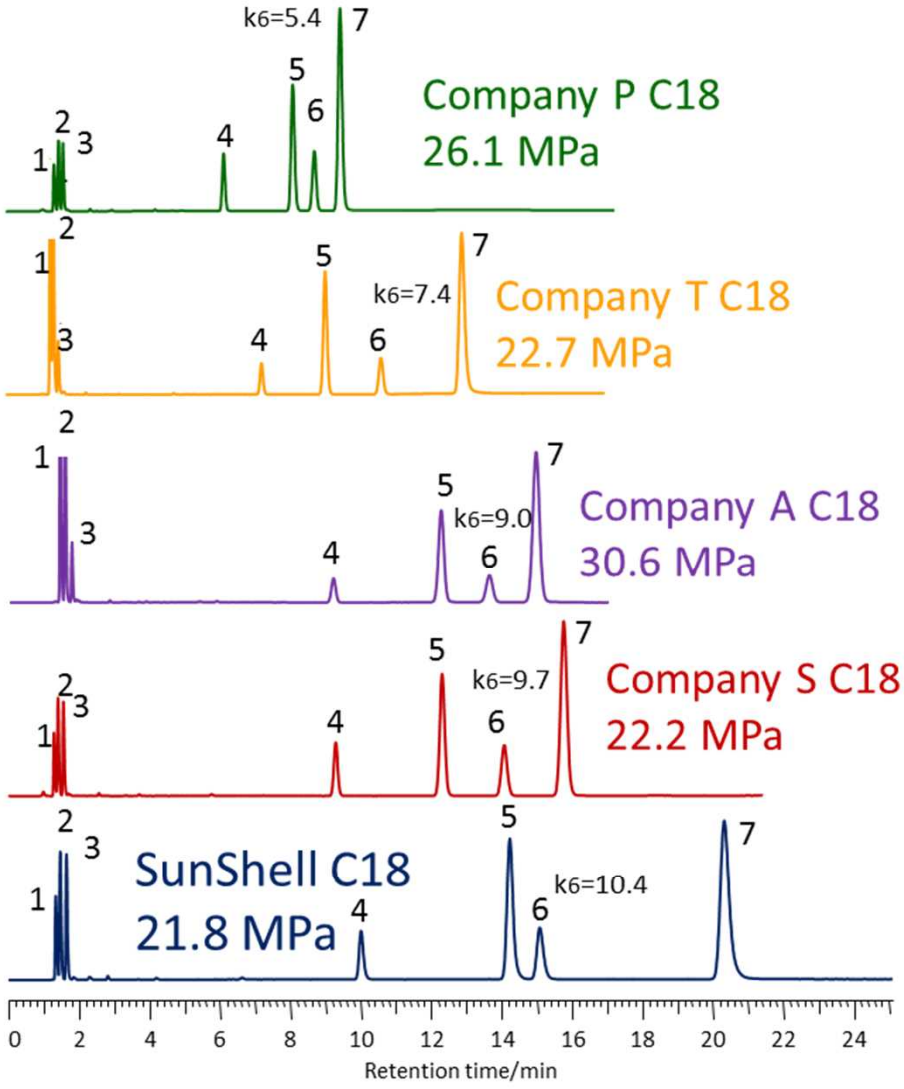
Comparison data of 5 kinds of core shell C18 column

Column name

1. Company P C18, 2.6 μm: Kinetex c18
2. Company T C18, 2.6 μm: Accucore C18
3. Company A C18, 2.7 μm: PoroShell C18 EC
4. Company S C18, 2.7 μm: Ascentis Express C18
5. SunShell C18, 2.6 μm

Comparison of standard samples



Column:

Company P C18, 2.6 µm 150 x 4.6 mm (26.1 MPa)
Company T C18, 2.6 µm 150 x 4.6 mm (22.7 MPa)
Company A C18, 2.7 µm 150 x 4.6 mm (30.6 MPa)
Company S C18, 2.7 µm 150 x 4.6 mm (22.2 MPa)
SunShell C18, 2.6 µm 150 x 4.6 mm (21.8 MPa)

Mobile phase: CH_3OH/H_2O=75/25

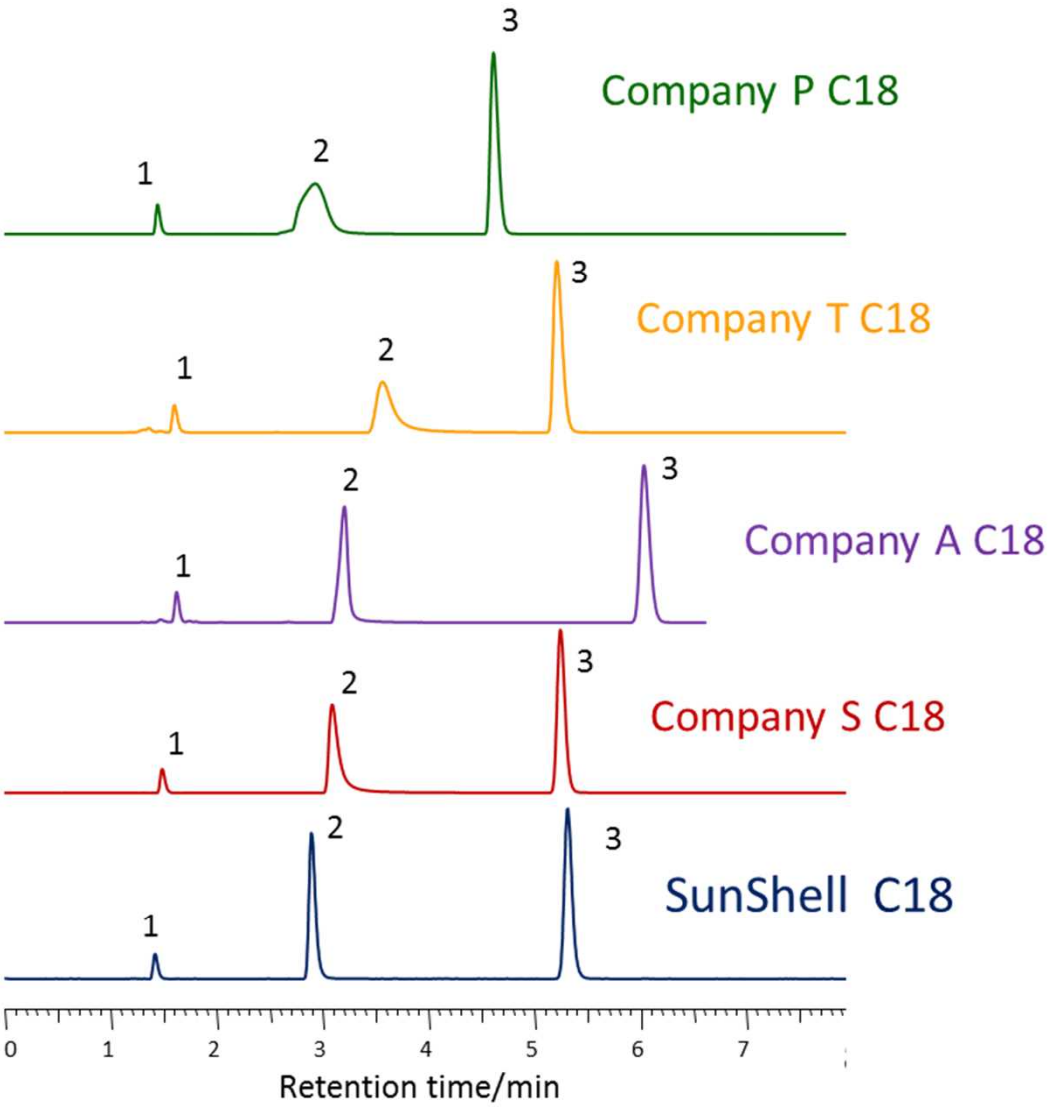
Flow rate: 1.0 mL/min

Temperature: 40 °C

Sample: 1 = Uracil, 2 = Caffeine, 3 = Phenol, 4 = Butylbenzene
5 = o-Terphenyl, 6 = Amylbenzene, 7 = Triphenylene

	Hydrogen bonding (Caffeine/Phenol)	Hydrophobicity (Amylbenzene/Butylbenzene)	Steric selectivity (Triphenylene/o-Terphenyl)
Company P C18	0.48	1.54	1.20
Company T C18	0.35	1.56	1.50
Company A C18	0.42	1.57	1.25
Company S C18	0.44	1.60	1.31
SunShell C18	0.39	1.60	1.46

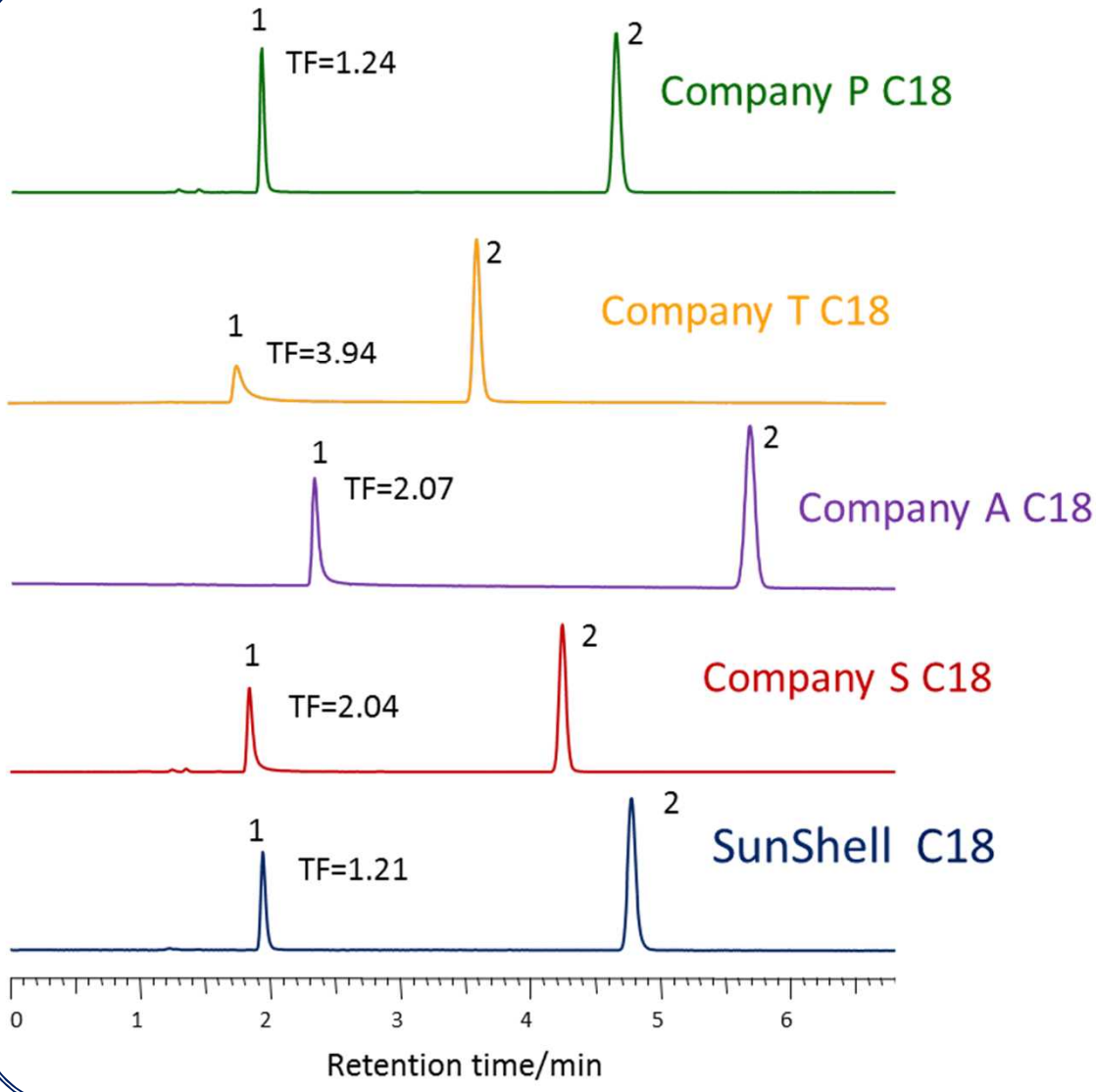
Comparison of pyridine



Column:
- Company P C18, 2.6 µm 150 x 4.6 mm
- Company T C18, 2.6 µm 150 x 4.6 mm
- Company A C18, 2.7 µm 150 x 4.6 mm
- Company S C18, 2.7 µm 150 x 4.6 mm
- SunShell C18, 2.6 µm 150 x 4.6 mm

Mobile phase: CH_3OH/H_2O=30/70
Flow rate: 1.0 mL/min
Temperature: 40 ºC
Detection: UV@250nm
Sample: 1 = Uracil
2 = Pyridine
3 = Phenol

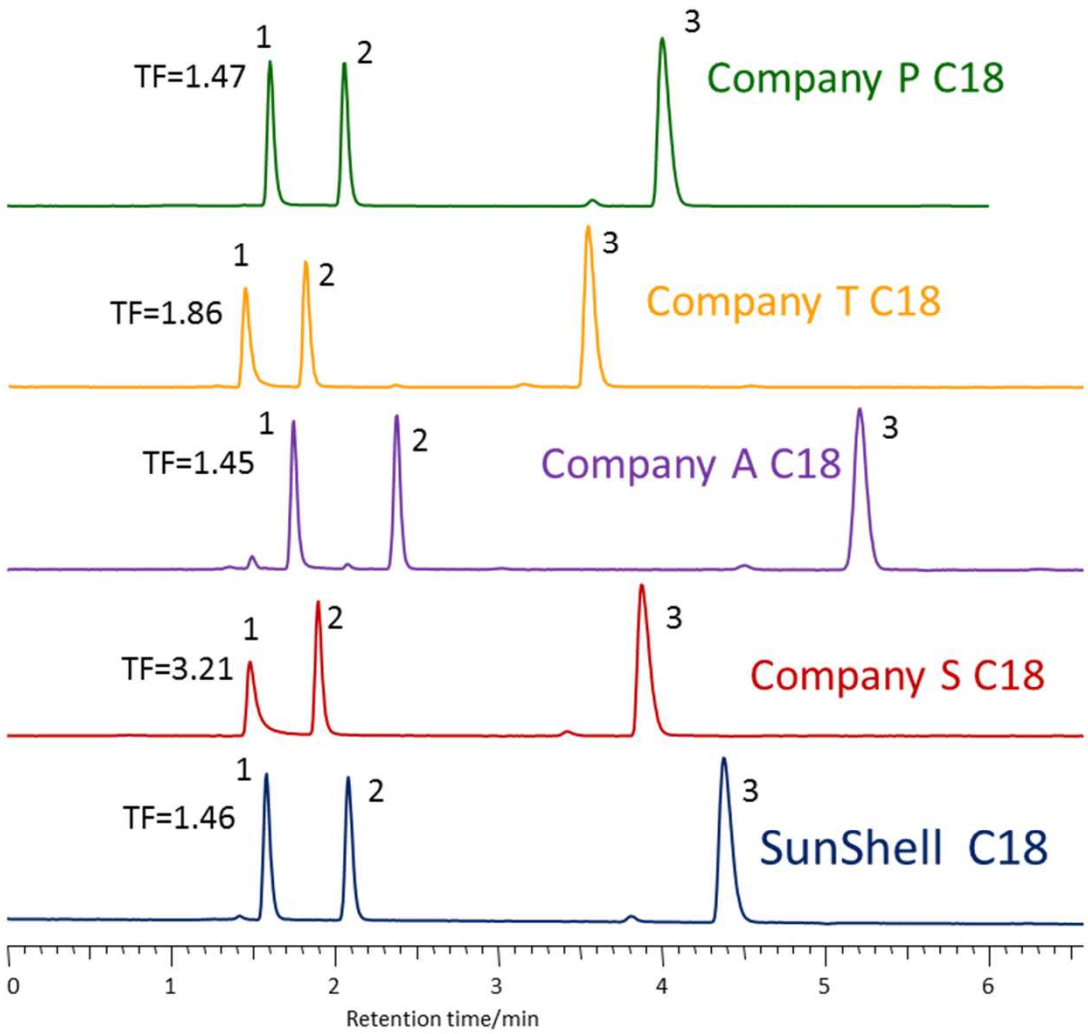
Comparison of oxine, metal chelating compound



Column:
- Company P C18, 2.6 μm 150 x 4.6 mm
- Company T C18, 2.6 μm 150 x 4.6 mm
- Company A C18, 2.7 μm 150 x 4.6 mm
- Company S C18, 2.7 μm 150 x 4.6 mm
- SunShell C18, 2.6 μm 150 x 4.6 mm

Mobile phase: CH_3CN/20mM H_3PO_4=10/90
Flow rate: 1.0 mL/min
Temperature: 40 ºC
Detection: UV@250nm
Sample: 1 = 8-Quinolinol (Oxine)
2 = Caffeine

Comparison of formic acid



Column:
Company P C18, 2.6 µm 150 x 4.6 mm
Company T C18, 2.6 µm 150 x 4.6 mm
Company A C18, 2.7 µm 150 x 4.6 mm
Company S C18, 2.7 µm 150 x 4.6 mm
SunShell C18, 2.6 µm 150 x 4.6 mm
Mobile phase: CH_3CN/0.1% H_3PO_4=2/98
Flow rate: 1.0 mL/min
Temperature: 40 ºC
Detection: UV@210nm
Sample: 1 = Formic acid
2 = Acetic acid
3 = Propionic Acid

Summary of standard samples

	Pressure[a]	Retention[b]	Pyridine	Oxine	Formic acid	Point
SunShell C18	◎21.8	10.4	◎	◎	◎	12
Ascentis Express C18	◎22.2	9.7	△	△	×	5
PoroShell C18 EC	×30.6	9.0	◎	△	◎	7
Accucore C18	◎22.7	7.4	×	×	△	4
Kinetex C18	△26.1	5.4	×	◎	◎	7

a. Mobile phase, methanol:water=75:25, 40 °C, 1mL/min 150 x 4.6mm

b. Retention factor of amylbenzene

◎: 3 point, ○: 2 point, △: 1 point, ×: 0 point

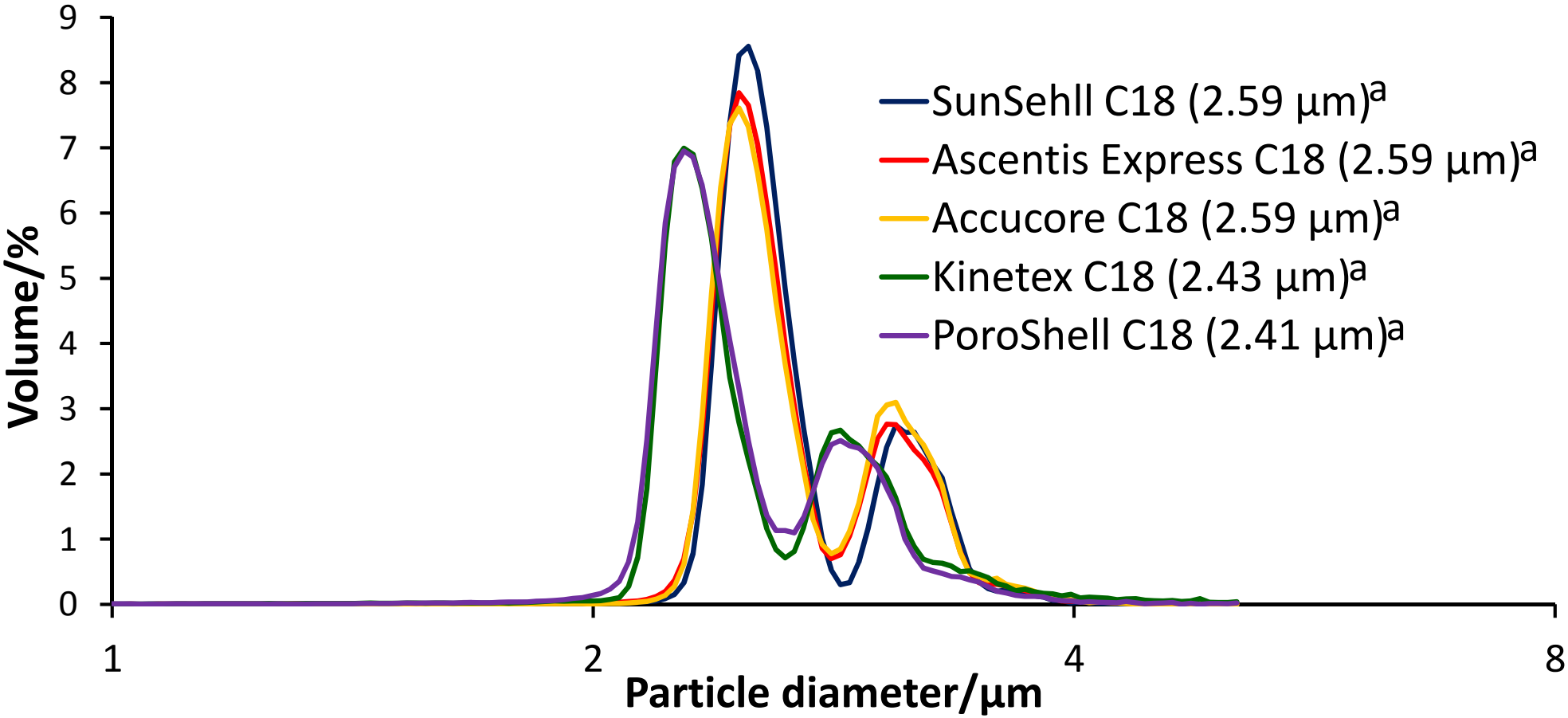
Characteristics

	Carbon loading (%)	Specific surface area [a] (m^2/g)	Pore volume [a] (mL)	Pore diameter [a] (nm)
SunShell C18	7.3 (7)[b]	125 (150)[b]	0.261	8.34 (9)[b]
Ascentis Express C18	8.0	133 (150)[b]	0.278	8.20 (9)[b]
PoroShell C18 EC	8.5 (8)[b]	135 (130)[b]	0.414	12.3 (12)[b]
Accucore C18	8.8 (9)[b]	130 (130)[b]	0.273	8.39 (8)[b]
Kinetex C18	4.9 (12 effective)[b]	102 (200 effective)[b]	0.237	9.25 (10)[b]

a. Measured after C18 materials were sintered at 600 degree Celsius for 8 hours. The measured value of each sintered core shell silica is considered to be smaller than that of the original core shell silica.
b. Value written in each brochure or literature

All data were measured in ChromaNik laboratory.

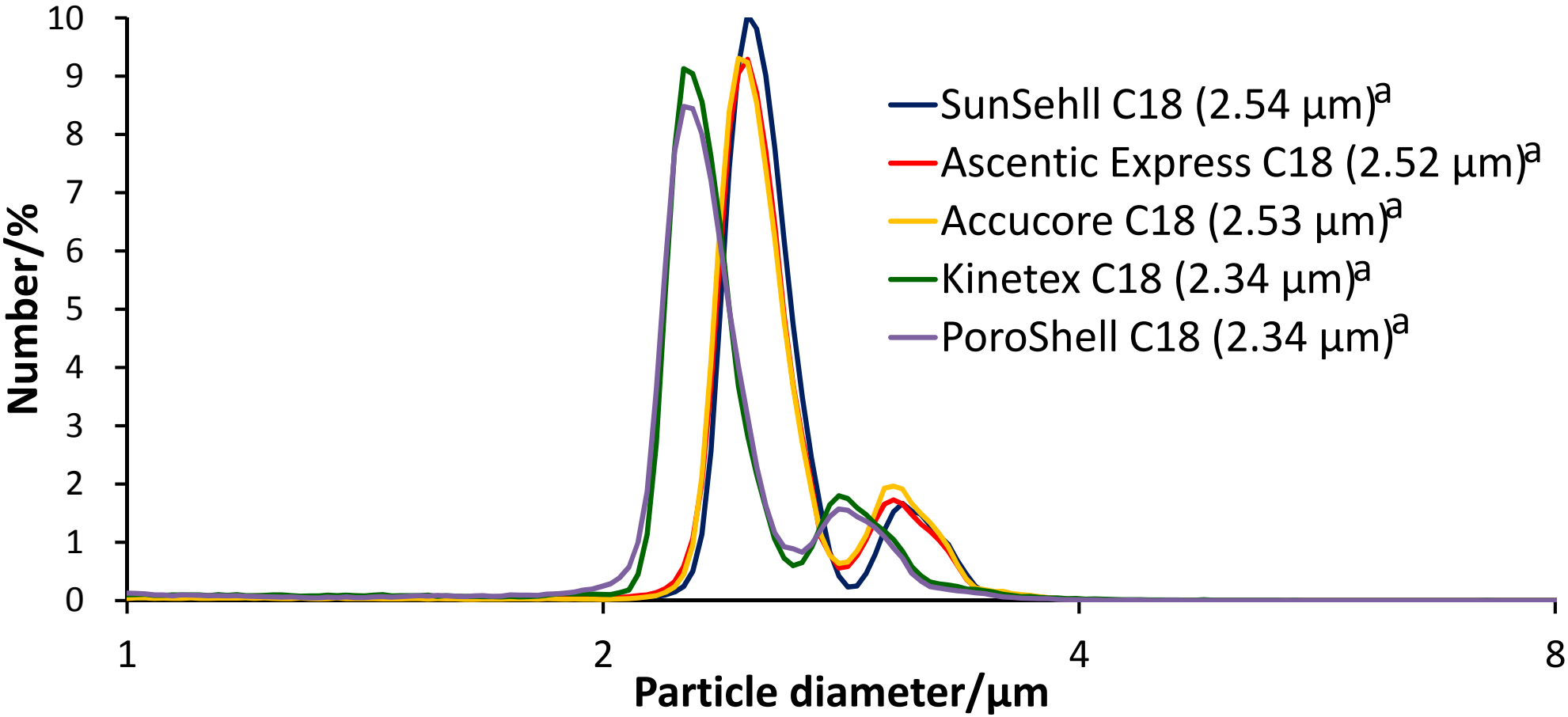
Particle distribution I



*Measured using Beckman Coulter Multisizer 3 after C18 materials were sintered at 600 degree Celsius for 8 hours. The measured value of each sintered core shell silica is considered to be different from that of the original core shell silica.

a. Median particle size

Particle distribution II

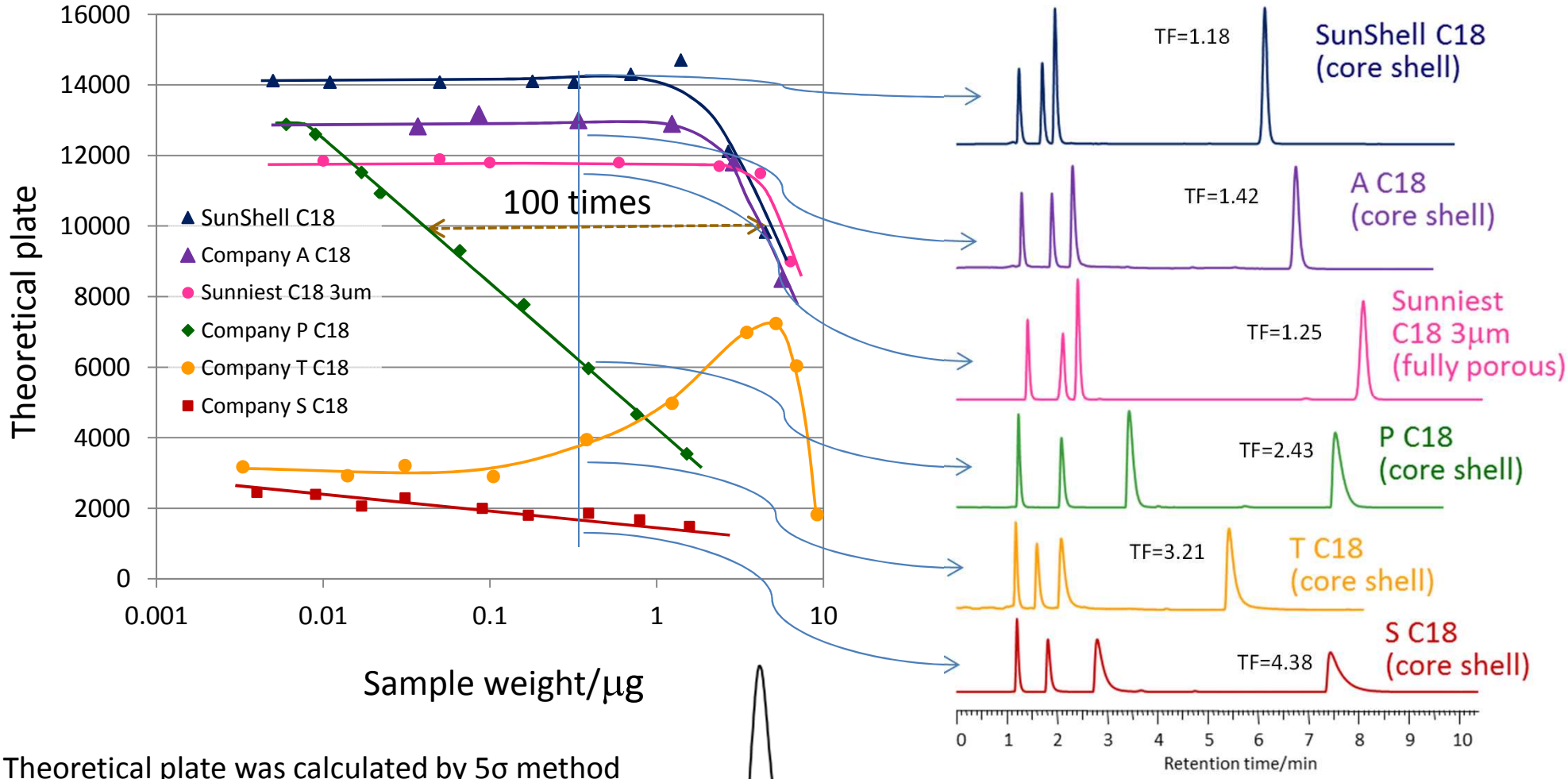


*Measured using Beckman Coulter Multisizer 3 after C18 materials were sintered at 600 degree Celsius for 8 hours. The measured value of each sintered core shell silica is considered to be different from that of the original core shell silica.

a. Median particle size

Loading capacity of amitriptyline I

Mobile phase: Acetonitrile/**20mM phosphate buffer pH7.0**=(60:40)
Column dimension: 150 x 4.6 mm, Flow rate: 1.0 mL/min, Temp.: 40°C

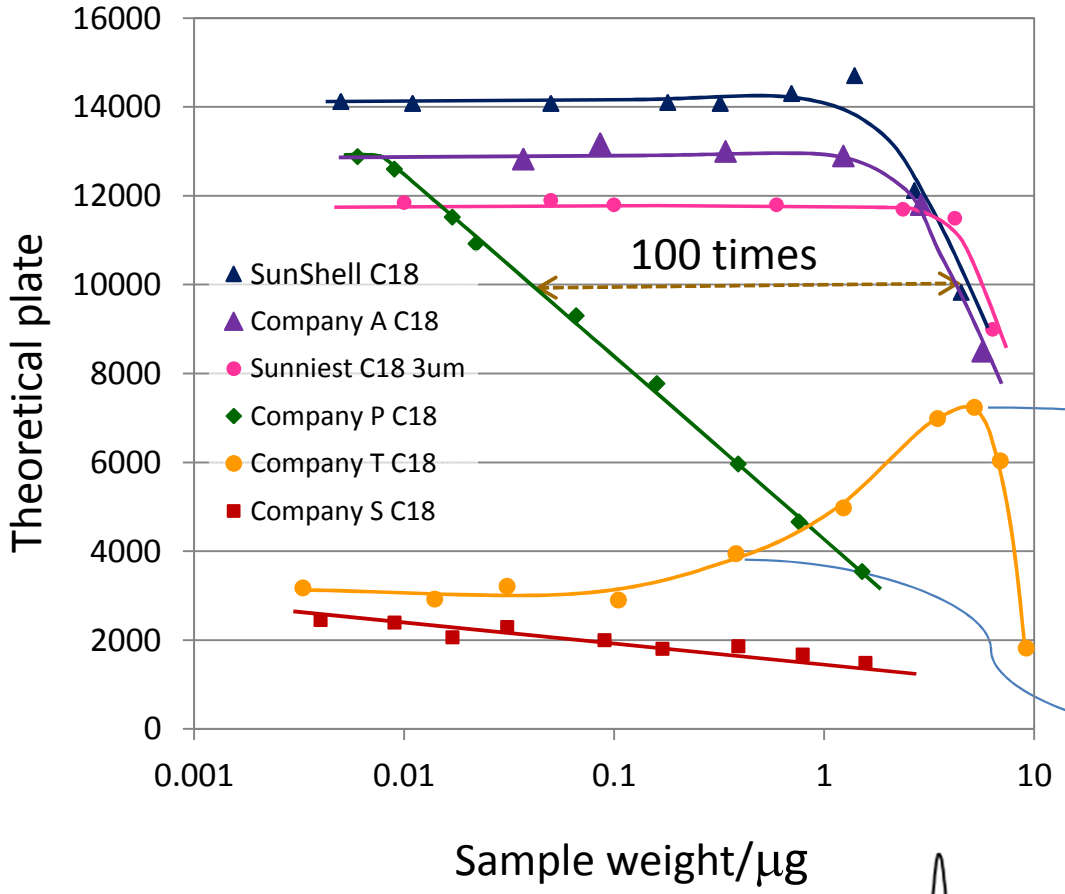


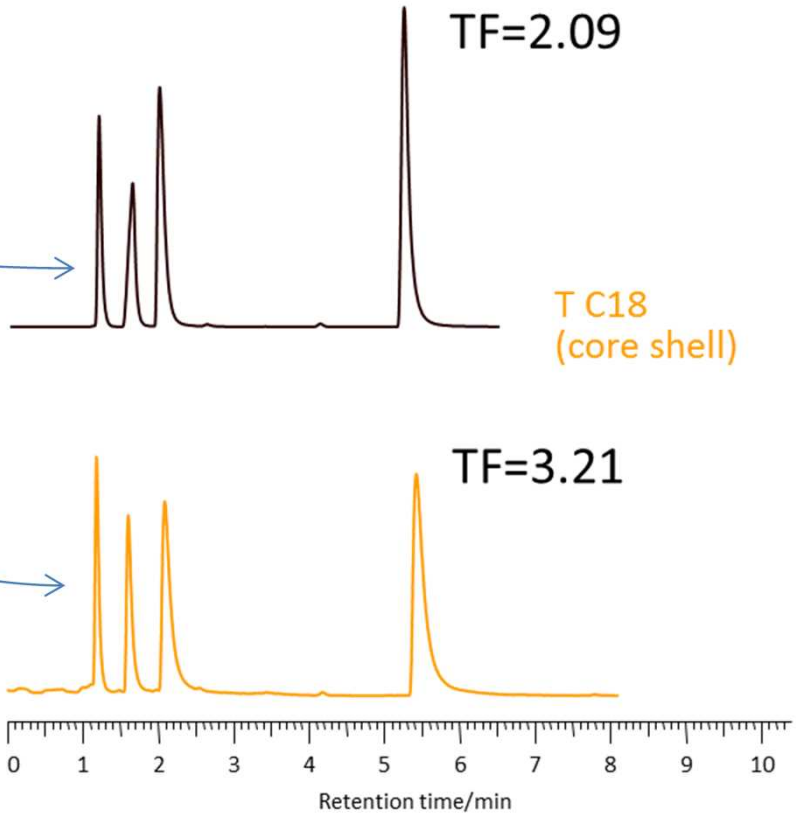
Theoretical plate was calculated by 5σ method using peak width at 4.4% of peak height.

Sample: 1=Uracil, 2=Propranolol, 3= Nortriptyline, 4=Amitriptyline

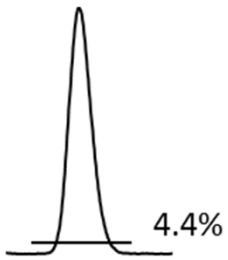
Loading capacity of amitriptyline I

Mobile phase: Acetonitrile/**20mM phosphate buffer pH7.0**=(60:40)
Column dimension: 150 x 4.6 mm, Flow rate: 1.0 mL/min, Temp.: 40°C





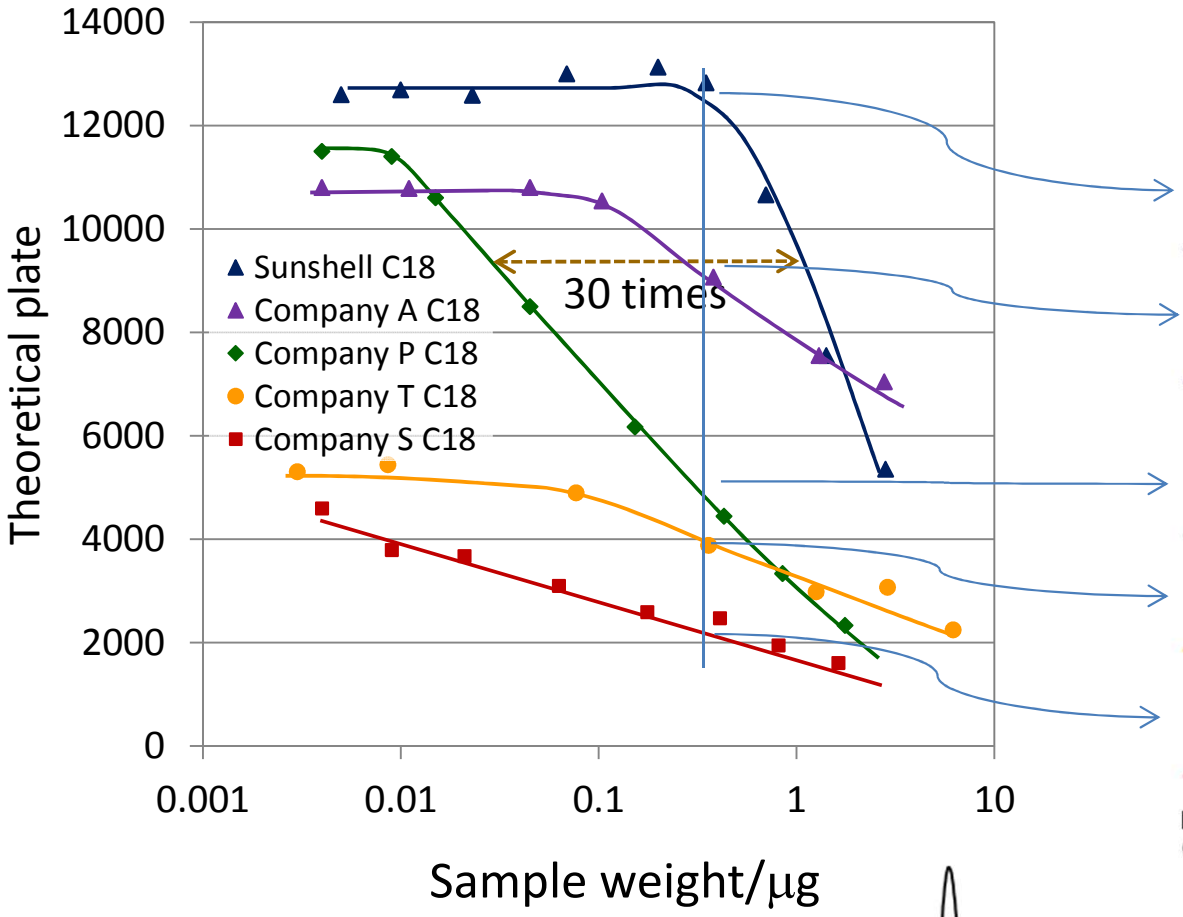
Theoretical plate was calculated by 5σ method using peak width at 4.4% of peak height.

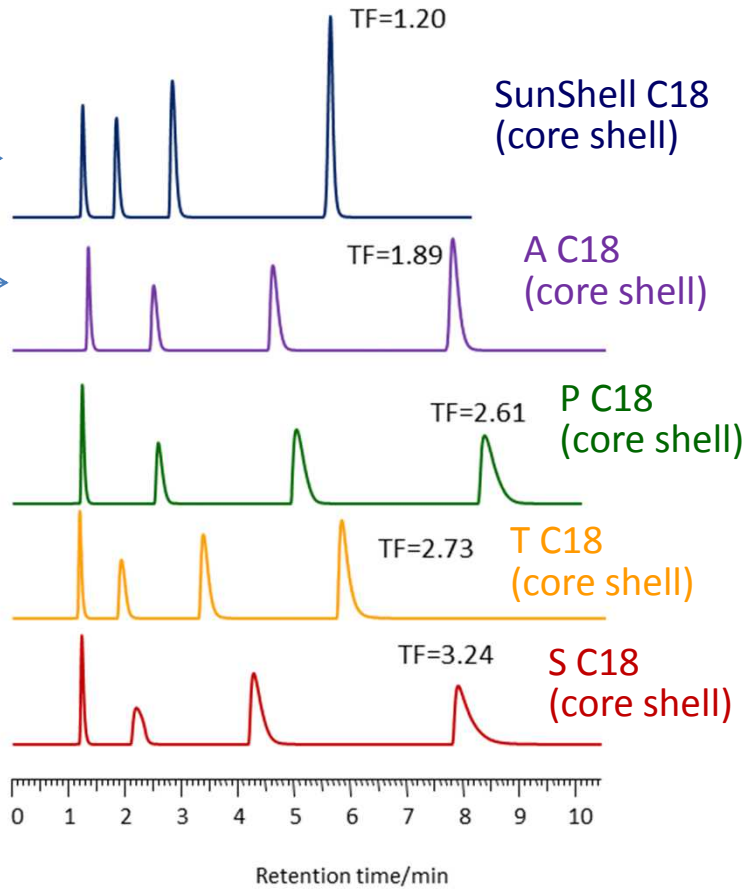


Sample: 1=Uracil, 2=Propranolol,
3= Nortriptyline, 4=Amitriptyline

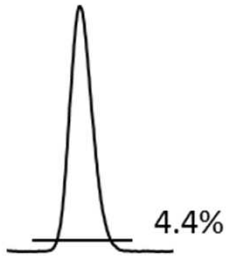
Loading capacity of amitriptyline II

Mobile phase: Acetonitrile/**10mM ammonium acetate pH6.8**=(40:60)
Column dimension: 150 x 4.6 mm, Flow rate: 1.0 mL/min, Temp.: 40°C





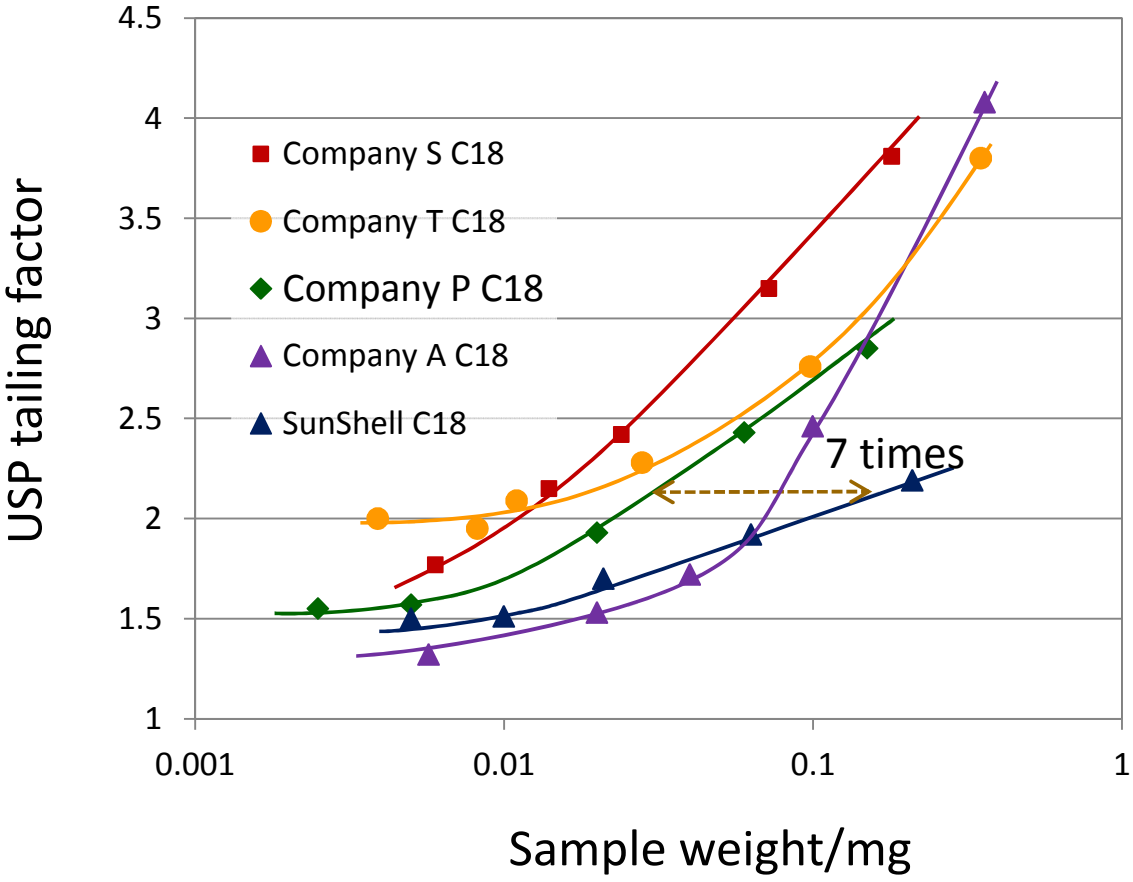
Theoretical plate was calculated by 5σ method using peak width at 4.4% of peak height.

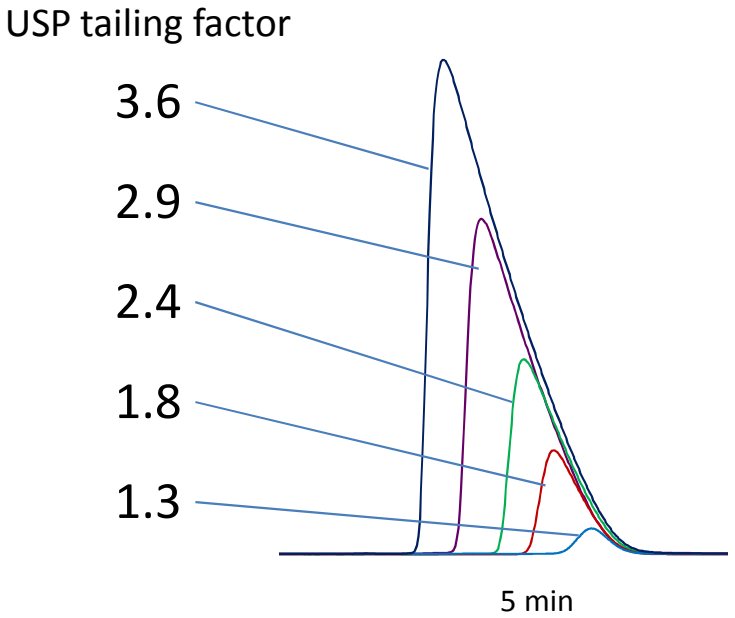


Sample: 1=Uracil, 2=Propranolol, 3= Nortriptyline, 4=Amitriptyline

Loading capacity of amitriptyline III

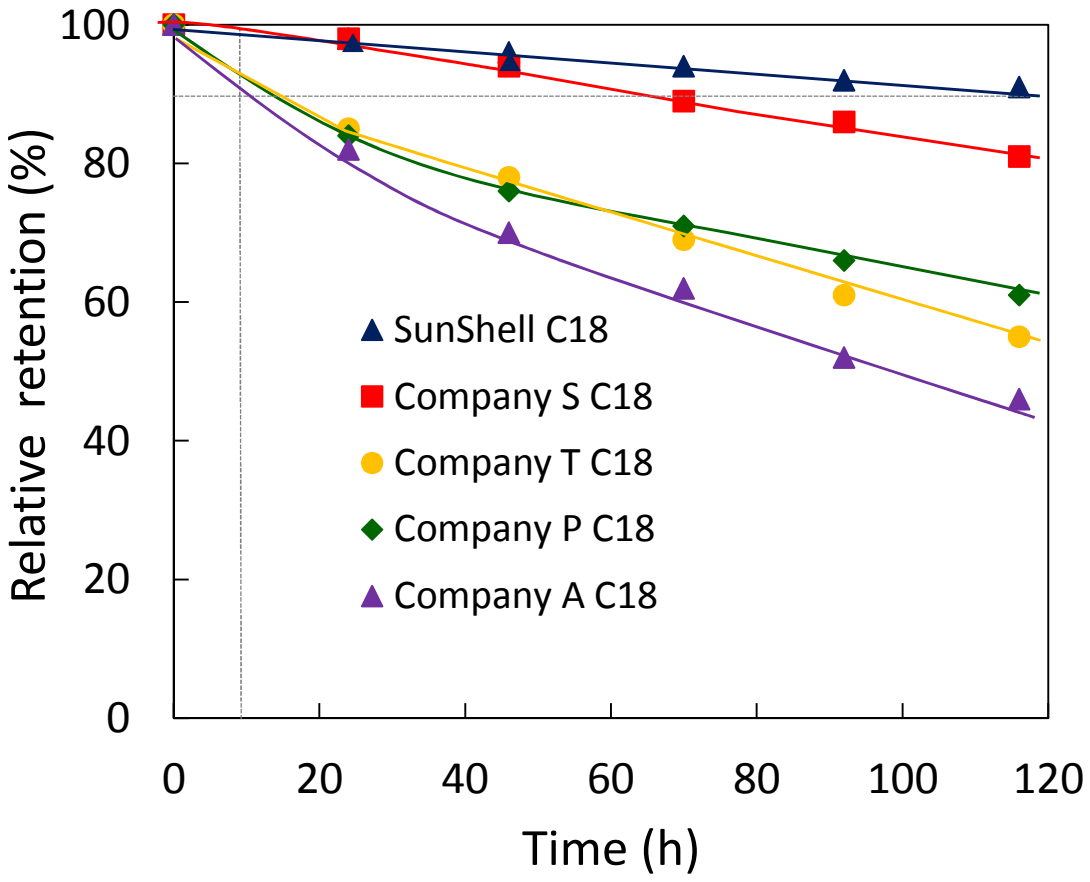
Mobile phase: Acetonitrile/**0.1% formic acid**=(30:70)
Column dimension: 150 x 4.6 mm, Flow rate: 1.0 mL/min, Temp.: 40°C





In the case of using acetonitrile /0.1% formic acid as a mobile phase, amitriptyline peak shows more tailing because a loading capacity decreases in an acidic, low-ionic-strength mobile phase.

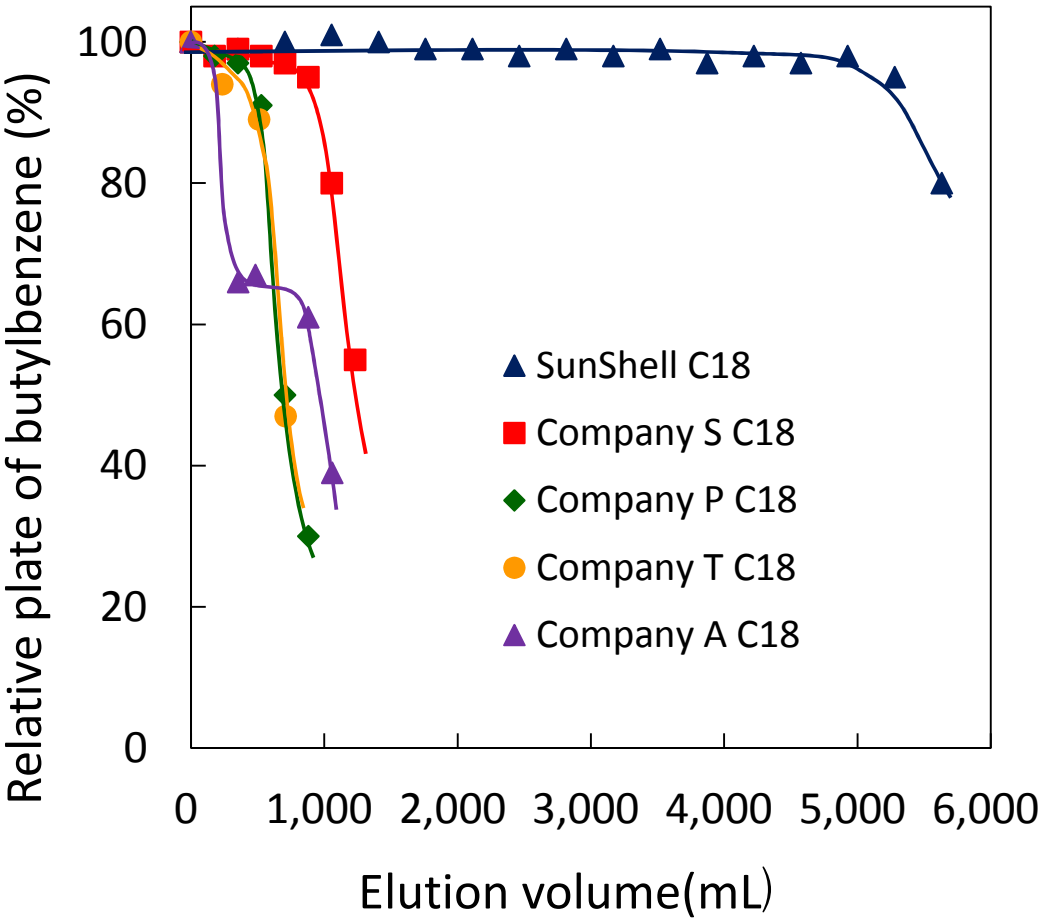
Stability under acidic pH condition



Durable test condition
Column size: 50 x 2.1 mm
Mobile phase: CH_3CN/1.0% TFA, pH1=10/90
Flow rate: 0.4 mL/min
Temperature: 80 ºC

Measurement condition
Column size: 50 x 2.1 mm
Mobile phase: CH_3CN/H_2O=60/40
Flow rate: 0.4 mL/min
Temperature: 40 ºC
Sample: 1 = Uracil
2 = Butylbenzene

Stability under basic pH condition



Durable test condition
Column Size: 50 x 2.1 mm
Mobile phase:
CH_3OH/20mM Sodium borate/10mM NaOH=30/21/49 (pH10)
Flow rate: 0.4 mL/min
Temperature: 50 °C

Measurement condition
Column Size: 50 x 2.1 mm
Mobile phase: CH_3OH/H_2O=70/30
Flow rate: 0.4 mL/min
Temperature: 40 °C
Sample: 1 = Butylbenzene

Summary of stability

	Acidic condition pH 1	Basic condition pH 10	pH range written in each brochure
SunShell C18	◎	◎	1.5 - 10
Ascentis Express C18	○	○	2 - 9
PoroShell C18 EC	△	△	2 - 9
Accucore C18	△	△	1 - 11
Kinetex C18	△	△	1.5 - 10