Effect of Chiral Selector on Performance of ZirChrom®-Chiral CSPs

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High-performance liquid chromatography has become the dominant method for the analytical and preparative separation of chiral pharmaceuticals. However, no current chiral stationary phase uses zirconia or inorganic oxides other than silica as a substrate. A promising new route to preparing chiral stationary phases using a zirconia substrate has been developed (See ZirChrom Technical Bulletin #313). The following demonstrates the effect of chiral selector change on the performance of these new versatile, durable, and efficient ZirChrom®-Chiral zirconia-based chiral stationary phases (CSP).

Introduction

Many of the challenges faced in chiral method development stem from the inability to quickly and cost effectively analyze the performance of a set of chiral selectors for a given racemic set. In this application we demonstrate the effects of chiral selector choice on a set of enantiomer pairs:

1. 1,1'-Bi-2-naphthol
2. 2-Phenylcycohexanone
3. 3,5-Dinitro-N-(1-phenethyl)benzamide
4. 4-Phenyl-1,3-dioxane
5. 7,8,9,10-Tetrahydrobenzo(a)pyren-7-ol
6. a-Methylbenzylcyanide
7. a-Methylnaphthalene Methanol
8. Flavanone
9. Trans-stilbene oxide
10. Trifluoranthrylethanol
11. Napropamide
12. 1-Naphtheyl-leucine ethyl ester

In these experiments the only change made to the stationary phase was the chiral selector, thus minimizing the influence of any other stationary phase effects on selectivity.

Experimental

Twelve sets of racemic probe solutes were injected on a ZirChrom®-Chiral(S)LEU and a ZirChrom®-Chiral(S)PG column for selectivity comparison. The separation conditions were as follows:

Columns:	ZirChrom®-Chiral(S)LEU and ZirChrom®-Chiral(S)PG, 100 mm x 4.6 mm i.d. (Part #: ZRC01-1046 and ZRC04-1046)
Mobile Phase:	99/1 hexane/isopropanol
Temperature:	30 ºC with Metalox™ 200-C column heater
Flow Rate:	1.0 ml/min.
Injection Vol.:	0.5 µl
Pressure Drop:	195 bar
Detection:	UV at 254 nm

Selectivity is compared in *Figure 1* for 12 probe solute enantiomers on ZirChrom®-Chiral(S)LEU and ZirChrom®-Chiral(S)PG columns. As expected, changing the chiral selector had a significant effect on the resolution of the enantiomers. This ability to change chiral selectors on the same column can reduce the influence of other column factors and allow the focus to be placed on choosing the best chiral selector during method development.

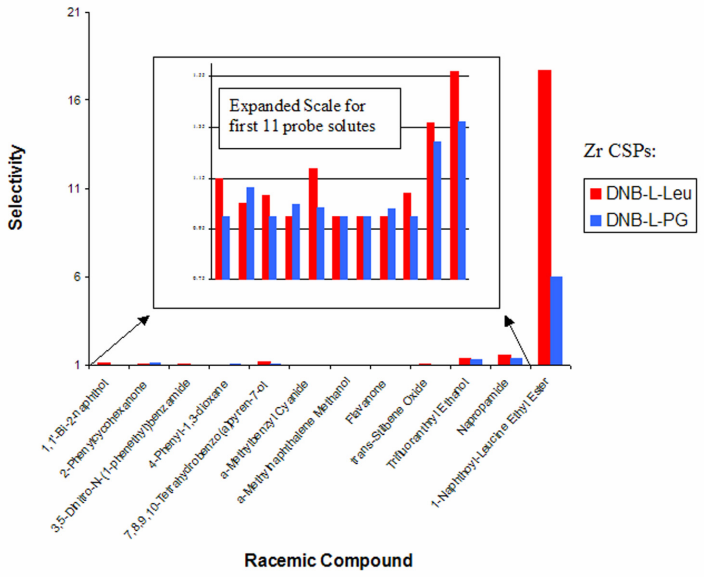

Figure 1: Selectivity comparison between ZirChrom®-Chiral(S)LEU and ZirChrom®-Chiral(S)PG CSP columns.

ZirChrom now offers a full line of chiral phases. ZirChrom chiral phases utilize a fully renewable platform and offer unique selectivity, high efficiency, and excellent stability. Please contact ZirChrom technical support at 1-866-STABLE-1 or support@zirchrom.com for more information regarding this exciting new technology.

References

(1) American Laboratory, 37, No. 21, pp 22-4 (October 2005).

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