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Acclaim PolarAdvantage columns are reversed-phase silica columns with a polar-enhanced stationary phase for operation at wider chromatographic conditions and with a broader application range when compared to conventional reversed-phase columns.

- Analysis of polar and nonpolar analytes
- Excellent peak shapes for both basic and acidic analytes
- Compatible with 100% aqueous mobile phases
- High reversed-phase capacity
- Unique polar selectivity
- Mass spectrometry (MS) compatible

Separate Both Polar and Nonpolar Compounds

Acclaim PolarAdvantage (PA) columns are a new line of silica-based, reversed-phase columns featuring a polar-enhanced stationary phase. This phase consists of a C16 functional group bonded to the surface of ultrapure silica using a sulfonamide group, coupled to an ether linkage (Figure 1). While providing polarity, hydrophobicity, and selectivity similar to conventional C18 phases, this

new polar-embedded phase provides excellent peak shapes for both basic and acidic compounds, compatibility with 100% aqueous mobile phases, and hydrolytic stability—overcoming many of the limitations of conventional C8 and C18 reversed-phase columns.

Acclaim PA columns exhibit enhanced retention of polar compounds and the ability to perform analysis of both polar and nonpolar analytes on a single column. By providing for a much larger range of application possibilities, the Acclaim PA column can meet or exceed the requirements for the majority of reversed-phase HPLC separations.

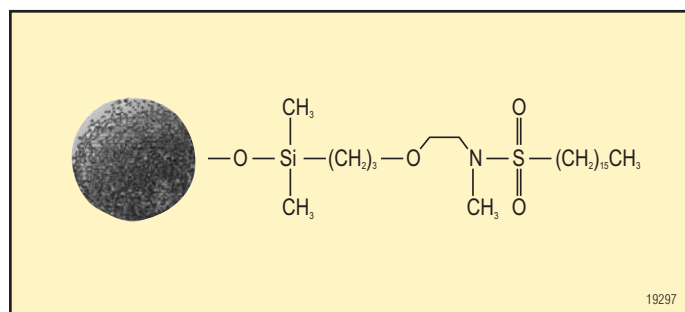


Figure 1. Acclaim PolarAdvantage bonding.



Wide Range of Applications

For conventional reversed-phase separations, the Acclaim PA column exhibits selectivities similar to standard C8 or C18 phases. As illustrated in Figures 2–9, Acclaim PA can be used in a wider range of application areas, including pharmaceuticals, bio and life sciences, foods, and environmental analysis work. In addition, Figures 2–3 show that efficient separations with good peak shapes are obtained for compounds of life science (nucleic acid bases) and pharmaceutical interest (sulfonamides), using highly aqueous mobile phases.

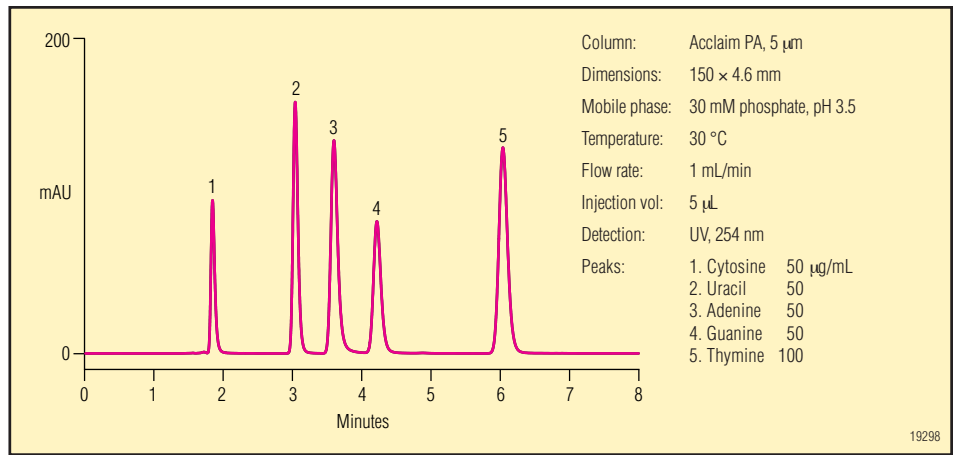


Figure 2. Separation of nucleic acid bases.

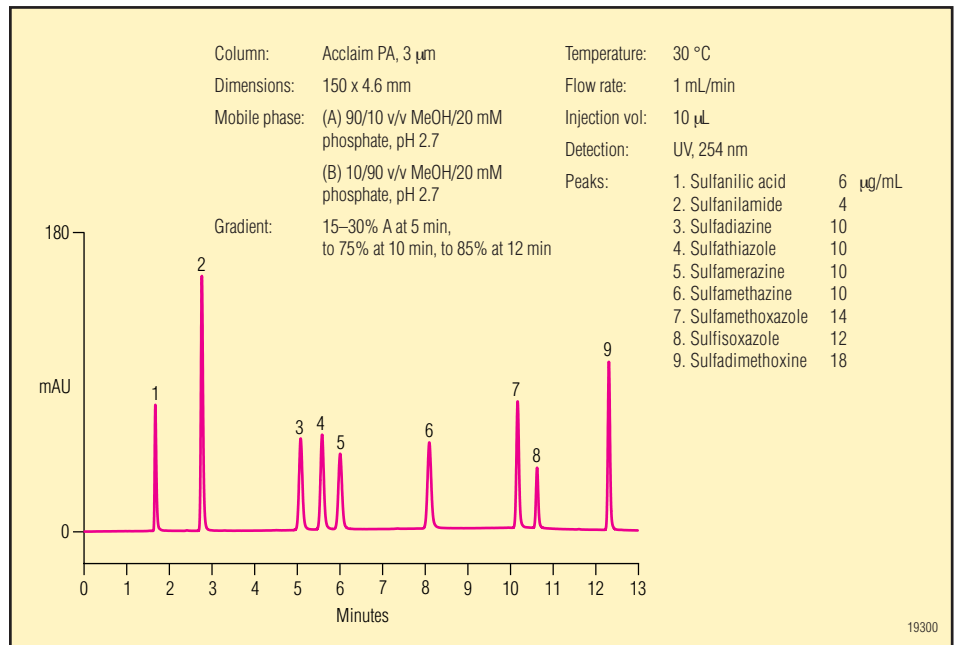


Figure 3. Separation of sulfa drugs.

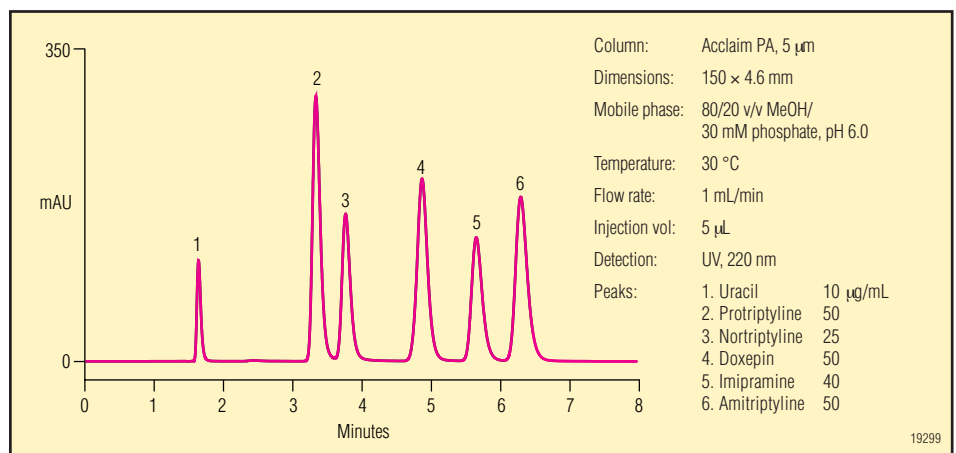


Figure 4. Separation of antidepressants.

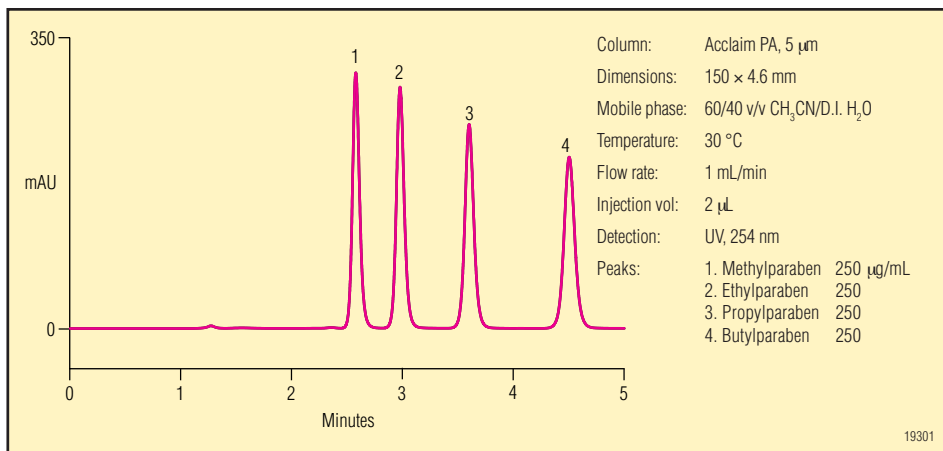


Figure 5. Separation of parabens.

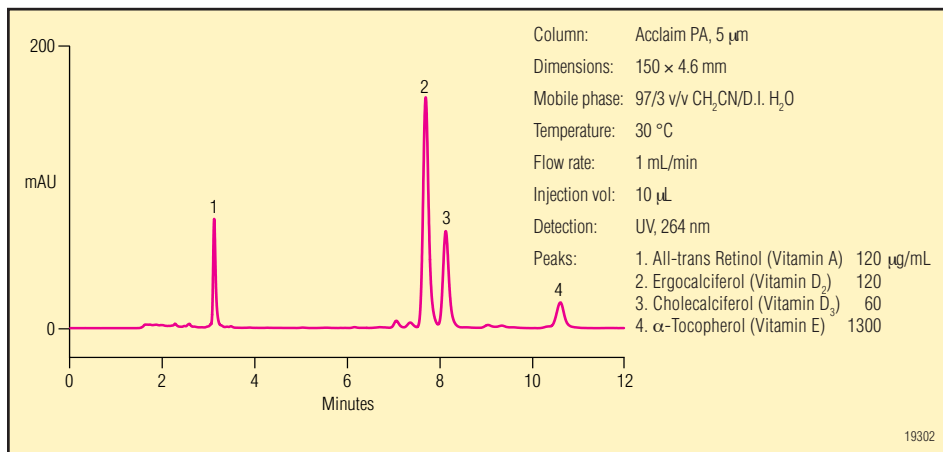


Figure 6. Separation of fat-soluble vitamins A, D₂, D₃, and E.

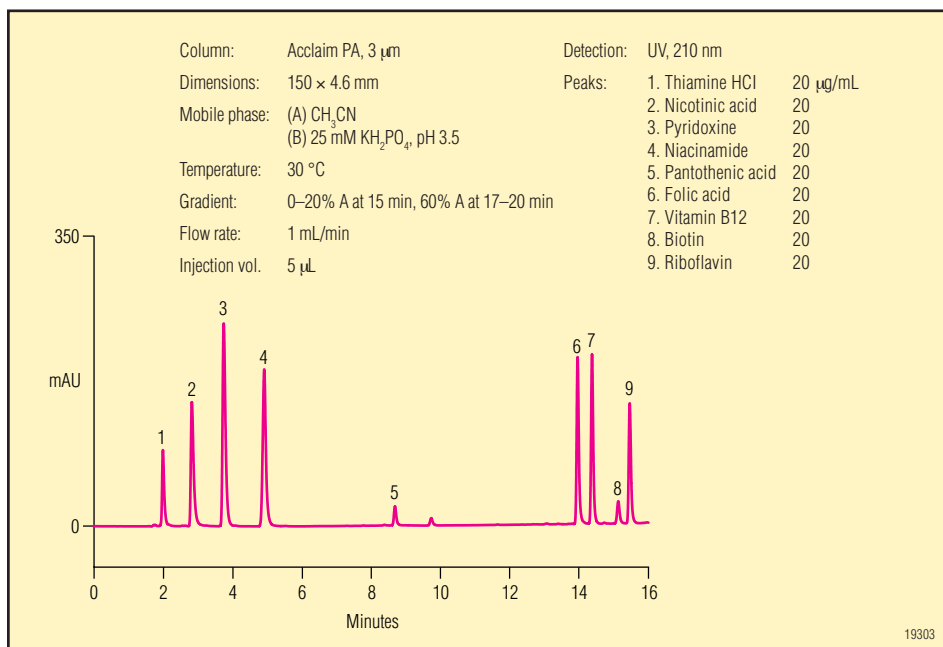


Figure 7. Separation of water-soluble vitamins.

Separate Polar and Nonpolar Analytes on a Single Column

Separation of antidepressants (Figure 4), nonpolar parabens (Figure 5), and fat-soluble vitamins (Figure 6) represent more conventional reversed-phase separations, whereas the addition of water-soluble vitamins (Figure 7) illustrates the versatility of this unique column.

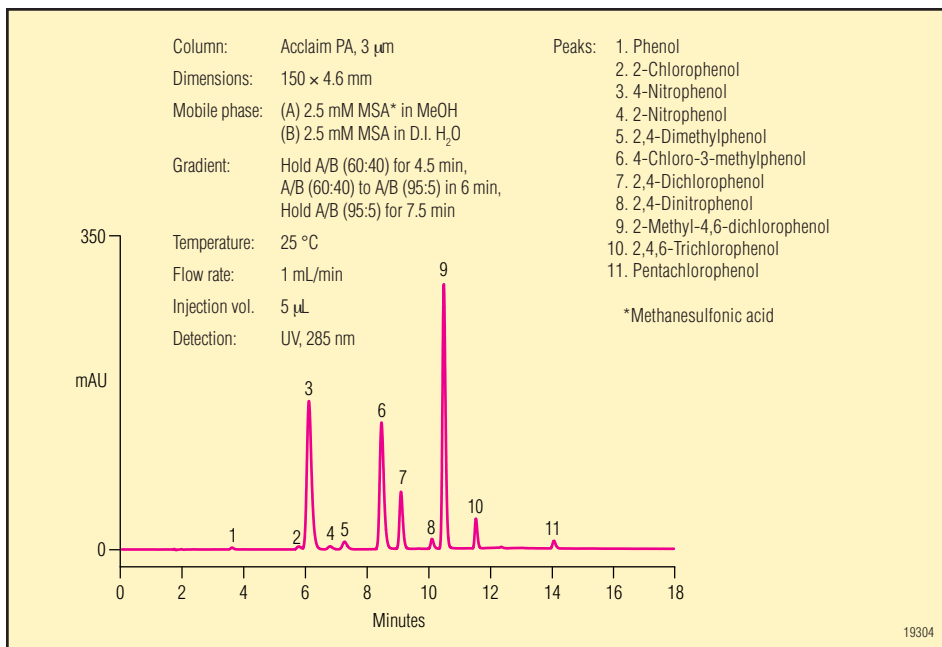


Figure 8. Separation of phenols (EPA 604 method mix).

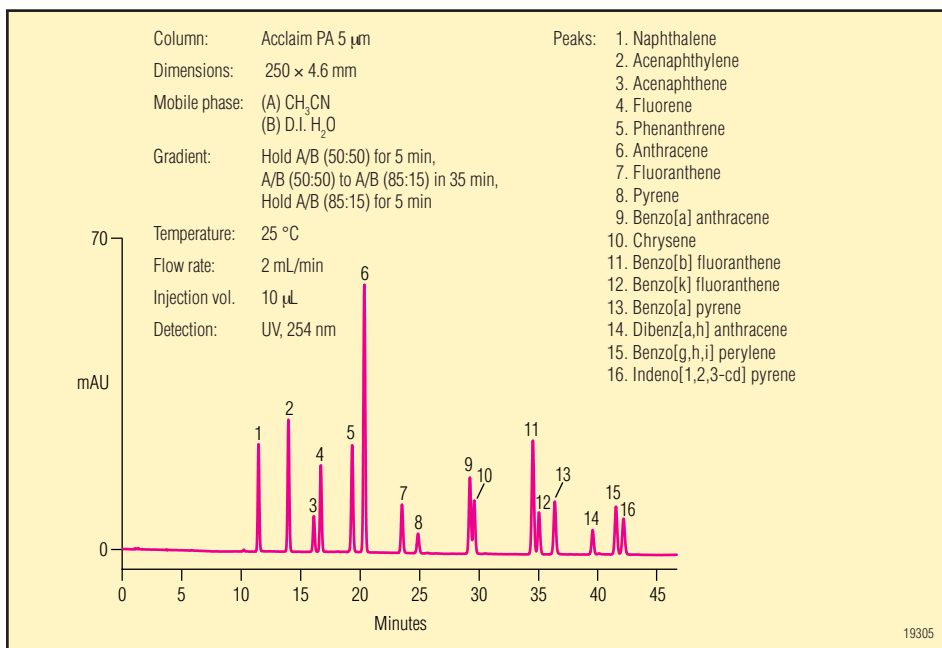


Figure 9. Separation of PAH polyaromatic hydrocarbons (EPA 610 method mix).

Versatile Operating Conditions

Standard environmental applications can also be performed (Figures 8 and 9) without significant changes to analyte elution order, when compared to conventional C18 phases.

The range of chromatographic conditions that can be used with Acclaim PA, combined with the wide polarity range of target analytes, has resulted in an extremely versatile column that can be used for method development, problem solving, and other analytical areas where conventional reversed-phase columns have limitations.

Resistant to Dewetting

Because of their high solubility, many polar analytes are adequately retained on a reversed-phase column only when the organic content of the eluent is very low (<5%). The stationary phase of a conventional C8 or C18 reversed-phase column has a highly hydrophobic surface. The attraction between this surface and the aqueous eluent can become so weak that the surface tension of the liquid pulls aqueous mobile phase out of the pores of the silica particles. This phenomenon is best described as dewetting, although it is commonly referred to as phase collapse. Dewetting leads to unexpected loss of analyte retention, reduced efficiency, and changes in peak-shape. The patent-pending technology of the Acclaim PA column incorporates a region of hydrophilic functional groups between the hydrophobic C16 chain and silica surface. This technology allows the surface to remain wetted even in 100% aqueous mobile phase conditions.

The onset of dewetting is unpredictable, but stopping the flow of eluent through the column is known to initiate this effect. Figure 10 shows the effect of repeatedly stopping the flow for 30 min between injections. The Acclaim PA column is immune to a loss of analyte retention, whereas the conventional C18 column dewets in only one cycle.

Stable at Low pH

HPLC separations of polar analytes are often run under acidic conditions to reduce tailing of amine-containing compounds. Separations under these conditions can shorten column life due to cleavage of the bonded phase. This cleavage results in frequent column replacement and instrument downtime. The proprietary bonding of the Acclaim PA column resists hydrolytic attack by protecting the bonded phase at low pH values. Many MS applications require mobile phases containing modifiers such as formic acid, TFA, or acetic acid. Low pH stability makes Acclaim PA an excellent choice for these types of analyses.

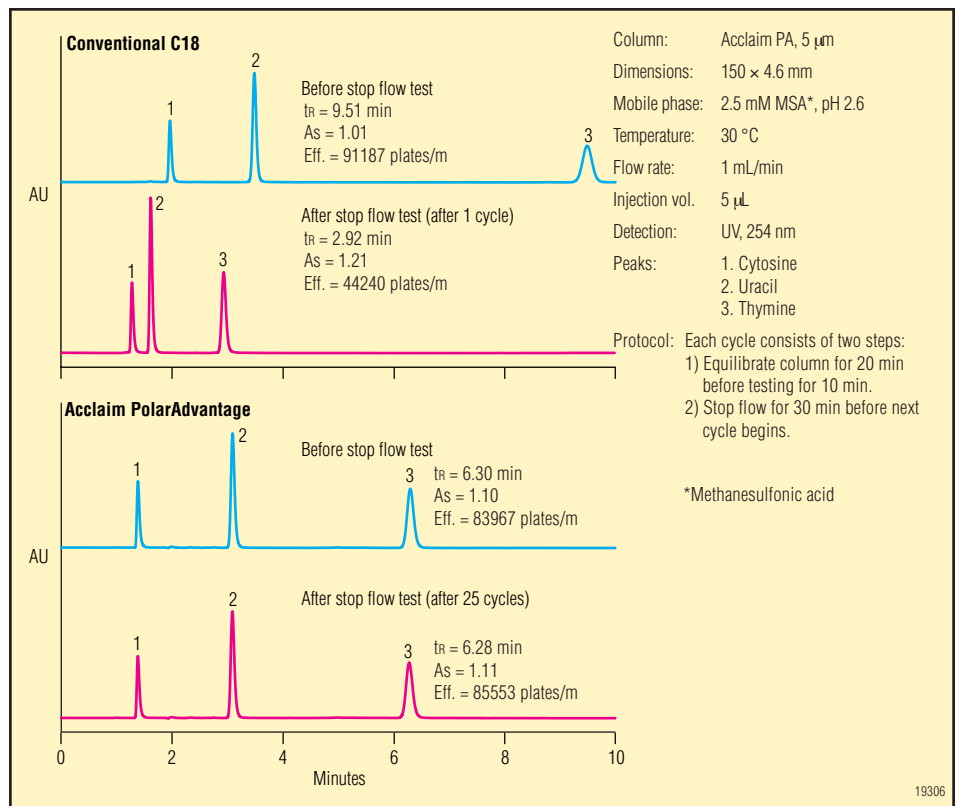


Figure 10. Resistance to dewetting.

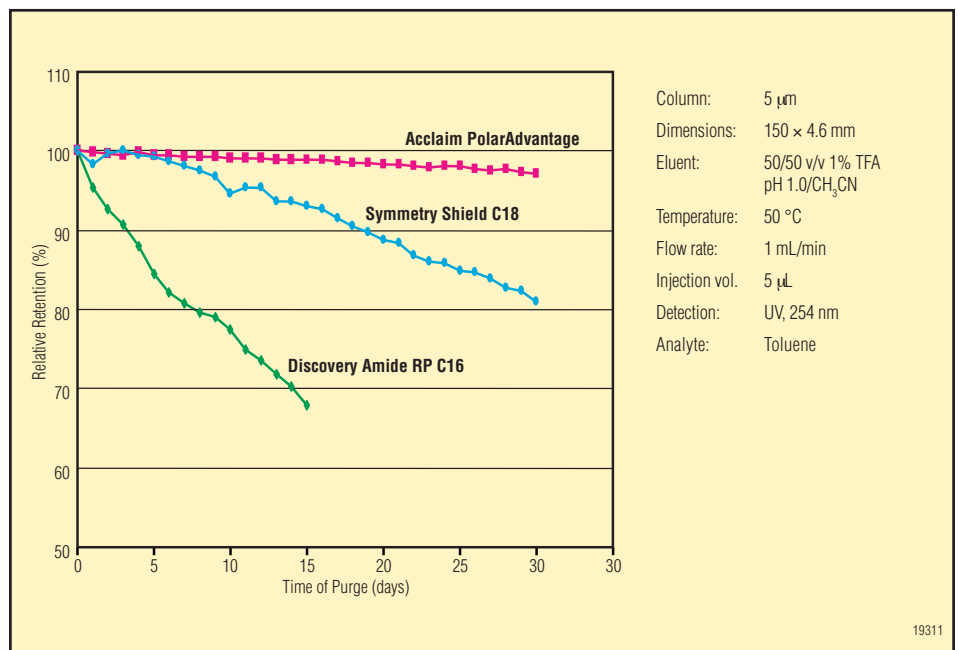


Figure 11. Hydrolytic stability comparison at low pH.

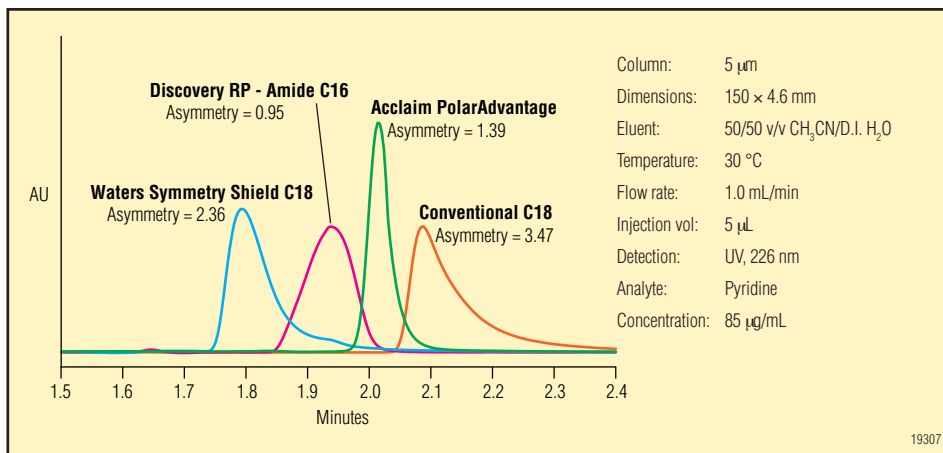


Figure 12. Low silanol activity.

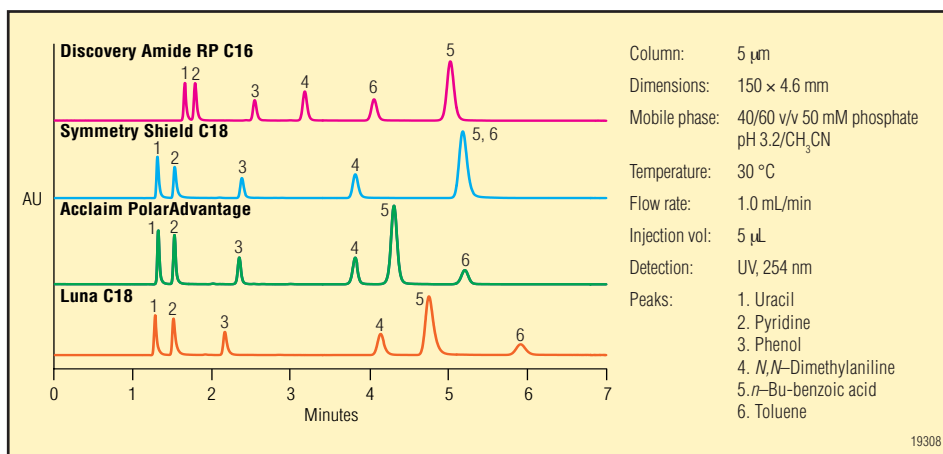


Figure 13. Comparison of selectivity.

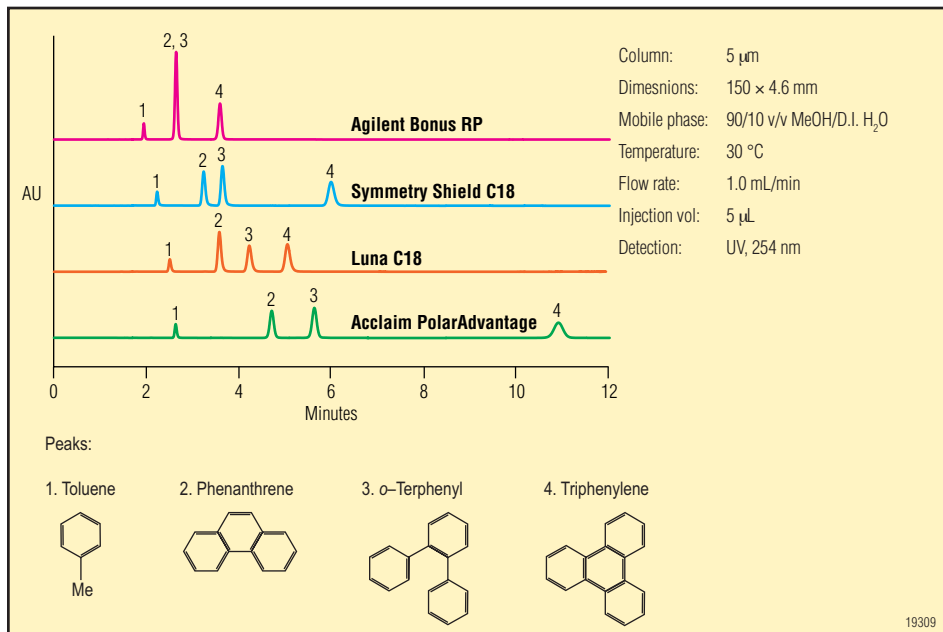


Figure 14. Comparison of steric selectivity.

Improved Peak Shape

Interaction with residual silanol groups on the surface of the silica particle can result in peak tailing, which can affect peak resolution and integration. This effect can be reduced by optimizing the surface coverage of the bonded phase, exhaustive end-capping of the residual silanol groups, and minimization of metal contaminants that increase the acidity of the free silanol groups. The tailing of pyridine is a very good indicator of the number of exposed silanol groups on the silica surfaces.

Figure 12 compares the performance of Acclaim PA with leading competitive columns for pyridine peak asymmetry. Exhaustive end-capping of Acclaim PA phases, combined with the embedded polar functional group, provide improved peak shapes for both basic and acidic analytes at low- and mid-range pH values (Figure 13). Figure 13 also illustrates that while providing a much broader range of application possibilities, the Acclaim PA column maintains selectivities very similar to conventional C18 phases when compared to other polar-embedded column types.

Enhanced Steric Selectivity and Resolution

Acclaim PA can provide enhanced resolution of closely related compounds, resulting in additional ability to improve separations, compared to conventional reversed-phases and other types of polar-embedded phases (Figure 14). This ability can be very beneficial when analyzing very complex mixtures, resolving closely eluting compounds, or detecting low-level contaminants.

Reproducible Manufacturing

To meet the exacting needs of our customers, each Acclaim PA column is manufactured to stringent specifications to ensure column-to-column reproducibility and reliability. Each column is shipped with a lot validation showing the test results and specifications for the lot of bonded silica packed into the column, and an individual test chromatogram validating performance.

ACCLAIM PA SPECIFICATIONS

<i>Phase:</i> C16	<i>Surface Area:</i> 300 m ² /g
<i>Particle Size:</i> 3 and 5 µm	<i>Carbon load:</i> 16–18%
<i>Pore Size:</i> 120 Å	<i>pH Range:</i> 2–8

ORDER INFORMATION

To order in the U.S., call (800) 346-6390 or contact the Dionex Regional Office nearest you. Outside the U.S., order through your local Dionex office or distributor. Refer to the following part numbers.

Acclaim PA, 3 µm analytical (2.1 × 100 mm)	061316
Acclaim PA, 3 µm analytical (2.1 × 150 mm)	061317
Acclaim PA, 3 µm analytical (4.6 × 150 mm)	061318
Acclaim PA, 5 µm analytical (4.6 × 50 mm)	061319
Acclaim PA, 5 µm analytical (4.6 × 150 mm)	061320
Acclaim PA, 5 µm analytical (4.6 × 250 mm)	061321
Acclaim PA, 5 µm Guard Cartridges (2 × 10 mm), 2 each	061331
Acclaim PA, 5 µm Guard Cartridges (4.3 × 10 mm), 2 each	061332
Acclaim Guard Kit (Holder and Coupler)	059526
Acclaim SST Guard Cartridge Holder	059456
Guard to Analytical Column Coupler	059457



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