

The Advantage

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High Resolution
Chromatography
Products

MXT[®]-500 Sim Dist New carborane stationary phase for High Temperature GC

Hot

by Andy Schuyler

in this issue

Gas chromatographic analysis at temperatures above 400°C requires stationary phases and tubing that can withstand temperatures beyond the limits of most conventional polymers and tubing used in GC. By incorporating carborane into the backbone of the polymer chain, the thermal stability is increased (**Figure 1**). Because these slightly polar polymers are not pure dimethyl polysiloxanes like MXT-1, Restek uses the phase designation MXT-500 Sim Dist for this new stationary phase.

Tubing Constraints

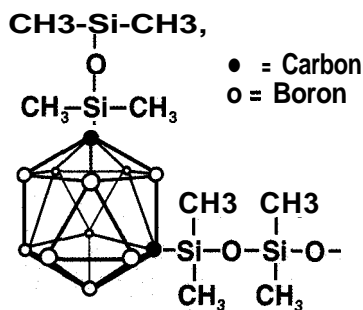
An improved, high-temperature stationary phase is not enough; the tubing used is also an important consideration. The polyimide coating that keeps fused silica tubing flexible breaks down rapidly at oven temperatures above 360°C and is unsuitable for high temperature gas chromatography. Aluminum-clad tubing overcomes the problems with the polyimide, but has limitations. When repeatedly temperature programmed above 400°C or

- MXT columns will not break like brittle Al-Clad columns.
- Safe for Hydrogen carrier gas
- Low bleed and long life to 430°C.



Figure 1:

Carborane dimethyl polysiloxane-MXT-500 Sim Dist stationary phase.



MXT-500 Sim Dist
Column
...pg. 1

Rtx-OPPesticides
Column
...pg. 3

SilcoCan-The ideal
canister for sulfur
compound storage
...pg. 6

Organo-Tin Analysis by
Capillary GC
...pg. 8

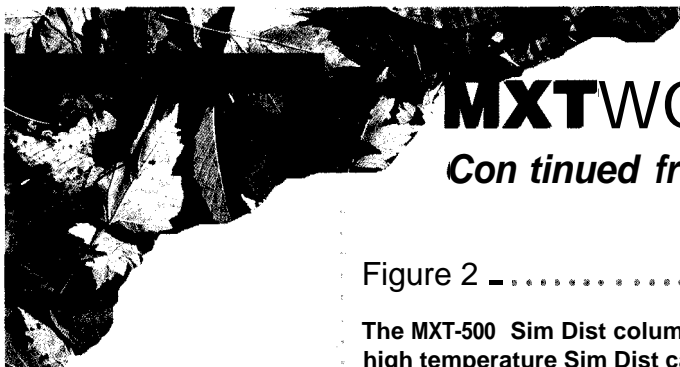
Koni's Korner
...pg. 10

Inertsil HPLC Columns
...pg. 13

Peak Performers
...pg. 14

Continued on page 2.

FALL
INTERNATIONAL



MXTWOO Sim Dist

Continued from page 1.

**Tubing stable
at ANY GC
temperature!**

Figure 2

The MXT-500 Sim Dist column demonstrates low bleed and stable baseline to 430°C for high temperature Sim Dist calibration and analysis.

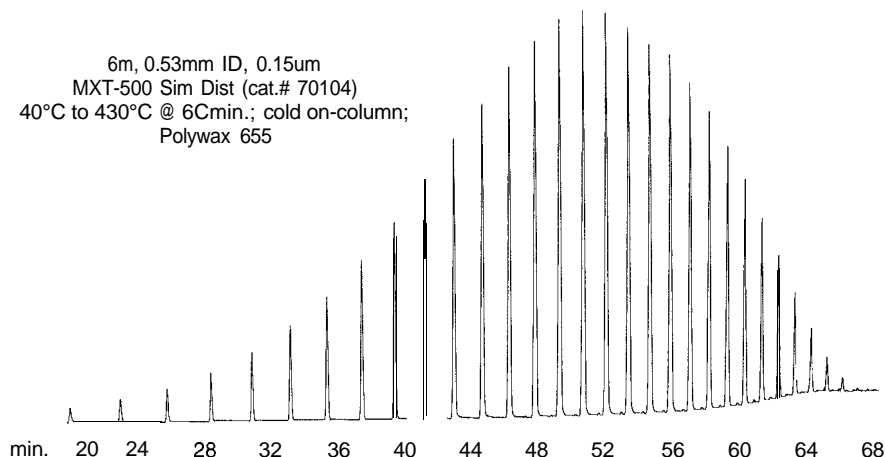
allowed to cool below 50°C the aluminum sheath becomes brittle and eventually breaks. The most durable capillary columns available are Restek's MXT columns, which are manufactured using Silcosteel tubing (metal tubing with the inertness of fused silica and the robustness of metal).

MXT columns are designed for High Temperature Simulated Distillation

Simulated distillation (Sim Dist), one of the most common high temperature GC applications, is a good demonstration of the durability of MXT columns. Simulated distillation is a technique in which the GC is calibrated using the retention times of hydrocarbons that have published boiling points. The analysis of a high molecular weight petroleum sample, such as lubricating oil, is compared to the calibration by a special software program and the boiling range distribution is determined. Simulated distillation requires stable retention times under temperature programmed conditions and a baseline with low bleed that is repeatable with multiple temperature programmed analyses.

Figure 2 illustrates low and stable column bleed, excellent peak symmetry, and good recovery of the high molecular weight hydrocarbons in Polywax 655 on an MXT-500 Sim Dist column. Retention time and baseline stability are excellent indications that the polymer is stable. This column has been operated at 430°C isothermal for over 100 hours

6m, 0.53mm ID, 0.15um
MXT-500 Sim Dist (cat.# 70104)
40°C to 430°C @ 6Cmin.; cold on-column;
Polywax 655



without significant retention time shift or baseline increase. And, of course, the MXT tubing will never become brittle!

Restek offers MXT-1 and MXT-500 Sim Dist stationary phases for high temperature Sim Dist

Although the carborane 500 Sim Dist stationary phase is the most stable phase available for Sim Dist, many analysts prefer to use a true methyl silicone column for this analysis. Differences in polarity of the stationary phases cause a shift in the calculated boiling range distribution for petroleum samples containing aromatic hydrocarbons. The MXT-500 Sim Dist stationary phase has increased relative retention of aromatic hydrocarbons compared to the methyl silicone MXT-1 Sim Dist. This causes the boiling points to be slightly higher using the 500 Sim Dist phase when the sample contains aromatics. Restek now gives analysts a choice by providing both types of phases on

high temperature MXT columns. While both columns can be operated to 430°C, the MXT-500 Sim Dist column has lower bleed and longer lifetime, while the MXT-1 offers methyl silicone polarity that matches many laboratories' historical data.

Durable Silcosteel tubing and stable stationary phases for High Temperature GC

High temperature GC challenges the limits of existing column and stationary phase technology. Restek's MXT tubing is ideally suited to the task when compared to fused silica or aluminum clad tubing, which cannot withstand re-

peated temperature programmed operation to 430°C. These temperatures also push GC polymers to the limit of thermal decomposition. But Restek's new MXT-500 and MXT-1 Sim Dist columns hold up well under these extreme conditions. When properly conditioned to 430°C these columns give stable baselines with low bleed and repeatable retention times needed for high temp Sim Dist and other HTGC analyses.

Product Listing:

Columns	
Description	cat.#
MXT-1 Sim Dist (6m, 0.53mm ID, 0.1um)	70101
MXT-500 Sim Dist (6m, 0.53mm ID, 0.15um)	70104
Polywax (655 Calibration Material 1 gm)	36225
Polywax Calibration Material 1 gm)	36227