An HPLC Column

# Inertsil® C8-4

**Though ODS (C18) phases are the most widely used reverse phase columns, Octyl (C8) columns can often provide good resolution with much shorter retention times. Unlike many competitive brands, Inertsil C8-4 offers the very same selectivity as Inertsil ODS-4, making it simple to change columns without additional method development work. Uniquely among C8 phases, Inertsil C8-4 can be used with 100% aqueous phases without loss of resolution caused by phase collapse.**

## Physical Properties

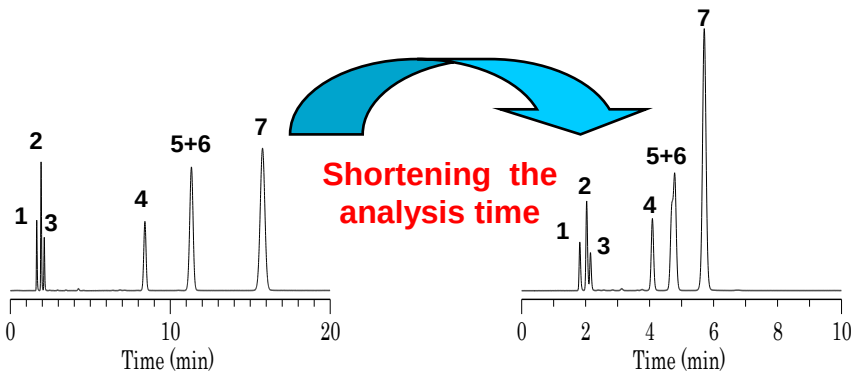
| | |
|---|---|
| Silica: | High Purity Spherical Silica Gel |
| Particle Size: | 5um |
| Surface Area: | 450 m2/g |
| Pore Size: | 100A |
| Pore Volume: | 1.05 mL/g |
| Bonded Phase: | Octyl groups (C8) |
| End-capping: | Yes |
| Carbon Loading: | 5% |
| USD Code: | L7 |

## Comparison of retention and separation pattern

1. **Virtually the same retentivity**
2. **The same separation pattern**

**Analytical Conditions**

| | |
|---|---|
| **System:** | GL7400 HPLC system |
| **Column:** | 5um, 150 x 4.6 mmI.D. |
| **Eluent :** | A) $CH_3OH$<br>B) $H_2O$<br>(A / B) = (80 / 20) |
| **Flow Rate:** | 1.0 mL/min |
| **Col. Temp.:** | 40 ℃ |
| **Detection:** | UV 254 nm |
| **Sample:** | **1**. Uracil<br>**2**. Caffeine<br>**3**. Phenol<br>**4**. n-Butylbenzene<br>**5**. o-Terphenyl<br>**6**. n-Amylbenzene<br>**7**. Triphenylene |

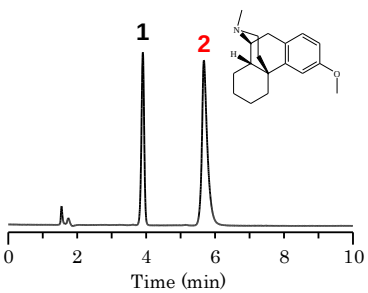



**Inertsil ODS-4** **Inertsil C8-4**

## Adsorption performance on various compounds

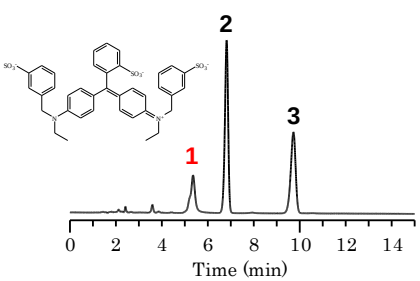
### Basic Compound (Dextromethorphan)

Column: Inertsil C8-4 5um 150x4.6mmI.D.
Eluent: A) $CH_3CN$
B) 25 mM Phosphate buffer ; pH 7.0
(A / B) = (40 / 60)
Flow rate: 1.0 mL/min
Col.Temp.: 40 ℃
Detection: UV at 220 nm
Sample: 1.0 µL（0.1 mg / mL）
1) Phenol
2) Dextromethorphan hydrobromide



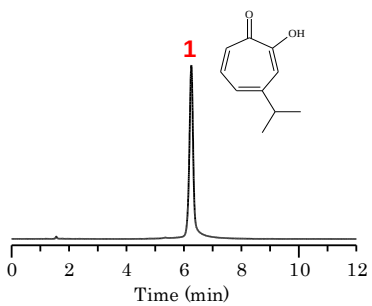

### Acidic Compound (Brilliant Blue FCF)

Column: Inertsil C8-4 5um 150x4.6mmI.D.
Eluent : A) $CH_3CN$
B) 0.1% $H_3PO_4$
(A / B) = (25 / 75)
Flow rate: 1.0 mL/min
Col.Temp.: 40 ℃
Detection: UV at 254 nm
Sample: 3.0 µL
1) Brilliant Blue FCF (0.05 mg / mL)
2) Phenol (0.3 mg / mL)
3) Salicylic acid (0.2 mg / mL)




### Chelating Compound (Hinokitiol)

Column: Inertsil C8-4 5um 150x4.6mmI.D.
Eluent: A) $CH_3CN$
B) 0.1% $H_3PO_4$
(A / B) = (40 / 60)
Flow rate: 1.0 mL/min
Col.Temp.: 40 ℃
Detection: UV at 254 nm
Sample: 1.0 µL (0.1 mg / mL)
1) β-Thujaplicin（Hinokitiol）

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# Strength and Advantage of Inertsil C8-4

- Useful for reducing the analysis time, and therefore increasing productivity, for very hydrophobic samples as compared to use of ODS phase.

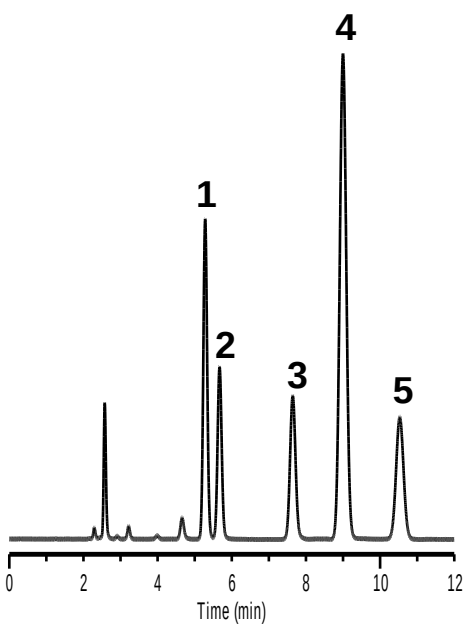
  * For the purpose of shortening the analysis time further.
  * For the purpose of reducing the amount of organic solvent used.

- Virtually the same separation pattern can be obtained when comparing to the the same brand/series of an ODS column.

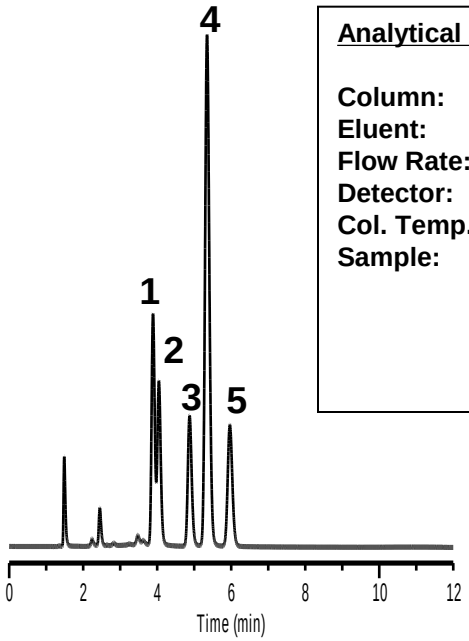
  * Rarely necessary alter the analytical conditions when switching from an ODS (C18) to a C8 column.

| | Carbon Loading of ODS (%) | Carbon Loading of C8 (%) | Ratio |
|---|---|---|---|
| Inertsil 2 Series | 18.50% | 10.50% | 10.5/18.5＝0.57 |
| Inertsil 3 Series | 15.00% | 9.00% | 9.0/15.0＝0.60 |
| Inertsil 4 Series | 11.00% | 5.00% | 5.0/11.0＝0.45 |
| The Length of Alkyl Chain | C18 | C8 | 8 / 18＝0.44 |

# Comparison of Analysis Time between ODS-3 & C8-3




Inertsil ODS-3




Inertsil C8-3

**Analytical Condition**

| | |
|---|---|
| Column: | 150 x 4.6 mmI.D. |
| Eluent: | $CH_3CN$ / $H_2O$ = 70 / 30 |
| Flow Rate: | 1.0 mL/min |
| Detector: | UV 254nm |
| Col. Temp.: | 40C |
| Sample: | 1) Naphthalene |
| | 2) Ethylbenzene |
| | 3) Propylbenzene |
| | 4) Anthracene |
| | 5) Butylbenzene |

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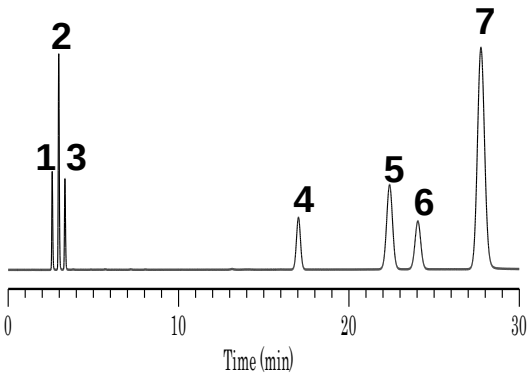
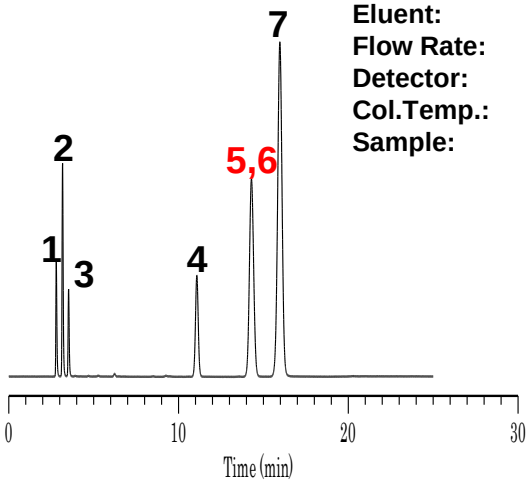
# Compare Selectivities of Inertsil 3 series vs. new 4 series




**Analytical Conditions**

| | |
|---|---|
| Column: | 250 x 4.6 mmI.D. |
| Eluent: | $CH_3OH$ / $H_2O$ = 80 / 20 |
| Flow Rate: | 1.0 mL/min |
| Detector: | UV 254nm |
| Col.Temp.: | 40C |
| Sample: | 1) Uracil |
| | 2) Caffeine |
| | 3) Phenol |
| | 4) Butylbenzene |
| | 5) o-Terphenyl |
| | 6) Amylbenzene |
| | 7) Triphenylene |

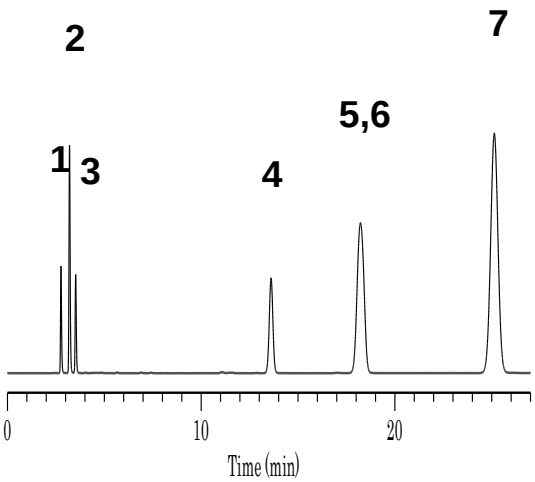
**Inertsil ODS-3**

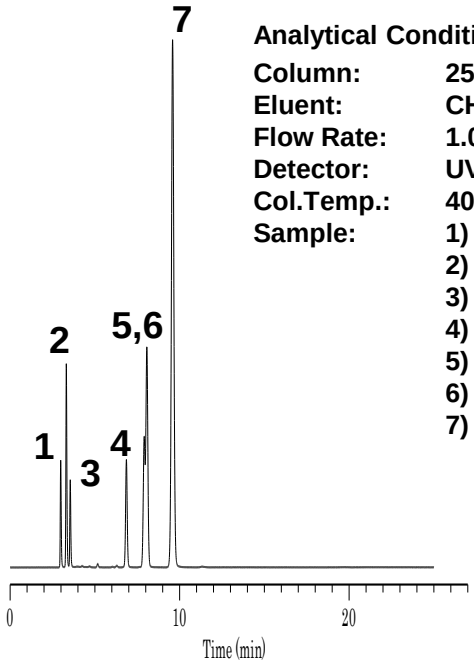
**Carbon Loading = 15%**

**Inertsil C8-3**

**Carbon Loading = 9%**

The bonding density of the functional group is high on a commercially available C8 column when comparing to the same brand/series of their ODS column. Since the silica surface properties will therefore be different, the separation pattern (selectivity) may change depending on the sample.




**Analytical Conditions**

| | |
|---|---|
| Column: | 250 x 4.6 mmI.D. |
| Eluent: | $CH_3OH$ / $H_2O$ = 80 / 20 |
| Flow Rate: | 1.0 mL/min |
| Detector: | UV 254nm |
| Col.Temp.: | 40C |
| Sample: | 1) Uracil |
| | 2) Caffeine |
| | 3) Phenol |
| | 4) Butylbenzene |
| | 5) o-Terphenyl |
| | 6) Amylbenzene |
| | 7) Triphenylene |

**Inertsil ODS-4**

**Carbon Loading = 11%**

**Inertsil C8-4**

**Carbon Loading = 5%**

**Nearly the same Bonding Density**

**Retentivity nearly Proportional to the Alkyl Chain Length**

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# Adsorption Performance on Strong Basic Compound

**Analytical Conditions**

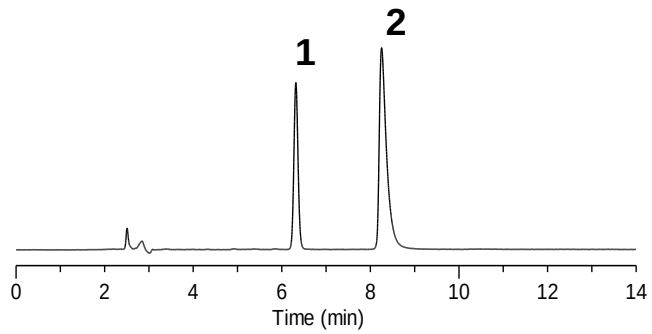
**Eluent:** A) $CH_3CN$
B) 25 mM Phosphate buffer ; pH 7.0
(A / B) = (40 / 60)

**Flow Rate:** 1.0 mL/min

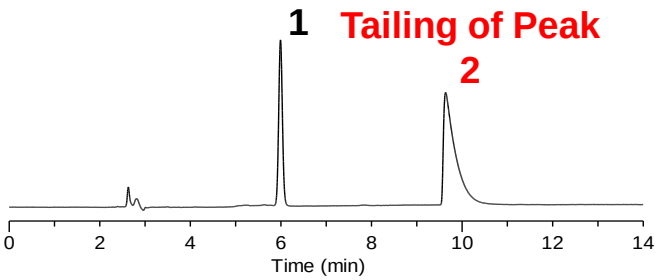
**Col.Temp.:** 40C

**Detection:** UV at 220 nm

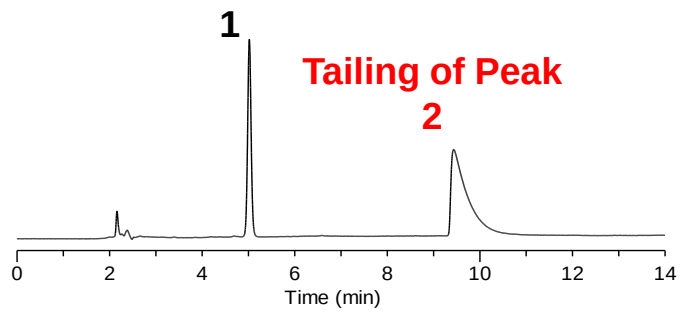
**Sample:** 1.0 µL
1) Phenol (0.015 mg/mL)
2) Dextromethorphan Hydrobromide (0.1mg/mL)



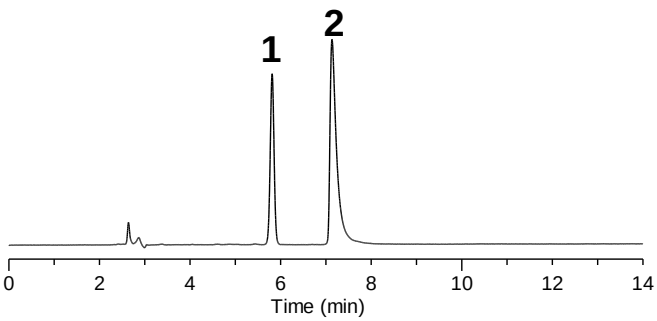

**Inertsil C8-4 5um**
**4.6 x 250mm**



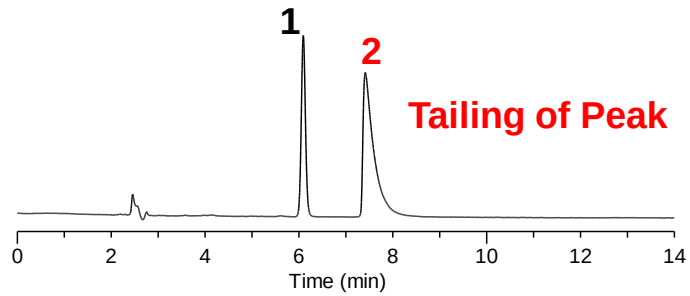

YMC-Pack Pro C8 5um
4.6mm x 250mm (S/N: 0425020742W)



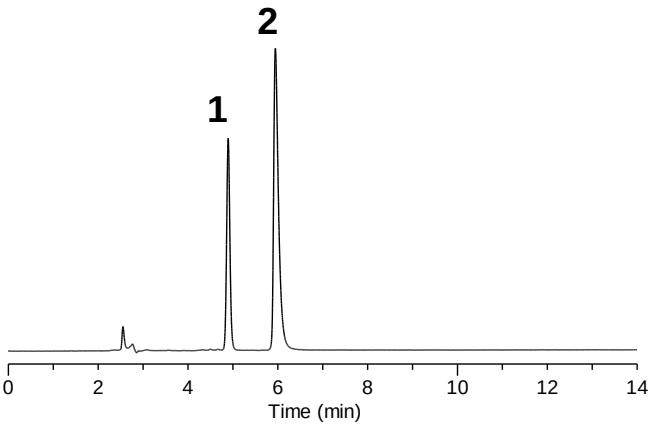

ZORBAX Eclipse-Plus C8 5um
4.6mm x 250mm (S/N: USUTA01326)




Luna C8(2) 5um
4.6mm x 250mm (S/N: 462435-6)




SunFire C8 5um
4.6mm x 250mm (S/N: 01103914212103)




XBridge C8 5um
4.6mm x 250mm (S/N: 01073909313003)

# Compare to the Competition for Basic Compounds

**Analytical Conditions**

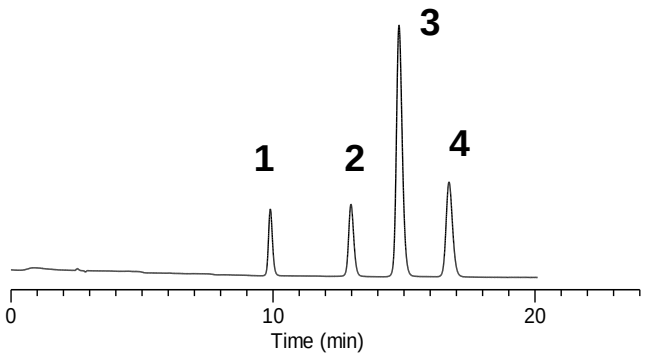
**Eluent:** A) $CH_3CN$
B) 25 mM Phosphate buffer ; pH 7.0
(A / B) = (50 / 50)

**Flow Rate:** 1.0 mL/min

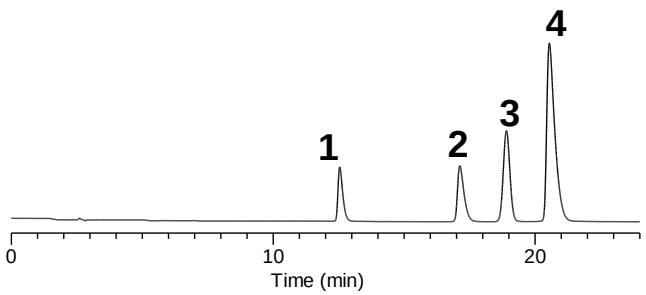
**Col.Temp.:** 40C

**Detection:** UV at 220 nm

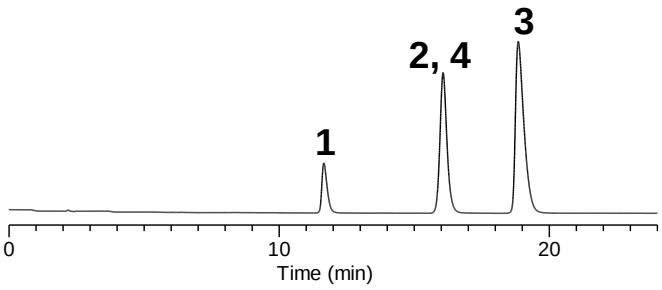
**Sample:** 1) Imipramine HCl (0.05 mg/mL)
2) Amitriptyline HCl (0.05 mg/mL)
3) Clomipramine HCl (0.2 mg/mL)
4) Mianserine HCl (0.1 mg/mL)



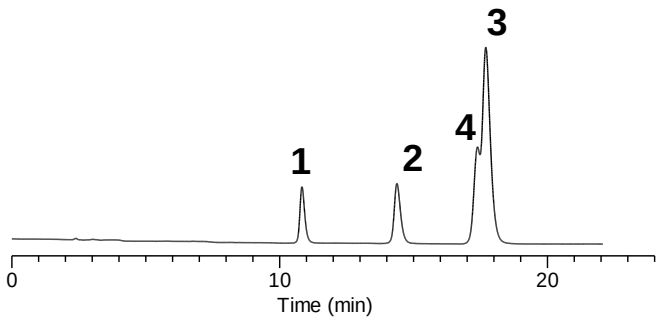

**Inertsil C8-4 5um**
**4.6 x 250mm**



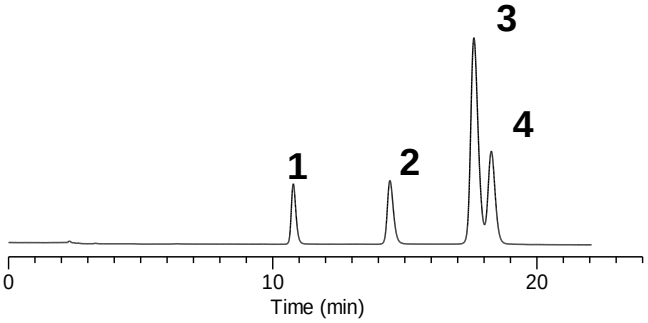

YMC-Pack Pro C8 5um
4.6mm x 250mm (S/N: 0425020742W)



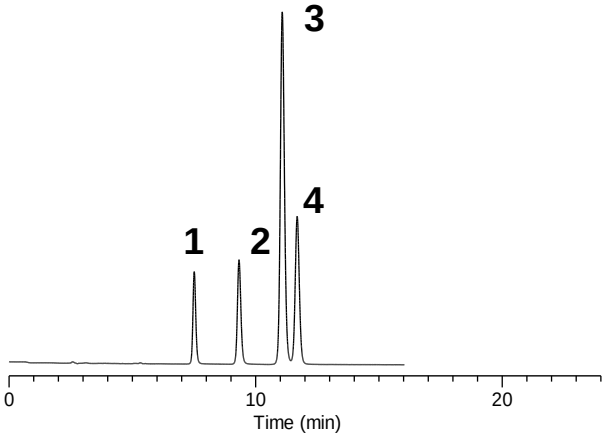

ZORBAX Eclipse-Plus C8 5um
4.6mm x 250mm (S/N: USUTA01326)




Luna C8(2) 5um
4.6mm x 250mm (S/N: 462435-6)




SunFire C8 5um
4.6mm x 250mm (S/N: 01103914212103)




XBridge C8 5um
4.6mm x 250mm (S/N: 01073909313003)

# Compare to the competition for strongly acidic compounds

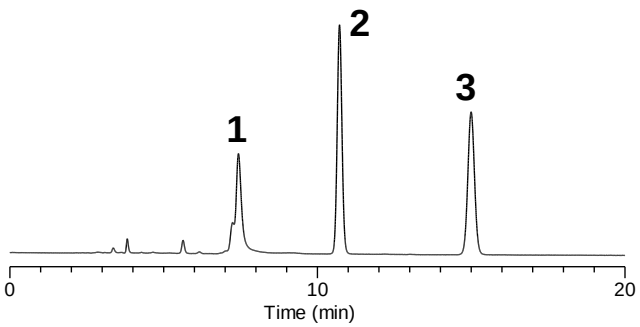
**Eluent:** A) $CH_3CN$
B) 0.1% $H_3PO_4$
(A / B) = (25 / 75)

**Flow Rate:** 1.0 mL/min

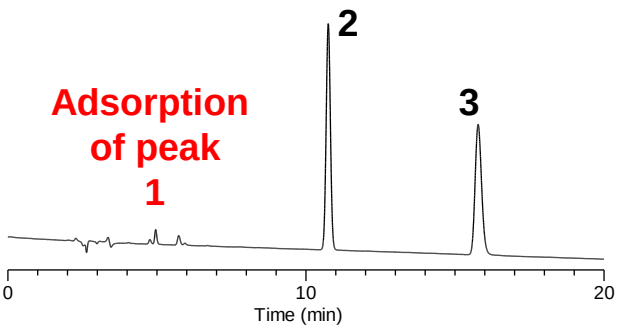
**Col.Temp.:** 40C

**Detection:** UV at 254 nm

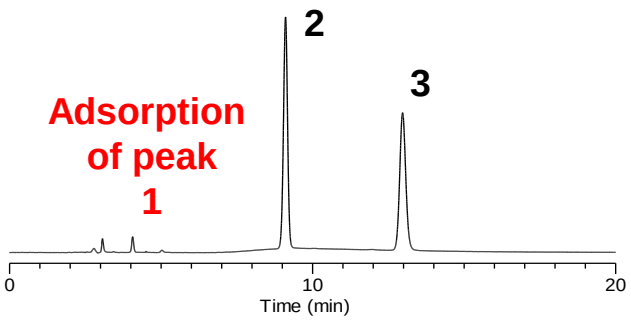
**Sample:** 3.0 µL
1) Brilliant Blue FCF (0.05 mg / mL)
2) Phenol (0.3 mg / mL)
3) Salicylic acid (0.2 mg / mL)



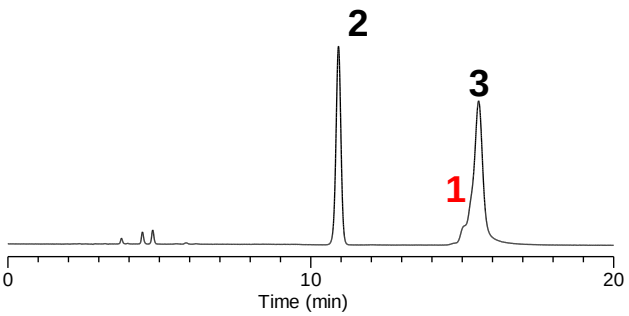

**Inertsil C8-4 5um**
**4.6 x 250mm**



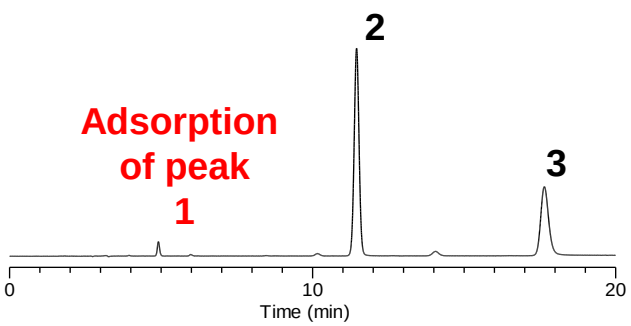

YMC-Pack Pro C8 5um
4.6mm x 250mm (S/N: 0425020742W)



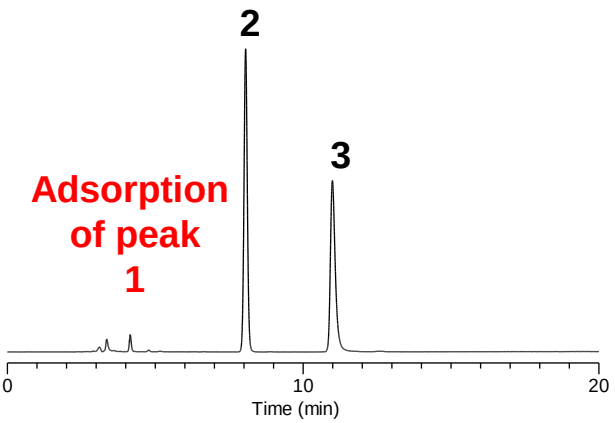

ZORBAX Eclipse-Plus C8 5um
4.6mm x 250mm (S/N: USUTA01326)




Luna C8(2) 5um
4.6mm x 250mm (S/N: 462435-6)




SunFire C8 5um
4.6mm x 250mm (S/N: 01103914212103)




XBridge C8 5um
4.6mm x 250mm (S/N: 01073909313003)

# Compare to the Competition for Strong Chelator

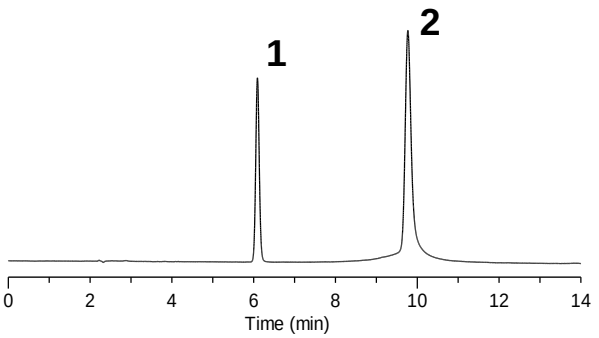
**Eluent:** A) $CH_3CN$
B) 0.1% $H_3PO_4$
(A / B) = (40 / 60)

**Flow Rate:** 1.0 mL/min

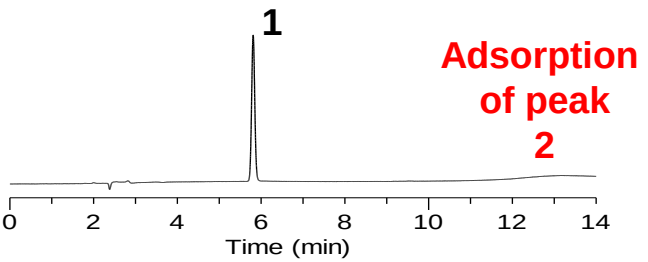
**Col.Temp.:** 40C

**Detection:** UV at 254 nm

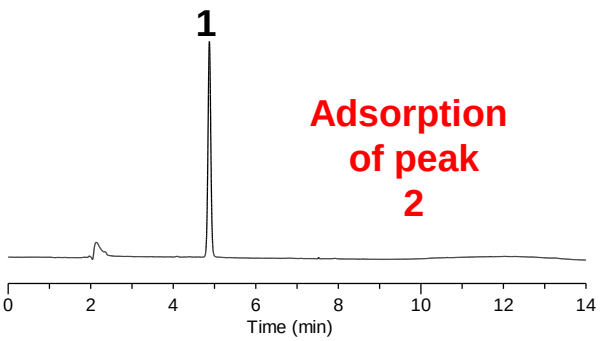
**Sample:** 2.0 µL
1) Phenol (0.25 mg/mL)
2) β-Thujaplicin/Hinokitiol (0.05 mg/mL)



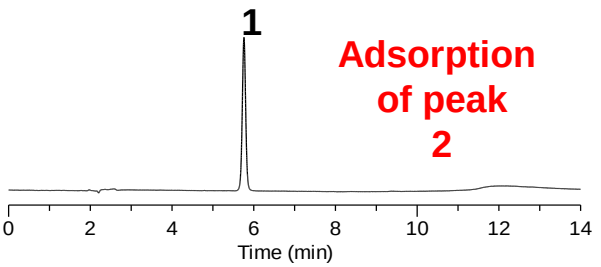

**Inertsil C8-4 5um**
**4.6 x 250mm**



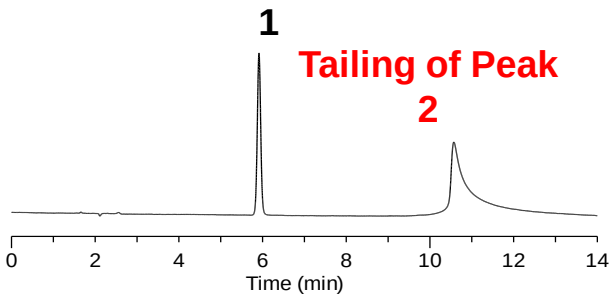

YMC-Pack Pro C8 5um
4.6mm x 250mm (S/N: 0425020742W)



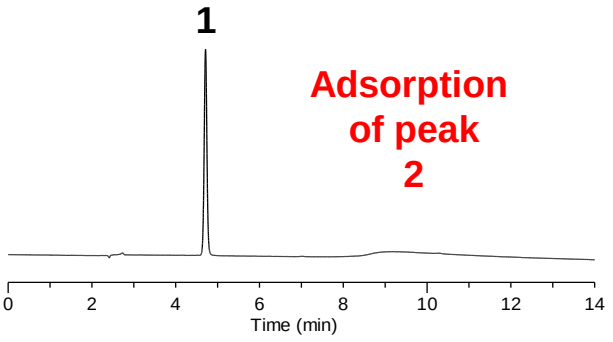

ZORBAX Eclipse-Plus C8 5um
4.6mm x 250mm (S/N: USUTA01326)




Luna C8(2) 5um
4.6mm x 250mm (S/N: 462435-6)




SunFire C8 5um
4.6mm x 250mm (S/N: 01103914212103)



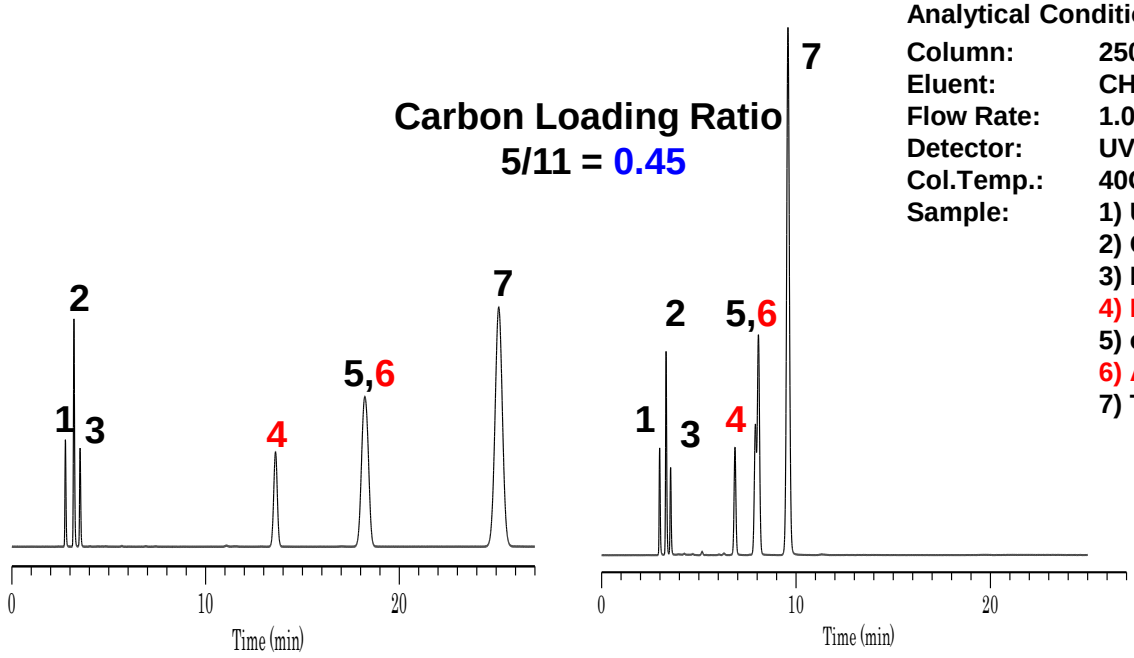

XBridge C8 5um
4.6mm x 250mm (S/N: 01073909313003)

# Compare Inertsil ODS-4 / C8-4 with Competitor's ODS / C8 Families

**Analytical Conditions**

| | |
|---|---|
| Column: | 250 x 4.6 mmI.D. |
| Eluent: | $CH_3OH$ / $H_2O$ = 80 / 20 |
| Flow Rate: | 1.0 mL/min |
| Detector: | UV 254nm |
| Col.Temp.: | 40C |
| Sample: | 1) Uracil |
| | 2) Caffeine |
| | 3) Phenol |
| | 4) Butylbenzene |
| | 5) o-Terphenyl |
| | 6) Amylbenzene |
| | 7) Triphenylene |

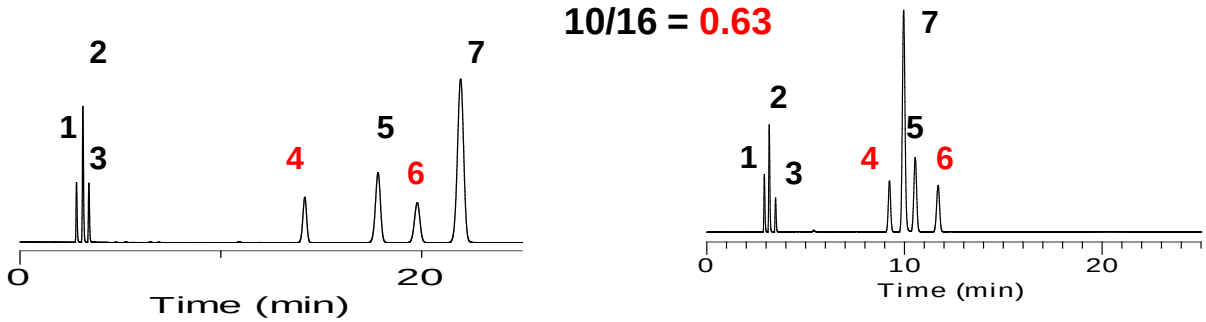
**Carbon Loading Ratio**
**5/11 = 0.45**




**Inertsil ODS-4 5um**
**Carbon Loading = 11%**

**Inertsil C8-4 5um**
**Carbon Loading = 5%**

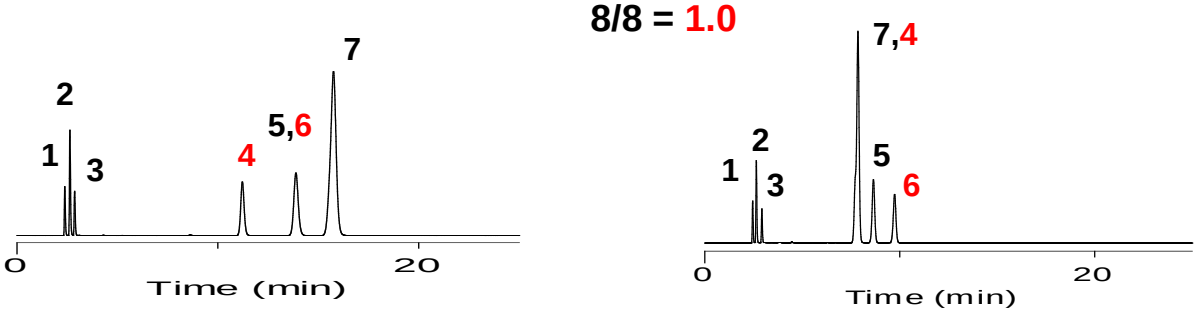
**Carbon Loading Ratio**
**10/16 = 0.63**




YMC-Pack Pro C18 5um
Carbon Loading = 16%

YMC-Pack Pro C8 5um
Carbon Loading = 10%

**Carbon Loading Ratio**
**8/8 = 1.0**




ZORBAX Eclipse-Plus C18 5um
Carbon Loading = 8%

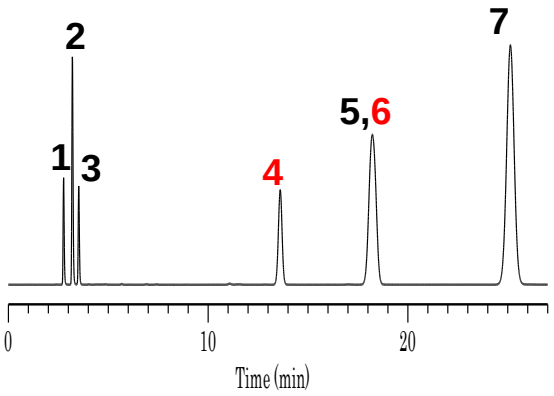
ZORBAX Eclipse-Plus C8 5um
Carbon Loading = 8%

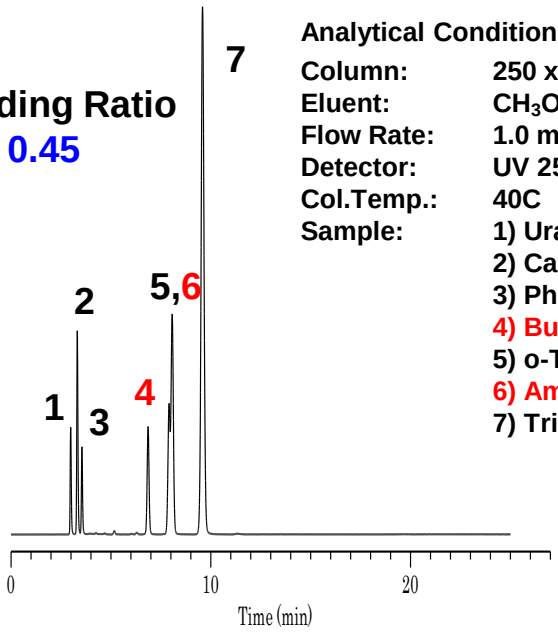
# Compare Inertsil ODS-4 / C8-4 with Competitor's ODS / C8 Families

**Analytical Conditions**

| | |
|---|---|
| Column: | 250 x 4.6 mmI.D. |
| Eluent: | $CH_3OH$ / $H_2O$ = 80 / 20 |
| Flow Rate: | 1.0 mL/min |
| Detector: | UV 254nm |
| Col.Temp.: | 40C |
| Sample: | 1) Uracil |
| | 2) Caffeine |
| | 3) Phenol |
| | 4) Butylbenzene |
| | 5) o-Terphenyl |
| | 6) Amylbenzene |
| | 7) Triphenylene |

**Carbon Loading Ratio**
**5/11 = 0.45**

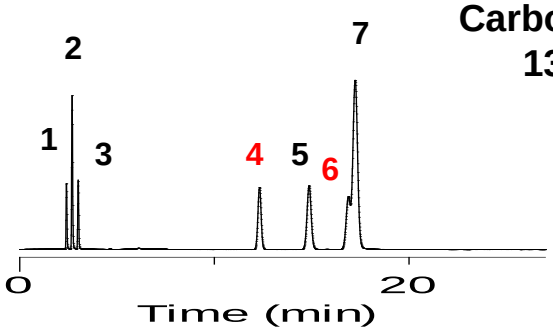


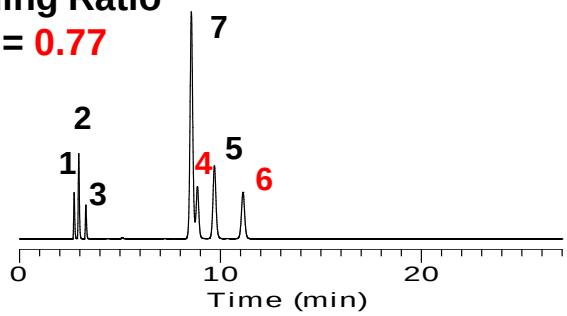




**Inertsil ODS-4 5um**
**Carbon Loading = 11%**

**Inertsil C8-4 5um**
**Carbon Loading = 5%**

**Carbon Loading Ratio**
**13.5/17.5 = 0.77**

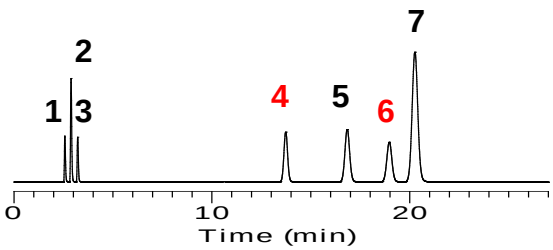


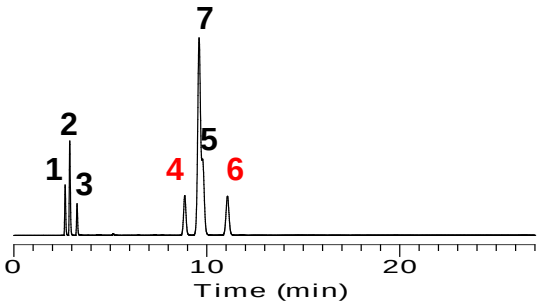




Luna C18(2) 5um
Carbon Loading = 17.5%

Luna C8(2) 5um
Carbon Loading = 13.5%

**Carbon Loading Ratio**
**11.5/16 = 0.72**




SunFire C18 5um
Carbon Loading = 16%

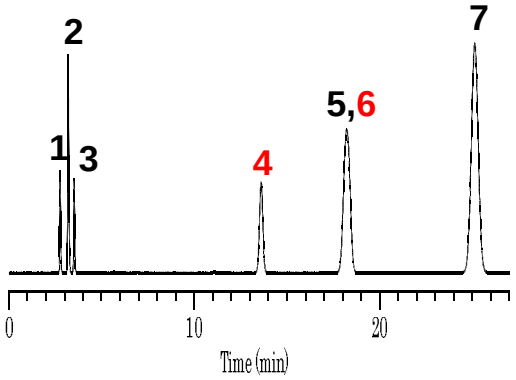
SunFire C8 5um
Carbon Loading = 11.5%

# Compare Inertsil ODS-4 / C8-4 to Waters XBridge ODS / C8

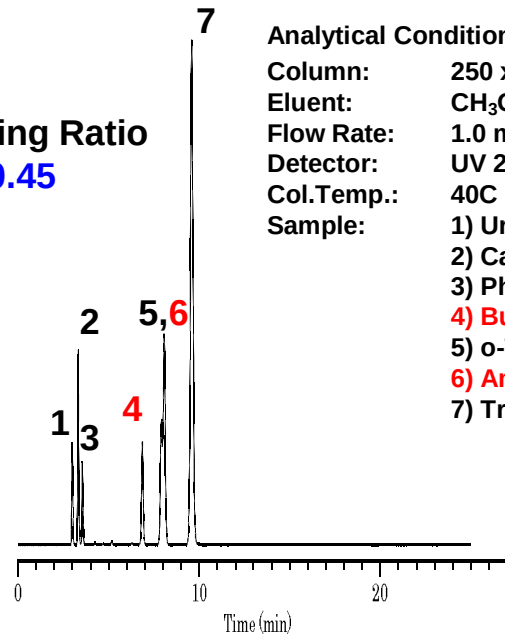
**Carbon Loading Ratio**
**5/11 = 0.45**

**Analytical Conditions**

| | |
|---|---|
| Column: | 250 x 4.6 mmI.D. |
| Eluent: | $CH_3OH$ / $H_2O$ = 80 / 20 |
| Flow Rate: | 1.0 mL/min |
| Detector: | UV 254nm |
| Col.Temp.: | 40C |
| Sample: | 1) Uracil |
| | 2) Caffeine |
| | 3) Phenol |
| | 4) Butylbenzene |
| | 5) o-Terphenyl |
| | 6) Amylbenzene |
| | 7) Triphenylene |




**Inertsil ODS-4 5um**
**Carbon Loading = 11%**




**Inertsil C8-4 5um**
**Carbon Loading = 5%**

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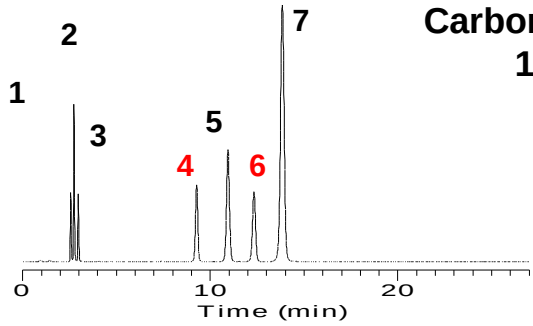
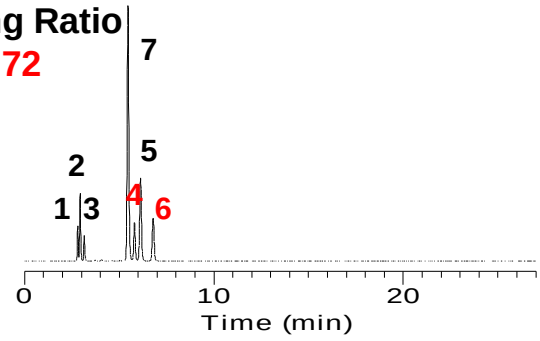
**Carbon Loading Ratio**
**13/18 = 0.72**




XBridge C18 5um
Carbon Loading = 18%




XBridge C8 5um
Carbon Loading = 13%

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