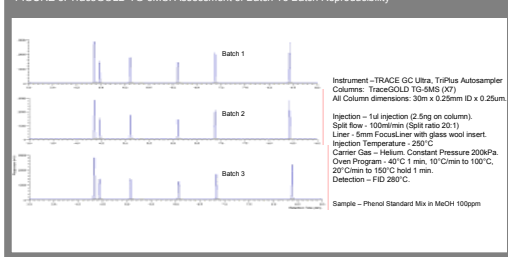
Column phase material stability is essential in ensuring low bleed values across the operating temperature range of the column. A low bleed characteristic ensures preservation of the stationary phase over its working life assuring high levels of run to run reproducibility with greater sensitivity and a reduction in detector contamination.

FIGURE 2. TraceGOLD TG-5MS: An Assessment of Run To Run Reproducibility Over 100 Analytical Runs



The run to run reproducibility of the TraceGOLD TG-5MS was assessed over 100 runs (Figure 2.) using a mixture of phenol standards. The runs were all alike, being run consecutively on the same instrument under identical conditions.

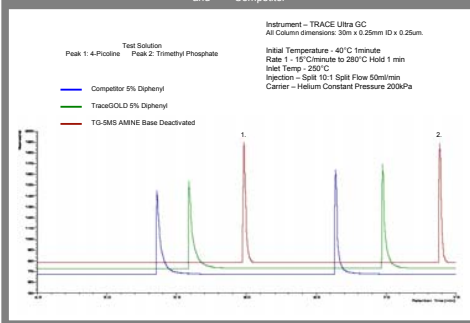
FIGURE 3. TraceGOLD TG-5MS: Assessment of Batch To Batch Reproducibility



In the batch to batch test each of three column batches were conditioned at 350°C and subsequently used over five runs to analyse a standard mixture of phenols using an identical set of run conditions for all batches.

The excellent reproducibility in terms of comparable response, resolution and the low batch to batch retention time drift is evident in the chromatograms for each batch (Figure 4.).

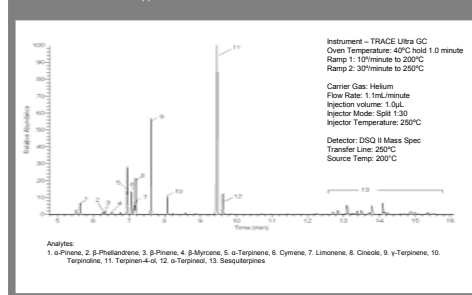
FIGURE 4. TraceGOLD TG-5MS AMINE: Comparison of Inertness With TraceGOLD TG-5MS and Competitor



The acidic nature of the silanol groups prevalent throughout GC systems can result in the adsorption of basic compounds in sample mixtures. This adsorption frequently leads to peak tailing especially at low sample concentrations.

Treatment of the analytical column which involves the bonding of basic functional groups onto the column surface can reduce the effects of tailing and improves run to run reproducibility. In the above test the TraceGOLD TG-5MS AMINE base deactivated column is compared with the TG-5MS and a competitor column. All analytical runs were made using the noted run conditions.

FIGURE 6. Tea Tree Oil Application On TraceGOLD TG-5MS



The qualities of the new TG-5MS can be seen in a typical application with the analysis of a standard Tea Tree oil sample.

Conclusions

The series of tests carried out to evaluate the new Thermo Scientific TraceGOLD GC column range clearly show the improvements in capillary column performance. The inherent stability of the phase bonding provides a proven basis for chromatographic clarity which is further enhanced by the low rate of bleed.

The advances in phase resistance to temperature extremes and the durability of the column when used close to its operating limits are evidenced by the column bleed tests and the run to run comparability results. The inert nature of the stationary phase can be further augmented by chemical base deactivation and this is seen in the superior resolution and peak shape of basic compounds when using the TraceGOLD TG-5MS Amine.

The improvements in chromatographic performance are matched by the integrity of the manufacturing process evidenced by the consistent results obtained from the analysis of a single standard mixture using columns from three discrete manufacturing batches.

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