



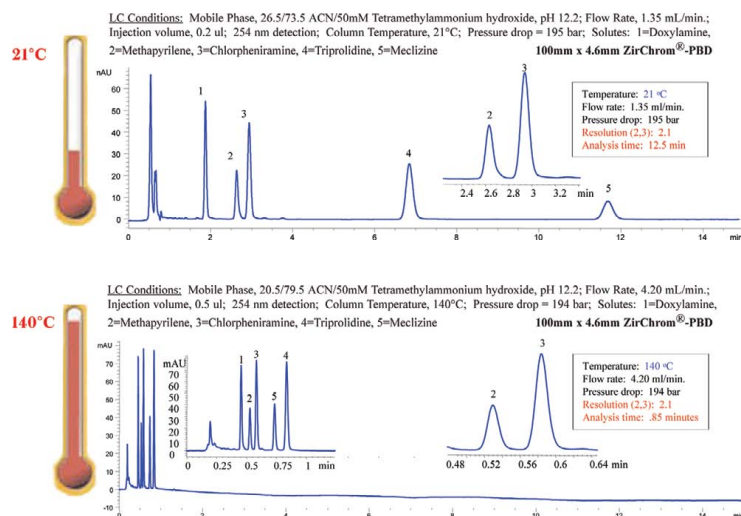
CHROMATOGRAPHIC SPECIALTIES INC.

www.chromspec.com

Technical Note CS36

Fast LC...Using Temperature to Speed Up LC Separations

Temperature control can be a very useful addition to the liquid chromatographer's tool box. The viscosities of liquids are temperature dependant – the higher the temperature, the lower the viscosity. By reducing viscosity, we can lower back pressure, and speed mass transfer between mobile and stationary phases. Most silica based columns can tolerate elevated temperatures up to 60°C; however there is a trade-off, column life is significantly shortened. Zirconia based columns are stable up to 200°C and tolerate these elevated temperatures without undue affect on column lifetime.



Advantages

- Faster analysis times
- Lower back pressure
- No loss of resolution
- Improved efficiency
- Increased savings

Will my compounds degrade?

This is a valid concern in high temperature LC. However, run times are very fast, and researchers are discovering that many compounds that are thermally unstable do not degrade measurably during an analytical run.

Will I need to worry about solvents boiling?

The high pressures used in HPLC dramatically raise the boiling point of any solvent. For temperatures over 100°C, the addition of a back pressure regulator after the detector is recommended to prevent flashing. Elevated temperatures greater than 150°C require that the mobile phase be cooled upon exiting the HPLC column and entering the detector.

Aqueous-Only LC !

As water temperature increases, polarity decreases. Above 100°C, water can be sufficiently non-polar that no organic modifiers are needed for efficient separations. This lets **UV/Visible detectors operate at wavelengths as short as 190nm!** And the workhorse detector of GC can be used – **FID works with water vapor** as the carrier gas!

Reproducible Results

High speed separations aren't the only reason to use column heaters. The temperature in your lab can vary with season, weather, time of day and time of week. If you use a column heater set 5°C above the highest anticipated temperature in your lab, you can eliminate retention time shifts and resolution changes that result from temperature changes in the lab.

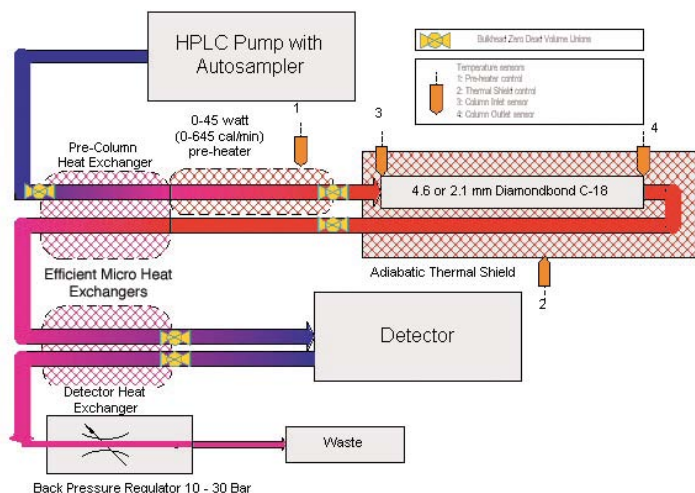


Available Products from Chromatographic Specialties for Fast LC

The Metalox-200™ High Temperature Column Heater

A column heater system designed to heat your column and mobile phase to temperatures up to 200°C reliably and efficiently! Pre-heaters and heat exchangers eliminate longitudinal and radial thermal gradients in the column, a major source of band broadening in high temperature HPLC. The heat exchangers also ensure a constant temperature in the detector, minimizing noise and baseline drift. Finally, there is an integrated back pressure regulator to prevent flash vaporization of the mobile phase in either the column or the detector.

Metalox™ Model 200-C – Patented Heating System



For more information on the Metalox-200 Column Heater, request literature code ZR04.

ZirChrom® Zirconia based HPLC Columns

ZirChrom® offers four unique phases for reverse phase high temperature liquid chromatography.

ZirChrom®-PBD

Great selectivity and peak shapes for basic compounds, pH stable from 1-14 and thermally stable to 150°C

ZirChrom®-PS

Suitable for highly aqueous mobile phases, pH stable from 1-13, thermally stable up to 150°C

DIAMONDBOND®-C18

Thermally stable up to 200°C for ultra fast separations. Ideal for separating steroids and analogues and acidic compounds, pH stable from 1-14

ZirChrom®-CARB

Carbon surface enhances retention for ultra polar analytes, excellent selectivity for geometric isomers and diastereomers. pH stable from 1-14, thermally stable up to 200°C

Request literature code ZR01 for more information on zirconia based HPLC columns.

High temperature HPLC can be used to perform many unique separations, contact Chromatographic Specialties to discuss how we can help you speed up your analysis.