(U)HPLC Analysis:
C18AQ stationary phases
(U)HPLC, prep-LC & Flash columns

**Uptisphere® CS Evolution**
Core Shell columns for fast & highly efficient identification & quantification of small molecules.

**Uptisphere® 120Å**
HPLC & prep LC columns for the identification, quantification & purification of small molecules & pharma compounds.

**Uptisphere® Strategy™**
(U)HPLC, Analytical & prep LC columns with high loadability for identification, quantification & purification of small molecules & pharma compounds.

**Uptisphere® X-serie™**
HPLC & prep LC columns for the identification, quantification & purification of small molecules & bio-drugs at high & low pH.

**Uptisphere® 300Å**
HPLC & prep LC columns for identification, quantification & purification of Proteins, Peptides & Polypeptides.

**puriFlash® Prep**
prep LC columns for sophisticated purification of small & bio-molecules & pharma compounds.

**puriFlash®**
Flash columns for routine purification of small & bio-molecules & pharma compounds.
<table>
<thead>
<tr>
<th><strong>(U)HPLC Analysis</strong></th>
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<th><strong>Purification</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Small molecules</td>
<td>Oligonucleotides, Peptides &amp; Polypeptides</td>
<td>Small molecules</td>
</tr>
<tr>
<td>70% C18 30% Hilic, C8, C4, Ph/Hex, PFP, ...</td>
<td>50% C18 35% C8, C4 15% Hilic</td>
<td>Oligonucleotides, Peptides &amp; Polypeptides</td>
</tr>
<tr>
<td></td>
<td>25% Reverse phase 75% Normal phase</td>
<td>80% Reverse phase 20% Normal phase/Hilic</td>
</tr>
</tbody>
</table>
Using polar or hydrophilic endcapping along with bonding of longer alkyl chains such as C18 is a successful development approach for stationary phases that can retain polar analytes reproducibly under highly aqueous conditions. For solubility reasons, many polar compounds prefer a highly aqueous mobile phase and can be retained only with a minimal concentration of organic modifier, sometimes less than 5%. …

... we demonstrated and discussed the phenomenon of phase collapse and mentioned approaches to solve the problem and successfully separate polar analytes using mobile-phase systems with a very high percentage of water, even as great as 100% water. … to separate polar compounds in highly aqueous environments.

LCGC Europe dec 2002; Columns for Reversed-Phase LC Separations in Highly Aqueous Mobile Phases

Ronald E. Majors, Agilent Technologies, Wilmington, Delaware, USA, and Matthew Przybyciel, ES Industries, West Berlin, New Jersey, USA
Benefits of C18AQ stationary phases

✓ Stable under 100% H2O conditions

✓ Retentive and Selective for polar compounds which represent the main molecules to be analyzed and purified today

✓ Good peak shape with basic compounds

✓ Available from analytical scale to purification, Core-Shell particles up to preparative => Interchim, unique offer on the market!
History & Evolution of Interchim C18 AQ technologies

1997
Uptisphere C18-HDO

2003
Uptisphere Strategy C18-RP

2010
Uptisphere X-Series C18-AQ
puriflash PF C18-AQ
Uptisphere CS Evolution C18-RP

2017
Uptisphere CS Evolution C18-AQ
Interchim C18-AQ: stable under 100% H2O conditions

Interchim C18-AQ Phases
=> Perfectly usable with 100% aqueous mobile phases
Repeatability of analysis times under 100% H2O conditions

C18 Silica
⇒ The C18 bonding condenses towards the silica surface using mobile phases containing > 95% H2O
⇒ No or loss of retention & separation
Interchim C18-AQ : retention with polar compounds

**Interchim C18-AQ Phases**

=> Better retention of polar compounds

**Conventional C18 silica**

=> Less retention of polar compounds
Interchim C18-AQ: selective for polar compounds

Acidic Drugs Separation

Coelution

Uptisphere C18-HDO 5µm 250 x 4.6mm

W...... S....... C18 5µm 250 x 4.6mm

1) Barbituric Acid, 2) Atropine, 3) Codeine, 4) Pavaverine, 5) Noscapine
30/70 ACN-buffer pH: 2.3 @ 1 ml/min – 30°C, UV: 220 nm
## Interchim C18-AQ: selectivity with basic polar compounds

<table>
<thead>
<tr>
<th></th>
<th>( \alpha ) 2,6 diMPyridine/Pyridine</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS Evolution 2.6µm C18-AQ</td>
<td>1.18</td>
</tr>
<tr>
<td>CS Evolution 2.6µm C18-RP</td>
<td>1.12</td>
</tr>
<tr>
<td>AMT Halo 2.7µm C18</td>
<td>1.00</td>
</tr>
<tr>
<td>Uptisphere 3µm C18-HDO</td>
<td>1.08</td>
</tr>
<tr>
<td>Uptisphere 5µm C18-HDO</td>
<td>1.09</td>
</tr>
<tr>
<td>Uptisphere Strategy 3µm C18-RP</td>
<td>1.06</td>
</tr>
<tr>
<td>Y.. 3µm ODS-AQ</td>
<td>1.05</td>
</tr>
<tr>
<td>PuriFlash 5µm C18AQ 70A</td>
<td>1.43</td>
</tr>
</tbody>
</table>

### Test Conditions

- **Mobile Phase**: Acetonitrile/Buffer pH=5.5 - (20/80)
- **Flow Rate (mL/min)**: 1.0

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![Interchim logo](Interchim.png)
Interchim C18-AQ: good peak shape with basic compounds

Interchim C18-AQ
⇒ Low activity of surface silanols
⇒ Good peak shape for basic compounds

Core Shell Competitor
2.7µm 50x4.6mm

Uptisphere CS Evolution C18-AQ
2.6µm 50x4.6mm

1) Pyridine, 2) 2,6 Dimethylpyridine
Mobile phase 20/80 ACN-buffer pH: 5.7 @ 1 ml/min – UV: 254nm
CS Evolution 2.6µm C18-AQ
  CS Evolution 2.6µm C18-RP
  Uptisphere 2.2µm C18-HDO

CS Evolution 2.6µm C18-AQ
  CS Evolution 2.6µm C18-RP
  Uptisphere 2.2µm C18-HDO

PuriFlash 5µm C18-AQ
  Uptisphere 3 & 5µm C18-HDO
  Uptisphere Strategy 3 & 5µm C18-RP
  Uptisphere X-Series 3 & 5µm C18-AQ

PuriFlash 5-10-15µm C18-AQ
  Uptisphere Strategy 5-10-15µm C18-RP

UHPLC > 650 bars

HPLC > 400 bars

HPLC < 400 bars

Prep LC
### Availability of Interchim C18AQ stationary phases

<table>
<thead>
<tr>
<th></th>
<th>UHPLC</th>
<th>HPLC</th>
<th>Prep LC</th>
<th>Flash</th>
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<tbody>
<tr>
<td>Uptisphere C18-HDO</td>
<td>😊</td>
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<tr>
<td>Uptisphere Strategy C18-RP</td>
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<td>😊</td>
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<tr>
<td>Uptisphere X-Series C18-AQ</td>
<td>😊</td>
<td>😊</td>
<td></td>
<td>😊</td>
</tr>
<tr>
<td>puriFlash PF C18-AQ</td>
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<td></td>
<td>😊</td>
<td>😊</td>
</tr>
<tr>
<td>Uptisphere CS Evolution C18-RP</td>
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<tr>
<td>Uptisphere CS Evolution C18-AQ</td>
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</table>
Uptisphere® CS Evolution™ C18-RP
85Å - 130m²/g
2.6 μm
Bonding: C18 monofunctional
%C: 6.0
End-capping: multi step mixte
pH stability: 1.5 to 8.0

Suitable for mid & non polar compounds separation. RP shows excellent mechanical stability that provides long-life & make it an excellent tool for analysis under acidic or basic conditions.

USP code: L1

Application: mid-polar organic compounds
**Uptisphere® CS Evolution™ C18-AQ**

- **Selectivity**
- **Capacity**
- **Productivity**

**Application:**
mid-polar organic compounds
100% water compatible

**USP code:** L1

**Uptisphere® CS Evolution™ C18-AQ**

85Å - 130m²/g

2.6 µm

Bonding: C18 monofunctional
%C: 6.5%
End-capping: Mixte

pH stability: 1.5 to 7.0

**Suitable for mid & non polar compounds separation.**
**RP shows excellent mechanical stability under 100% aqueous mobile phase conditions.**
**Strategy™ C18-RP**

100Å - 425m²/g

2.2, 3, 5, 10 & 15 µm

Bonding: C18 monofunctional
%C: 16
End-capping: multi step mixte

pH stability: 1.5 to 8.0

*Suitable for mid & non polar compounds separation. RP shows excellent mechanical stability that make it an excellent tool for purification under acidic or basic conditions.*

**Application:**
*mid-polar organic compounds*

**USP code:** L1
Uptisphere® C18-HDO
120Å - 320m²/g
2.2, 3, 5µm
Bonding: C18 monofunctional
%C: 17
End-capping: Mixte
pH stability: 1.5 to 7.0

*Suitable for mid & non polar compound separation. Shows excellent stability under 100% aqueous mobile phase condition.*

**Application:**
mid-polar organic compounds
100% water compatible

**USP code:** L1
**C18-AQ**

Selectivity

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**Uptisphere® X-serie™**

Capacity

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Productivity

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**Uptisphere® X-serie ™ C18-AQ**

220Å - 200m²/g

3, 5 & 15 µm

Bonding: C18

%C: 14

End-capping: mixte

pH stability: 1.0 to 10.0

*Reversible columns*

*Application:*

Bio-molecules, Bio-Drugs

*mid-polar BioDrugs & Peptides with medium molecular weight.*

*100% water compatible*
puriflash® Prep C18-AQ
Spherical silica
60Å - 500m²/g
5, 10, 15 & 30 μm
Bonding: C18
%C: 14
End-capping: one-step hydrophilic
pH stability: 2.0 to 7.5

The bonding chemistry allow to start gradient with 100% of water.
Suitable for the purification of mid and non polar compounds.

Application:
mid-polar organic compounds
100% water compatible