Novel Bonding Chemistry Imparts Enhanced Polar Selectivity to TSKgel ODS-100V Reversed Phase Columns

Introduction

While full coverage C18 phases have been responsible for the growth of HPLC as a reliable high efficiency technique, it has become apparent in recent years that such column types are not suited for reliable analysis of highly polar compounds under low organic or aqueous mobile phase conditions. It was shown that by incorporating a polar group in the alkyl bonded phase reagent extra retention could be obtained for polar solutes while maintaining the operating characteristics of traditional reversed phase columns. Adding polarity to the bonded alkyl phase also overcame 'bonded phase collapse', the steady decline of retention times under (near) aqueous mobile phase conditions. In this note we report on an alternative method to obtain enhanced retention of polar solutes by creating a low density bonded phase that is fully accessible to water molecules.

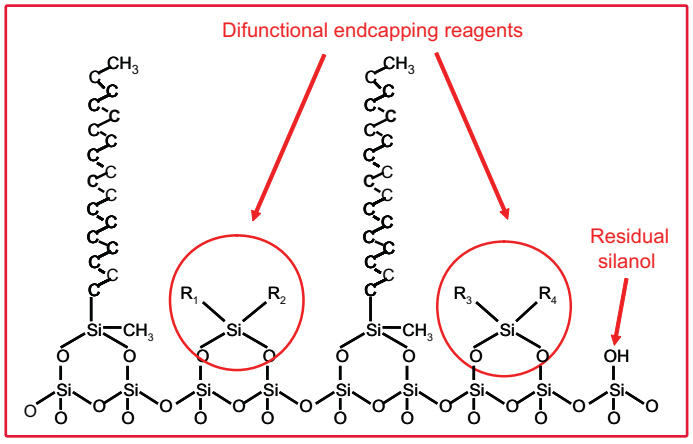
Results

TSKgel® ODS-100V columns contain high purity five micron silica particles with 100 angstrom pores and 450m^2/g surface area, which are functionalized by an incomplete reaction with a difunctional octadecylsilane reagent (see *Figure 1*). The low density C18 monolayer is then endcapped with two difunctional dialkylsilane reagents to improve the peak shape of basic compounds, while maintaining stable analysis times in low organic or aqueous mobile phases.

To demonstrate the absence of accessible silanol groups, *Figure 2* compares retention and peak shape for two tricyclic antidepressant drugs on four commercial water-wettable columns.

The same commercial columns were also evaluated with organic acids under low pH conditions in 2% acetonitrile, as is shown in *Figure 3.*

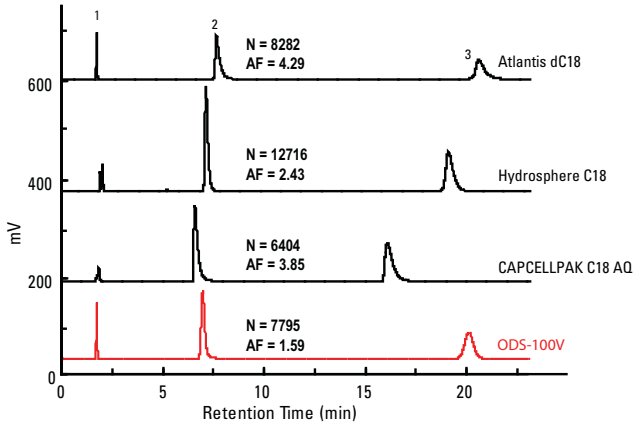
Figure 1. Bonded Phase Structure of TSKgel ODS-100V Columns



Conclusion

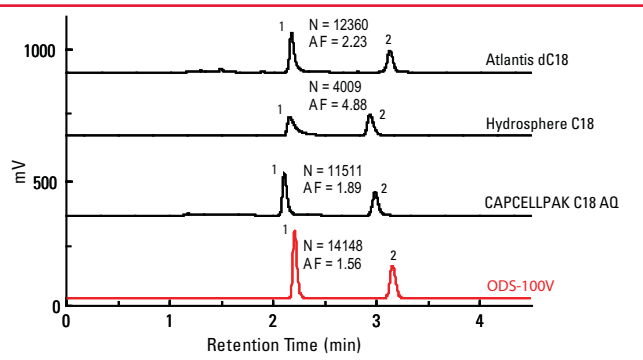
The ability to provide symmetrical peak shapes for basic as well as acidic compounds make TSKgel ODS-100V the column of choice for method development and quantitative analysis of small molecular weight compounds.

Figure 2. Retention, Efficiency and Peak Shape of Antidepressants on Water-Wettable C18 Columns



Columns:	4.6mm x 15cm
Eluent:	50mM phosphate buffer, pH 7.0/MeOH (30/70)
Flow Rate:	1.0mL/min
Inj. volume:	10µL
Detection:	UV @ 254nm
Temp.:	40°C
Sample:	1. Uracil, 2. Desipramine, 3. Imipramine

Figure 3. Retention, Efficiency and Peak Shape of Acids on Water-Wettable C18 Columns



Columns:	4.6mm x 15cm
Eluent:	H_2O/CH_3CN (98/2) +0.1% H_3PO_4
Flow rate:	1.0mL/min
Detection:	UV @ 210nm
Temp:	40°C
Inj. volume:	10µL
Sample:	1. Formic acid, 2. Acetic acid

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