Evaluation of Hybrid Silica C18 End-capped with Bidentate Silylating Reagent for HPLC

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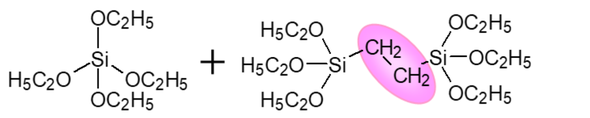
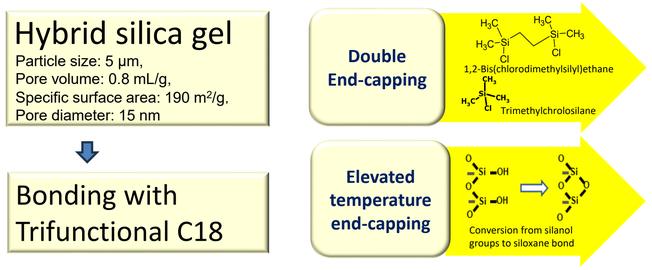
Comparison between Company W hybrid C18 and SunBridge C18 with Ethylene cross-linked silica gel And 1,2-Bis(chlorodimethylsilyl)ethane end-capping

SunBridge

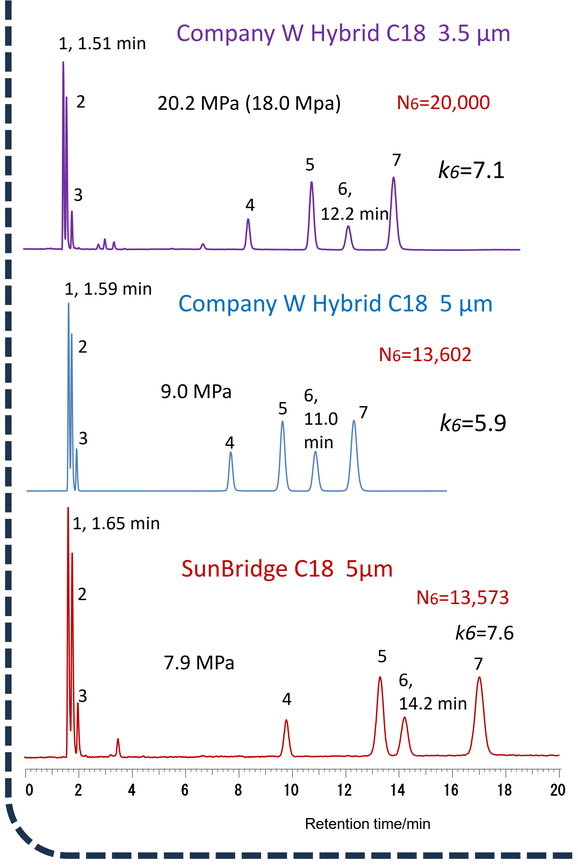


Ethylene cross-linked silica gel



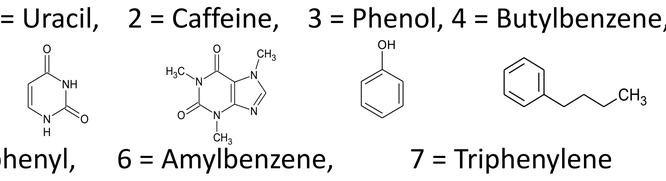
1,2-Bis(chlorodimethylsilyl)ethane end-capping

Evaluation of hydrogen bonding, hydrophobicity and steric selectivity

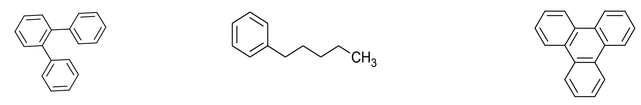


As a comparison, Hybrid C18 manufactured by W Company, which is ethylene crosslinked silica gel C18 in which an ethylene chain is incorporated into the silica skeleton, was used.

Column: Company W Hybrid C18 3.5 µm, 5 µm,
SunBridge C18 5 µm,
Column demensions: 150 x 4.6 mm
Mobile phase: CH_3OH/H_2O=75/25
Flow rate: 1.0 mL/min
Temperature: 40 °C
Sample: 1 = Uracil, 2 = Caffeine, 3 = Phenol, 4 = Butylbenzene,

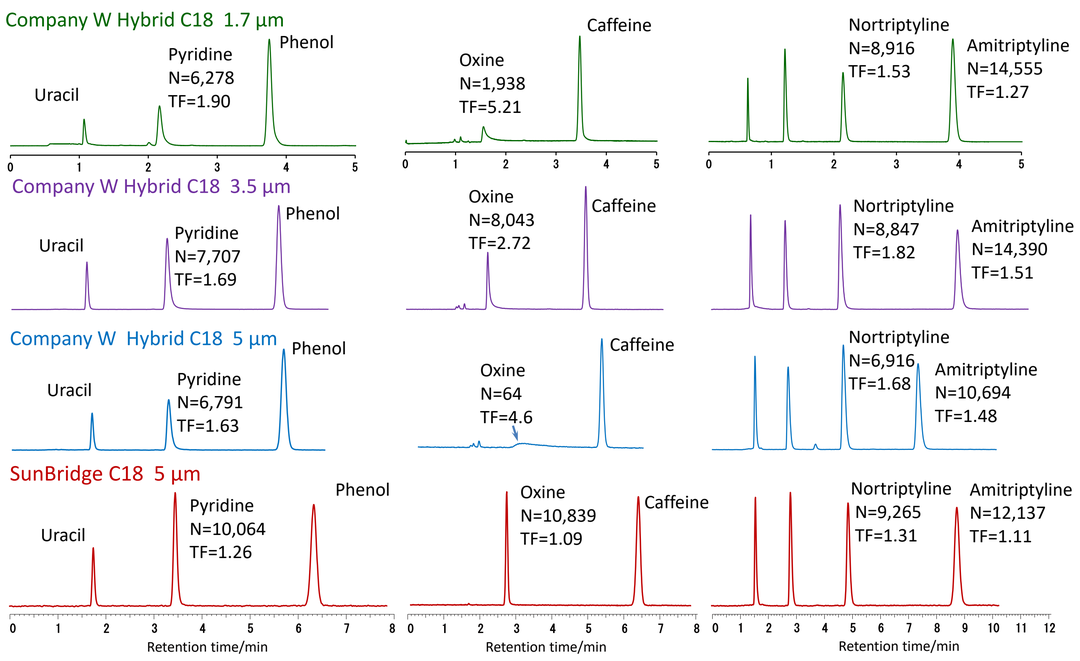


5 = o-Terphenyl, 6 = Amylbenzene, 7 = Triphenylene



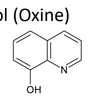
	Hydrogen bonding α(Caffeine/Phenol)	Hydrophobicity α(Amylbenzene/ Butylbenzene)	Steric selectivity α(Triphenylene/ o-Terphenyl)	Specific surface aera (m^2/g)	Carbon loading (%)
Company W Hybrid C18 3.5 µm	0.38	1.54	1.33	185	17.4%
Company W Hybrid C18 5 µm	0.39	1.52	1.33	188	18.0%
SunBridge C18 5µm	0.43	1.53	1.31	190	16.0%

Comparison of peaks for pyridine, oxine, and nortriptyline

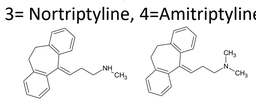


Column dimension:
150 x 4.6 mm for 3.5 and 5 µm
100 x 2.1 mm for 1.7 µm
Mobile phase: CH_3OH/H_2O=30/70
Flow rate:
1.0 mL/min for 3.5 and 5 µm
0.2 mL/min for 1.7 µm
Temperature: 40 °C
Detection: UV@250 nm
Sample: 1 = Uracil
2 = Pyridine
3 = Phenol

Column dimension:
150 x 4.6 mm for 3.5 and 5 µm
100 x 2.1 mm for 1.7 µm
Mobile phase: Acetonitrile / 20 mM H_3PO_4=10/90
Flow rate:
1.0 mL/min for 3.5 and 5 µm
0.2 mL/min for 1.7 µm
Temperature: 40 °C
Detection: UV@250 nm
Sample: 1 = 8-Quinolinol (Oxine)
2 = Caffeine

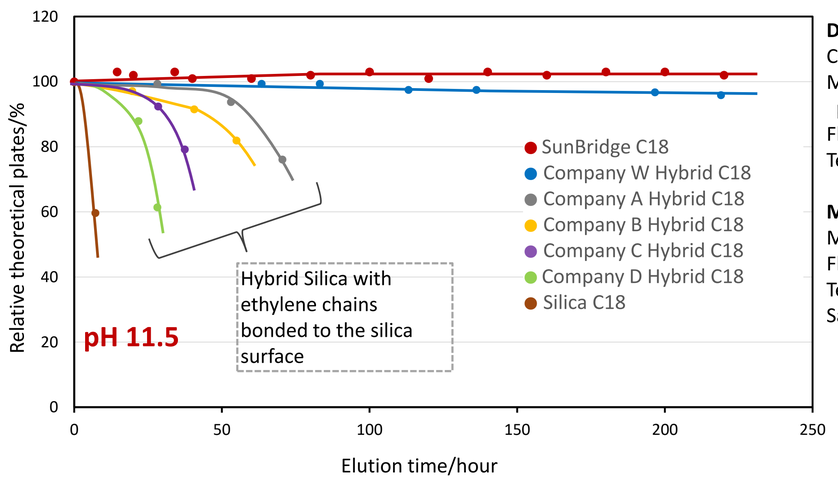


Column dimension:
150 x 4.6 mm for 3.5 and 5 µm
100 x 2.1 mm for 1.7 µm
Mobile phase: Acetonitrile/10 mM ammonium acetate pH6.8=40/60
Flow rate:
1.0 mL/min for 3.5 and 5 µm
0.3 mL/min for 1.7 µm
Temperature: 40 °C
Detection: UV@250 nm
Sample: 1=Uracil, 2=Propranolol, 3= Nortriptyline, 4=Amitriptyline



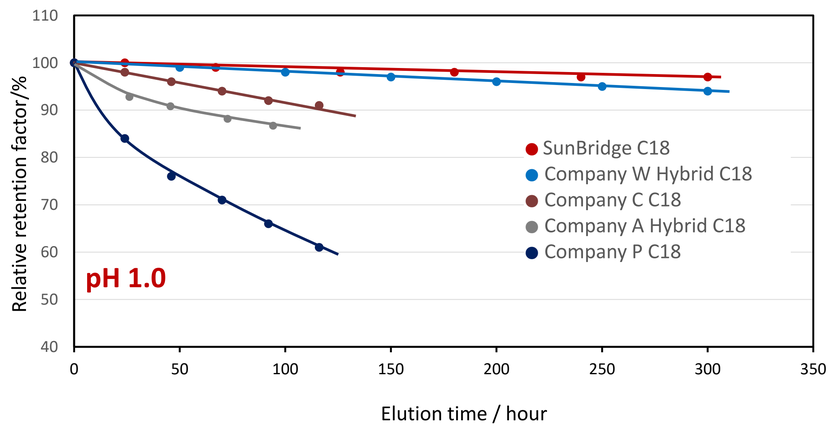
Company W Hybrid C18 showed severe tailing of metal-chelating, oxine. Compared to Company W Hybrid C18, SunBridge C18 showed a higher number of plates and less tailing of peaks for metal-chelating and basic compounds.

Comparison of Stability under pH 11.5 and pH 1.0 conditions



Durable test condition (pH 11.5)
Column dimension: 150 x 4.6 mm
Mobile phase: Methanol/50 mM potassium phosphate pH 11.5=10/90
Flow rate: 1.0 mL/min
Temperature: 40 °C

Measurement condition
Mobile phase: Acetonitrile/water=70/30
Flow rate: 1.0 mL/min
Temperature: 40 °C
Sample: 1 = Uracil, 2 = Butylbenzene

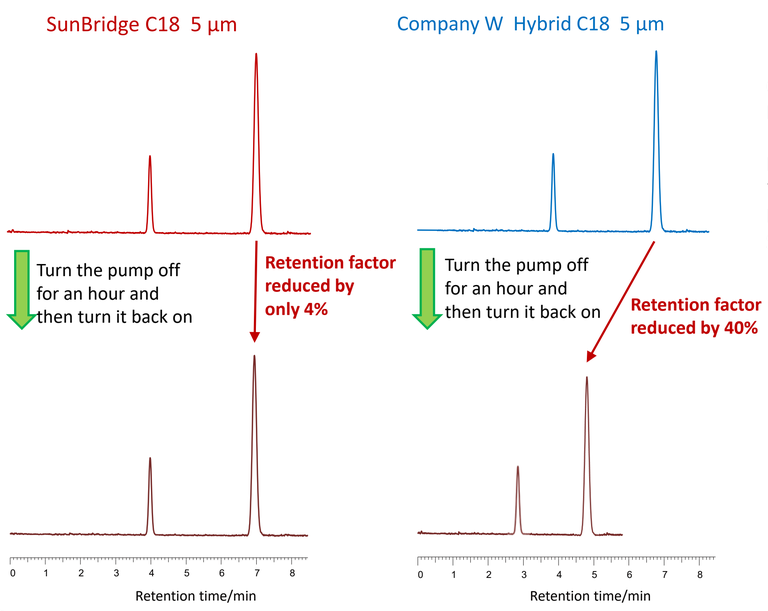


Durable test condition (pH 1.0)
Column dimension: 50 x 2.1 mm
Mobile phase: Acetonitrile/1.0% TFA pH1=10/90
Flow rate: 0.4 mL/min
Temperature: 80 °C

Measurement condition
Same as above

SunBridge C18 showed almost the same or higher stability under pH 11.5 and pH 1.0 conditions as Company W Hybrid C18, which shows an order of magnitude higher stability than other companies' hybrid C18.

Reproducibility in retention under 100% aqueous conditions



Column dimension: 150 x 4.6 mm
Mobile phase:
10 mM phosphate buffer pH 7.0
Flow rate: 1.0 mL/min
Temperature: 40 °C
Detection: UV@250 nm
Sample: 1=Uridine, 2=Adenine

Conclusions

- ✓SunBrige C18 was developed using Ethylene cross-linked silica gel and 1,2-Bis(chlorodimethylsilyl)ethane end-capping reagent.
- ✓As a comparison, Hybrid C18 manufactured by W Company, which is ethylene cross-linked silica gel C18 in which an ethylene chain is incorporated into the silica skeleton, was used.
- ✓Company W Hybrid C18 showed severe tailing of metal-chelating, oxine. Compared to Company W Hybrid C18, SunBridge C18 showed a higher number of plates and less tailing of peaks for metal-chelating and basic compounds.
- ✓SunBridge C18 showed almost the same or higher stability under pH 11.5 and pH 1.0 conditions as Company W Hybrid C18, which shows an order of magnitude higher stability than other companies' hybrid C18.
- ✓SunBridge C18 showed a excellent reproducibility in retention factor under 100% aqueous conditions while Company W Hybrid C18 showed a poor reproducibility.