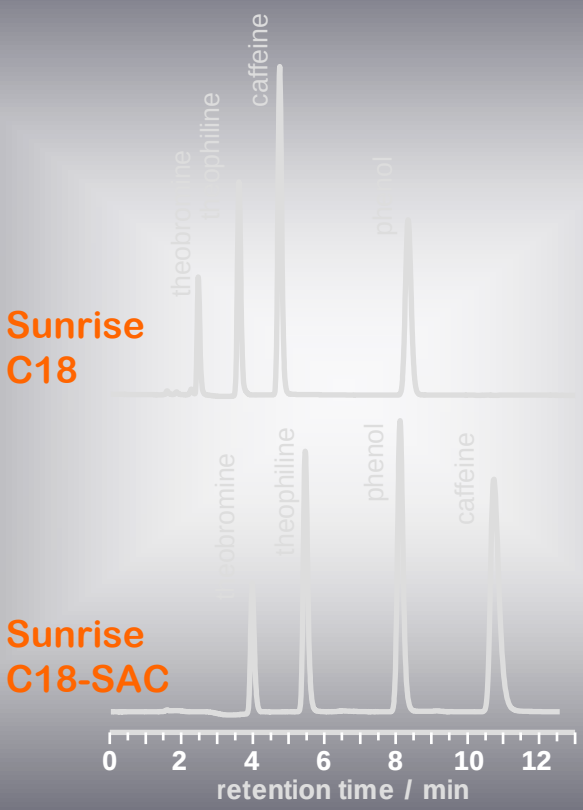
ChromaNik Technologies Inc.

Are Silanol Groups Bad or Good for Basic Compounds?

Sunrise C18
Sunrise C18-SAC

Silanol Activity Controlled C18 Column

New-Type RP Column



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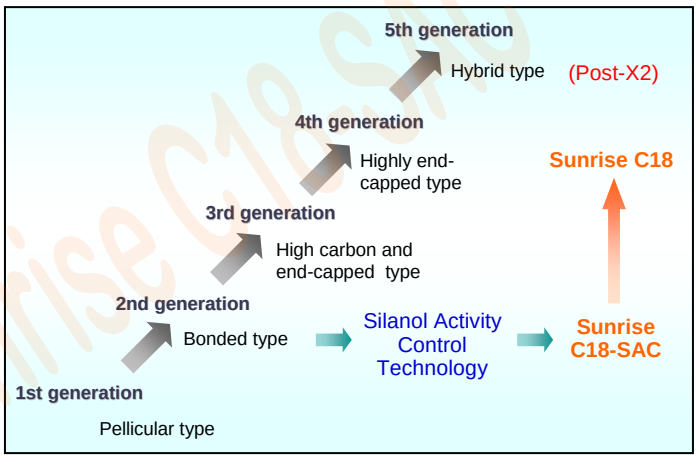
Sunrise C18 and C18-SAC

Silanol Activity Controlled C18 HPLC Column

◆ New generation reversed-phase utilized silanol groups

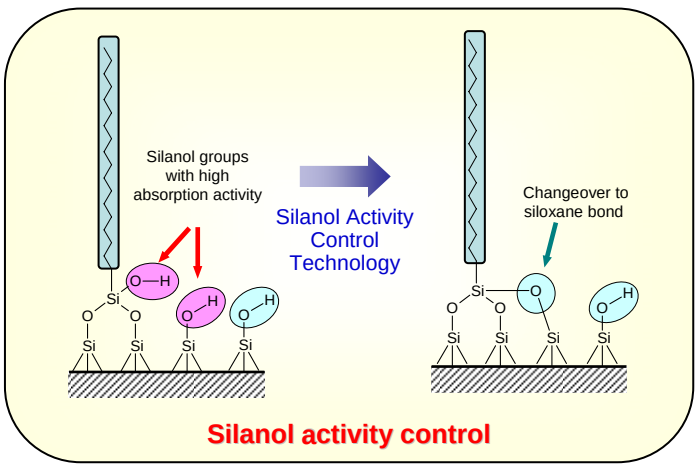
■ Silanol group and peak tailing

It is generally said that residual silanol groups on a stationary phase such as C18 (ODS) causes absorption or peak tailing for a sample. Especially silanol groups near a hydrophobic site don't solvate with water completely, so that they show high absorption for basic compounds. Its peak shows terribly tailing. Several end-capping techniques have been developed to solve these problems for many years.



■ Silanol activity control technology

ChromaNik developed the technique that decreased only silanol groups with high absorption activity to a basic compound and remained effective sailnol groups on the stationary phase. Silanol activity control and no end-capping led the existence of silanol groups with high hydration which created a new and unique reversed-phase separation mode including hydrogen bond and ion-exchange interaction. Furthermore, silanol activity controlling, then end-capping technique improved a peak shape of a basic compound exceedingly.



◆ Feature of Sunrise series

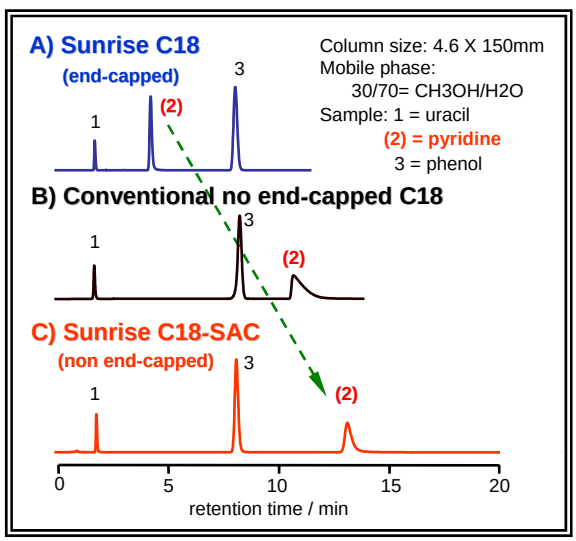
Sunrise C18

- The "1st Choice" column as a fully end-capped C18 column
- Full end-capping after silanol activity control
- Reducing adsorption of a basic compound extremely
- A good peak shape for a metal cheleting compound
- Widely available for general reversed-phase separation

Sunrise C18-SAC

- The "2nd Choice" column which takes advantage of effective silanol groups interaction
- Reducing silanol groups with high adsorption activity
- The new separation mechanism including hydrogen bond and ion-exchange interaction
- Effective for separation of a basic compound and a polar compound
- Different selectivity and improvement of separation without changing a mobile phase

■ The elution order of pyridine



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Sunrise C18 and C18-SAC

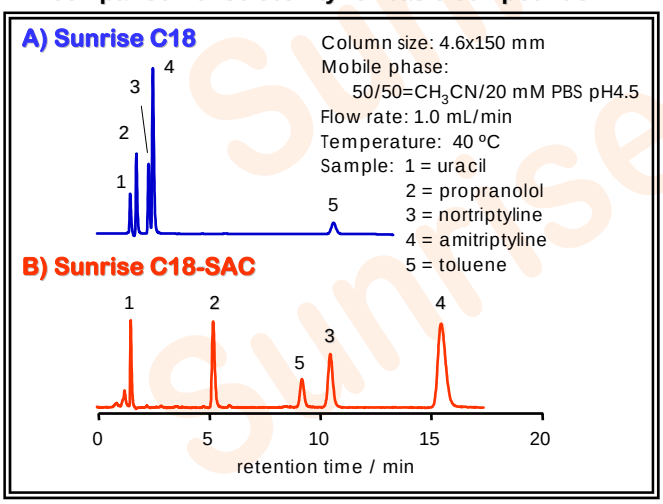
Silanol Activity Controlled C18 HPLC Column

◆ Sunrise series create an unique separation

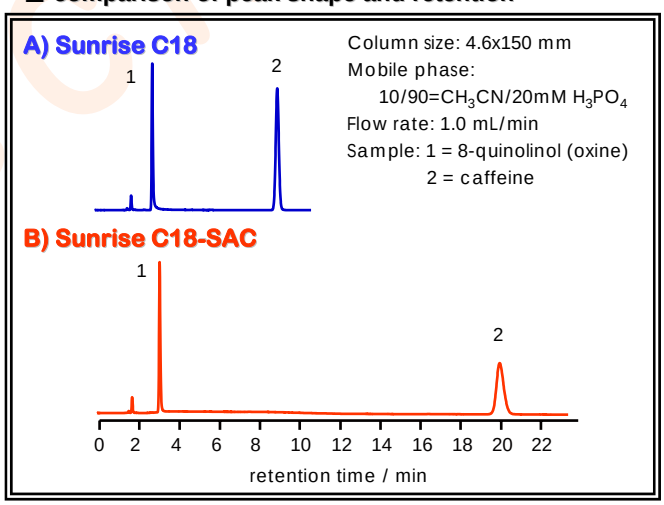
∗ Effectiveness of silanol activity control: Comparison between Sunrise C18 and C18-SAC

Sunrise C18 is the so-called fully end-capped C18 column. It shows the same separation behavior as a conventional C18 column.
On the other hand, Sunrise C18-SAC shows hydrogen bond and ion-exchange interactions based on a residual silanol on the silica support in addition to reversed-phase separation. For example Sunrise C18 column separates a basic compound similarly as a conventional C18, while Sunrise C18-SAC makes retention of a basic compound be large because an ion-exchange interaction works although a non-ionic compound shows the almost same retention on both Sunrise C18 and C18-SAC. Furthermore, Sunrise C18-SAC shows large retention for a polar compound such as caffeine.

■ comparison of selectivity for basic compounds



■ comparison of peak shape and retention

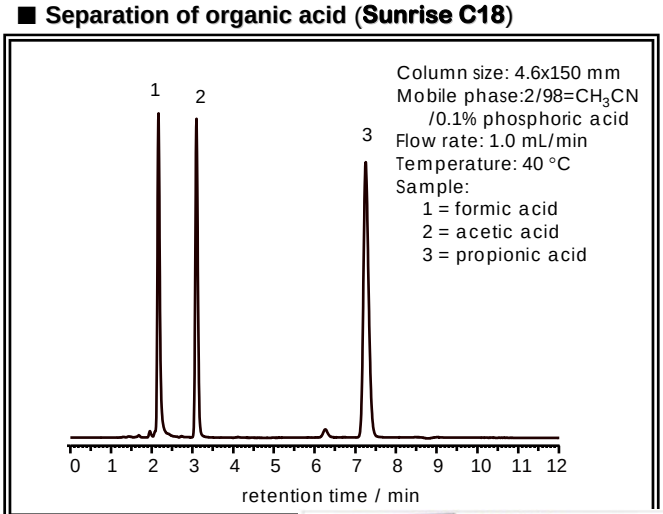


∗ C18 with both silanol activity control and full end-capping is effective in separation of polar compounds.

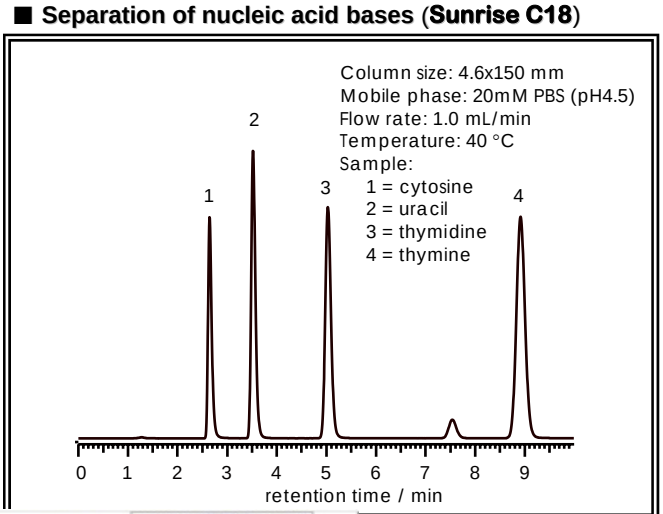
Sunrise C18 is bonded with octadecylsilane on pure silica gel (average pore size: 12nm, specific surface area: 340m^2/g), and end-capped after silanol activity control. Final carbon content of Sunrise C18 is 15%.

Ligand density of Sunrise C18 is intentionally rather low and uniformity of ligands is high, so that it shows enough retention, even if a mobile phase with a low organic solvent content is used, and good peak shape for a polar compound.

■ Separation of organic acid (Sunrise C18)



■ Separation of nucleic acid bases (Sunrise C18)



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Sunrise C18 and C18-SAC

Silanol Activity Controlled C18 HPLC Column

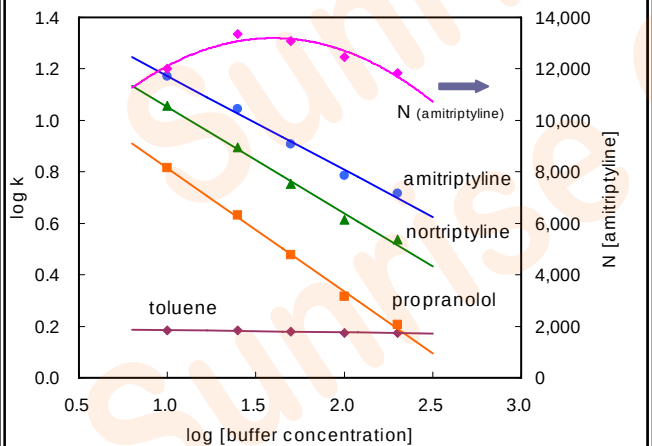
◆ Multiple mode separation is achieved on Sunrise series

＊ Silanol groups controlled its activity functions as ion-exchange groups

Sunrise C18-SAC is bonded with octadecylsilane on a pure silica gel and controlled its silanol activity without end-capping. Its carbon content is 14%.

Separation on Sunrise C18-SAC is done including hydrogen bond and ion-exchange interaction based on silanol groups except for hydrophobic interaction. Control of pH and salt concentration of a mobile phase can regulate retention.

■ Relationship between buffer concentration and retention(Sunrise C18-SAC)

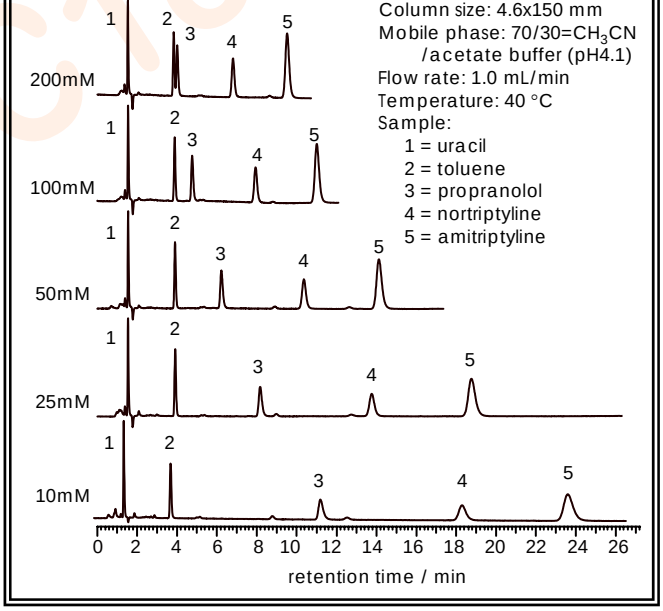


$$\log k = -\frac{z_B}{z_A}\log[A] + \frac{z_B}{z_A}\log[\bar{A}] + \log\frac{V_r}{V_m} + \frac{1}{z_A}\log K_A^B$$

A:ion in eluent, *B*:ion of sample, *k*:retention of *B*, *K*:selection coefficient

ZA, *ZB*:charge, *Vr*, *Vm*:resin volume and mobile phase volume in column

■ Separation of basic compounds with ammonium acetate: Effect of salt concentration(Sunrise C18-SAC)



Ordering infomation

Inner diameter	length	Sunrise C18, 5μm	Sunrise C18, 3μm	Sunrise C18-SAC, 5μm	Sunrise C18-SAC, 3μm
[mm]	[mm]	Cat. No.	Cat. No.	Cat. No.	Cat. No.
2.0	50	SB3241	SB2241	SA3241	SA2241
	75	—	SB2251	—	SA2251
	100	SB3261	SB2261	SA3261	SA2261
	150	SB3271	SB2271	SA3271	SA2271
4.6	10	SB3411	SB2411	SA3411	SA2411
	50	SB3441	SB2441	SA3441	SA2441
	75	—	SB2451	—	SA2451
	100	SB3461	SB2461	SA3461	SA2461
	150	SB3471	SB2471	SA3471	SA2471
	250	SB3481	—	SA3481	—
10.0	250	SB3781	—	SA3781	—
20.0	250	SB3881	—	SA3881	—