



Core-Shell Technology for Proteins and Peptides

Ultra-High Resolution and Performance on HPLC and UHPLC Systems



phenomenex[®]
...breaking with traditionSM



Welcome to the Future of BioSeparations

Introducing **Aeris™**, a specialized line of reversed phase core-shell HPLC / UHPLC columns, built exclusively for the ultra-high performance separation and analysis of proteins and peptides.

These columns can provide improved **resolving power, selectivity, throughput, sensitivity, column lifetime,** and **method flexibility** compared to other fully porous and core-shell columns typically used for bioseparations.

**Choose your optimal
Aeris column**

See page 6!

Aeris WIDEPORE

p16

Large pore optimized for
protein diffusion



XB-C18

XB-C8

C4

Multiple selectivities

3.6 μm particle for
HPLC and UHPLC systems

3.6 μm

Aeris PEPTIDE

p26

Small pore optimized
for peptide diffusion



XB-C18

Ideal surface chemistry
for resolving peptides

1.7 μm

Two scalable particle sizes
for method and system flexibility

3.6 μm

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Aeris Core-Shell Technology

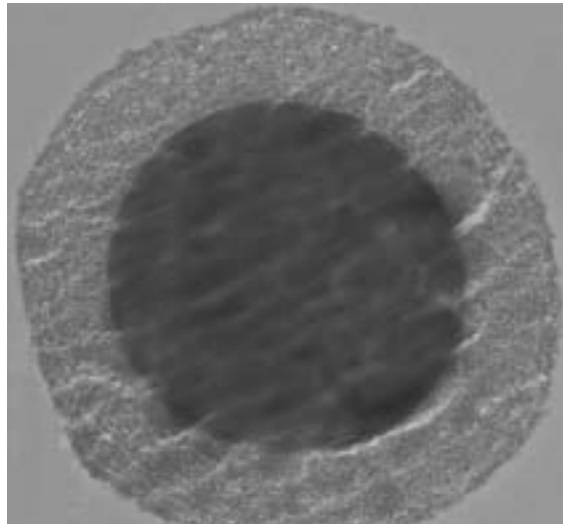
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Core-Shell Particles Precision Engineered for Protein and Peptide Separations

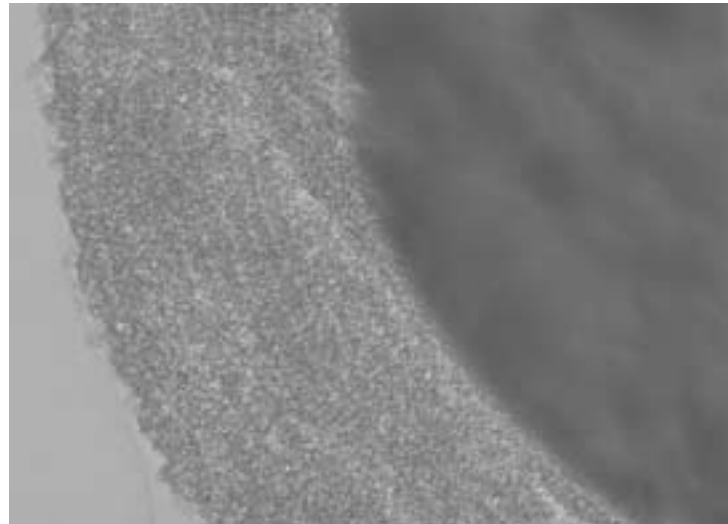
Core-shell particle technology provides **striking increases in peak capacity and resolution** at lower backpressures, giving chromatographers the ability to achieve ultra-high performance on ANY system, HPLC or UHPLC.

A uniform porous silica layer is grown around a solid, spherical silica core, providing effective retention and selectivity with improved resolution, speed, and recovery. Next, optimizing the pore size and shell thickness for intact proteins or smaller peptide fragments provides well-defined depth penetration of biomolecules leading to **maximum separation power**.

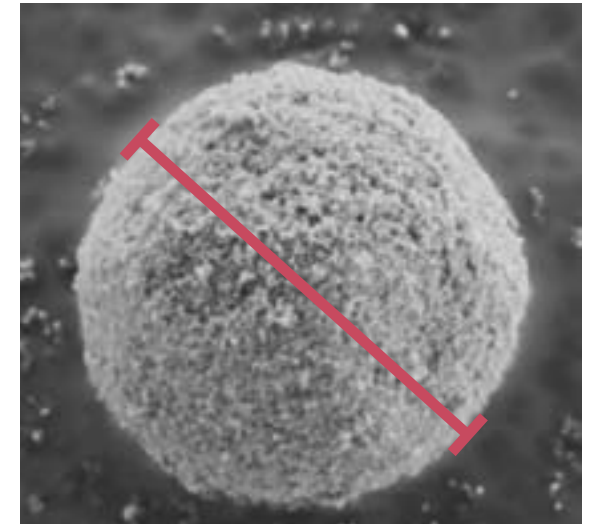
TEM and SEM of Aeris™ PEPTIDE 3.6µm Core-Shell Particles



**Cross section of an
Aeris core-shell particle**



Magnified cross section of the porous "shell"



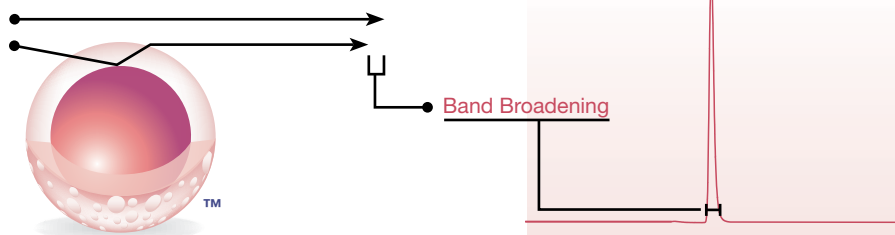
Uniform particle size and shape

The precise architecture of core-shell particles provides dramatic leaps in performance in two important ways:

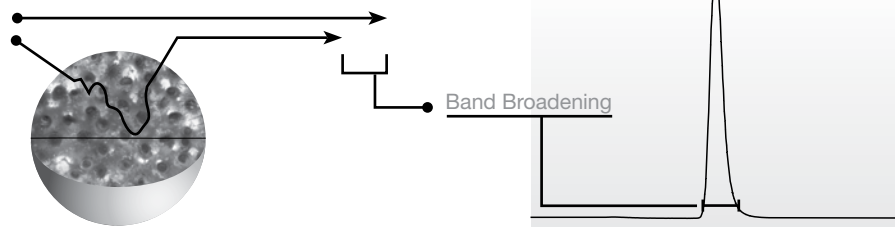
1

The thin, porous layer, or “shell”, decreases the diffusion path length, thus reducing the time it takes for biomolecules to adsorb/desorb into and out of the particle.

Aeris Core-Shell Particle



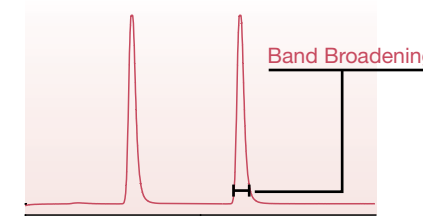
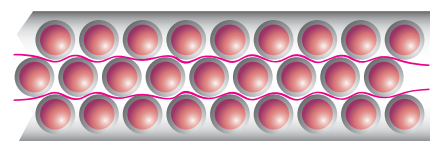
Fully Porous Particle



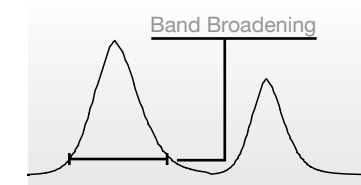
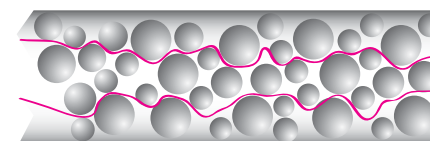
2

Uniform sizing and shape of the particles along with tight packing specifications reduces losses in efficiency and performance due to band broadening.

Aeris Core-Shell Particles



Fully Porous Particles

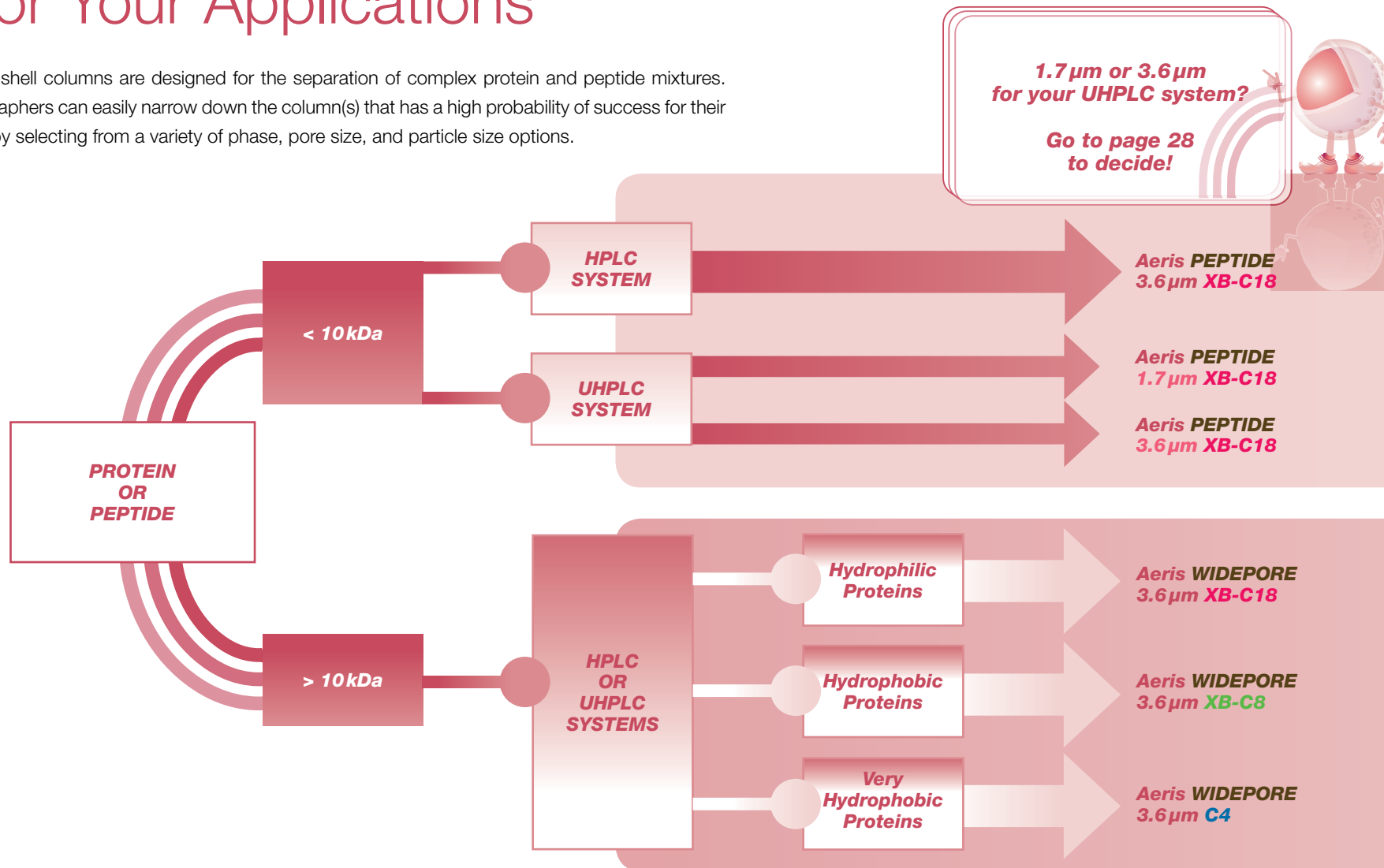


The result is

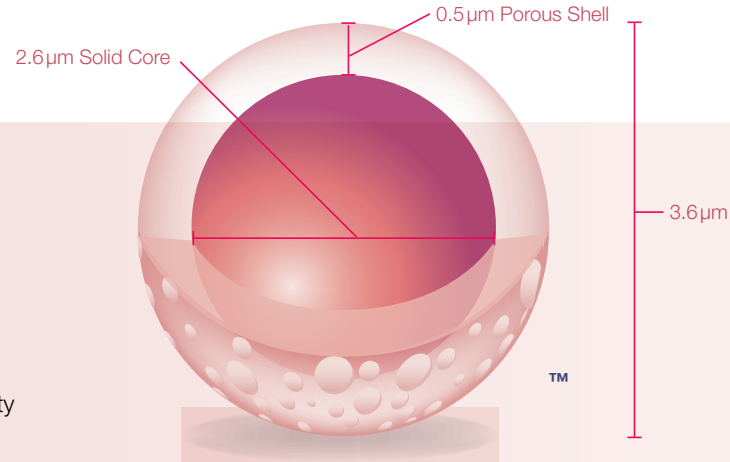
- **3.6 µm core-shell particles** that can perform like sub-2 µm columns on both HPLC and UHPLC systems at a fraction of the pressure
- **1.7 µm core-shell particles** that can provide higher peak capacities compared to fully porous sub-2 µm columns on UHPLC systems

Selecting the Optimal Aeris Column for Your Applications

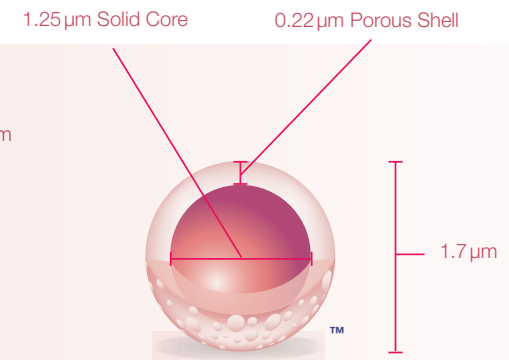
Aeris™ core-shell columns are designed for the separation of complex protein and peptide mixtures. Chromatographers can easily narrow down the column(s) that has a high probability of success for their separation by selecting from a variety of phase, pore size, and particle size options.



3.6µm Core-Shell Particle



1.7µm Core-Shell Particle

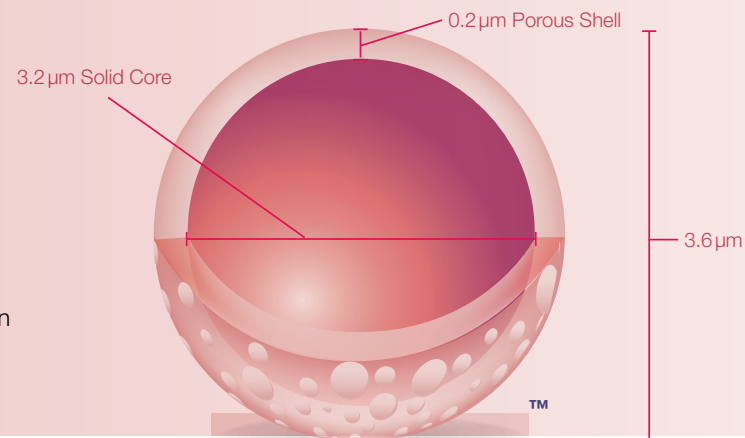


Aeris PEPTIDE

Recommended for the separation of low molecular weight peptides and for peptide mapping.

- XB-C18 chemistry best suited for resolving peptides
- 1.7µm and 3.6µm particles for method development flexibility
- Small pore optimized for peptide diffusion

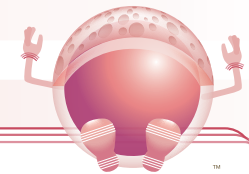
3.6µm Core-Shell Particle



Aeris WIDEPORÉ

Recommended for the separation of intact proteins and polypeptides.

- XB-C18, XB-C8, and C4 phases for alternate selectivities
- 3.6µm particle for system flexibility
- Large pore optimized for fast protein adsorption/desorption



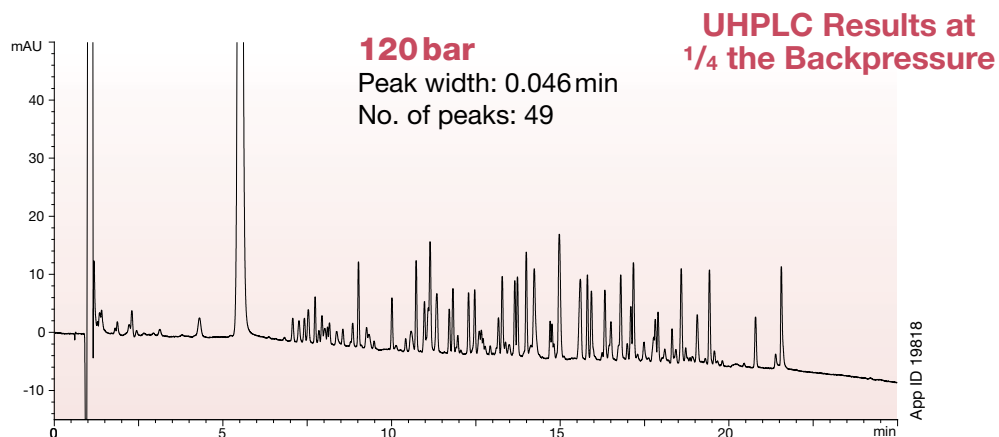
**Aeris WIDEPORÉ
XB-C18 and
Aeris PEPTIDE XB-C18
make a perfect pair
for peptide mapping.
See p. 32 for more details.**

Improve Resolution on ANY System by Leveraging Low Backpressure

Aeris™ PEPTIDE and Aeris WIDEPORE 3.6µm columns can **perform like sub-2µm columns at a fraction of the backpressure**. This allows chromatographers to utilize the resolving power of longer length (or coupled) columns without exceeding the pressure limits of their HPLC system. Scientists analyzing proteins and peptides can now have ultra-high resolution on HPLC or UHPLC systems.

Sub-2µm Performance at a Fraction of the Backpressure

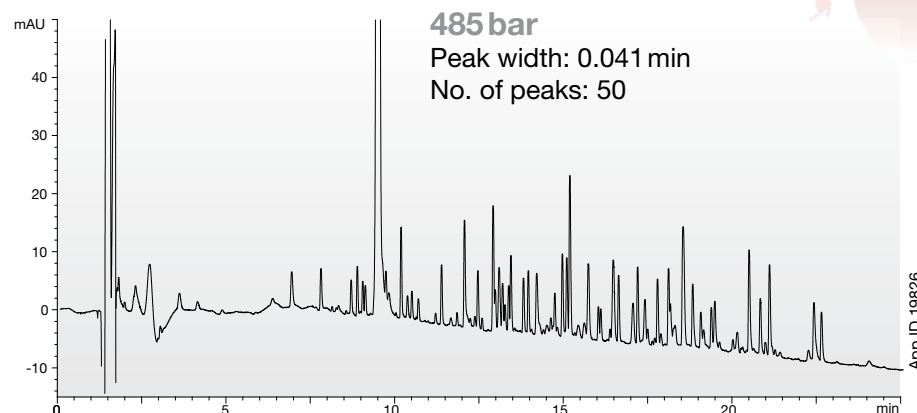
Aeris WIDEPORE 3.6µm XB-C18



Conditions for both columns:

Column: Aeris WIDEPORE 3.6µm XB-C18
ACQUITY® BEH™ 300 1.7µm C18
Dimensions: 150 x 2.1 mm
Mobile Phase: A: Water with 0.1% TFA
B: Acetonitrile with 0.1% TFA
Gradient: A/B (65:35) for 3 min to A/B (35:65) over 30 min

*Waters® ACQUITY® BEH™ 300 1.7µm C18

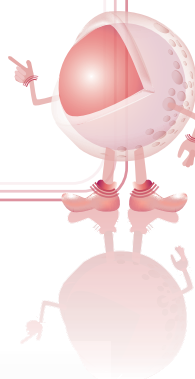


Flow Rate: 0.3 mL/min
Temperature: 40 °C
Injection Volume: 20 µL
Instrument: Agilent® 1200
Detection: UV @ 214 nm (ambient)
Sample: BSA (Bovine Serum Albumin) Tryptic Digest

Using a UHPLC system?

Try Aeris PEPTIDE 1.7µm columns for ultra-high efficiency peptide maps and stability up to 1,000 bar.

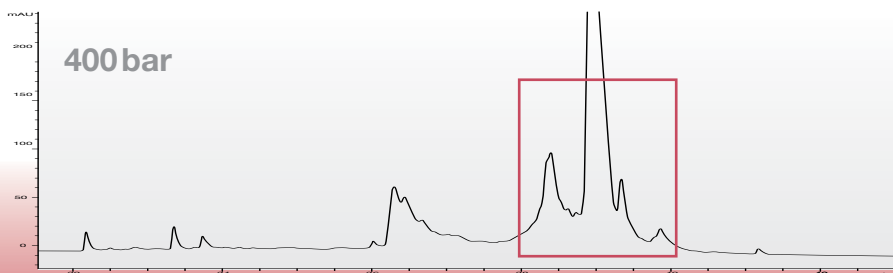
See page 11!



* ACQUITY and Waters are registered trademarks, and BEH Technology is a trademark of Waters Corporation. Phenomenex is not affiliated with Waters Corporation. Study was performed using new columns and, to the extent possible, identical experimental conditions were applied. Comparative separations may not be representative of all applications.

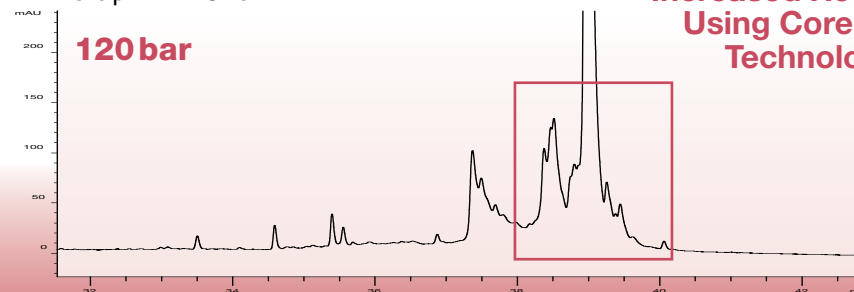
Utilize Long Columns to Maximize Resolution on UHPLC Systems

***Waters® ACQUITY® BEH™ 300
1.7µm C18**



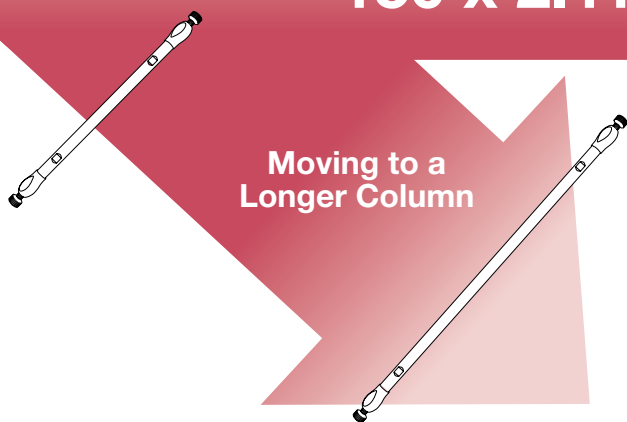
150 x 2.1 mm

**Aeris WIDEPORE
3.6µm XB-C18**



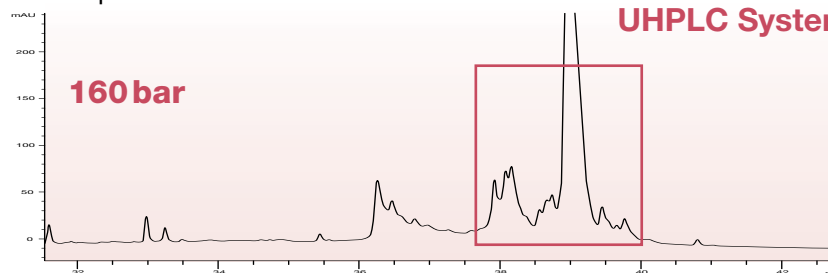
150 x 2.1 mm

**Increased Resolution
Using Core-Shell
Technology**



250 x 2.1 mm

**Aeris WIDEPORE
3.6µm XB-C18**



**Even Greater
Resolution on Your
UHPLC System**

Conditions for all columns:
Column: Aeris WIDEPORE 3.6µm XB-C18
 ACQUITY® BEH™ 300 1.7µm C18
Dimensions: as noted in chromatogram
Mobile Phase: A: Water with 0.1 % TFA
 B: Acetonitrile
Gradient: A/B (90:10) for 5 min to A/B (50:50) over 45 min
Flow Rate: 0.2 mL/min
Temperature: 22°C
Injection Volume: 20 µL
Instrument: Agilent® 1200SL
Detection: UV @ 210 nm
Sample: Degraded Myoglobin

* Waters and ACQUITY are registered trademarks, and BEH Technology is a trademark of Waters Corporation. Phenomenex is not affiliated with Waters Corporation. Study was performed using new columns and, to the extent possible, identical experimental conditions were applied. Comparative separations may not be representative of all applications.

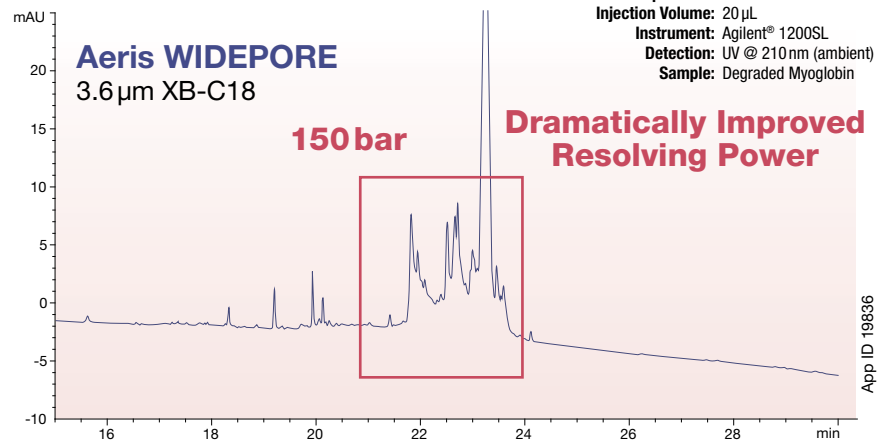
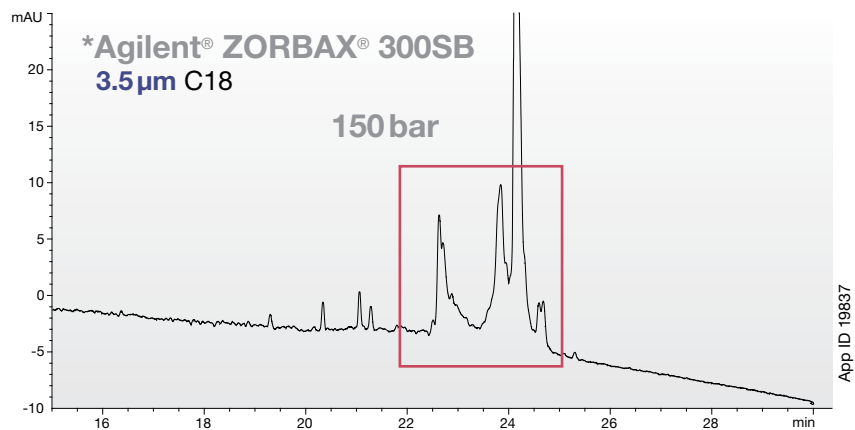
Achieve UHPLC Performance on HPLC Systems by Replacing 3 μm and 5 μm Columns

The innovative structure of 3.6 μm Aeris™ core-shell particles was specially designed to provide sub-2 μm performance at backpressures similar to fully porous 3 μm and 5 μm particles. Aeris columns can deliver increased resolution for existing protein and peptide separations performed on fully porous 3 μm and 5 μm columns, using the same HPLC system!

Upgrade Existing Methods on 3 μm and 5 μm Fully Porous Columns to Aeris Core-Shell Technology

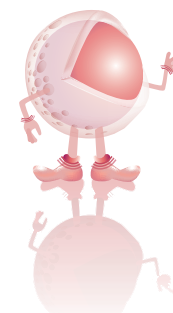
Now you can have **UHPLC performance on your HPLC system** and experience better performance and method flexibility than ever before.

Conditions for both columns:
Column: Aeris WIDEPORÉ 3.6 μm XB-C18
 ZORBAX® 300SB 3.5 μm C18
Dimensions: 150 x 4.6 mm
Mobile Phase: A: Water with 0.1% TFA
 B: Acetonitrile with 0.1% TFA
Gradient: A/B (97:3) for 3 min to A/B (35:65) over 30 min
Flow Rate: 1.5 mL/min
Temperature: 40 °C
Injection Volume: 20 μL
Instrument: Agilent® 1200SL
Detection: UV @ 210 nm (ambient)
Sample: Degraded Myoglobin



* Agilent and ZORBAX are registered trademarks of Agilent Technologies, Inc. Phenomenex is not affiliated with Agilent Technologies, Inc. Study was performed using new columns and, to the extent possible, identical experimental conditions were applied. Comparative separations may not be representative of all applications.

Improving your current method is fast and easy with an Aeris core-shell column.



Increase Efficiency on UHPLC Systems with Sub-2 μm Core-Shell Particles

For labs that have adopted higher pressure capable UHPLC instruments, Aeris PEPTIDE 1.7 μm core-shell columns are an excellent solution for ultra-high resolution peptide and peptide mapping separations. Core-shell particle technology combined with a sub-2 μm particle size results in extremely high efficiencies that scientists can use to pull apart critical peaks.

Ultra-High Resolution Achieved with 1.7 μm Core-Shell Technology

Conditions for both columns:

Column: Aeris PEPTIDE 3.6 μm XB-C18
Aeris PEPTIDE 1.7 μm XB-C18

Dimensions: 150 x 2.1 mm

Part Nos.: 00F-4057-AN
00F-4056-AN

Mobile Phase: A: Water with 0.1 % TFA
B: Acetonitrile with 0.08 % TFA

Gradient: A/B (97:3) for 1.5 min to A/B (60:40) over 11 min to
A/B (5/95) for 1 min

Flow Rate: 0.5 mL/min

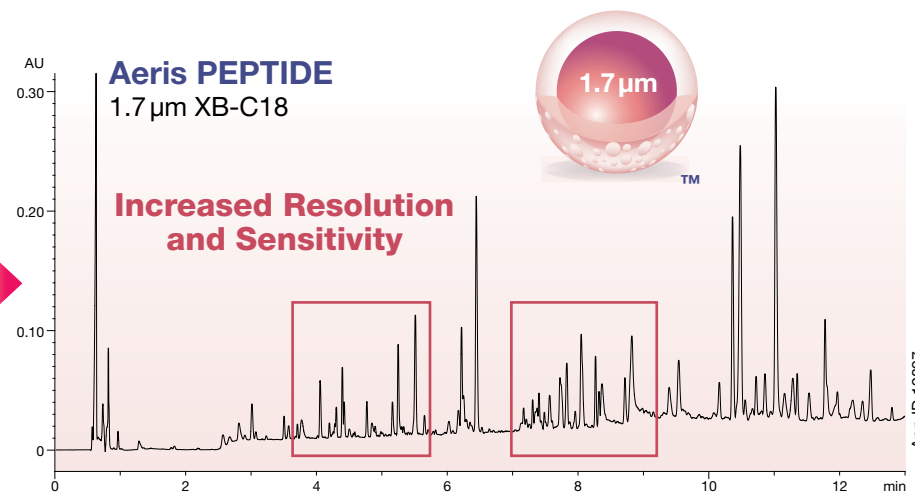
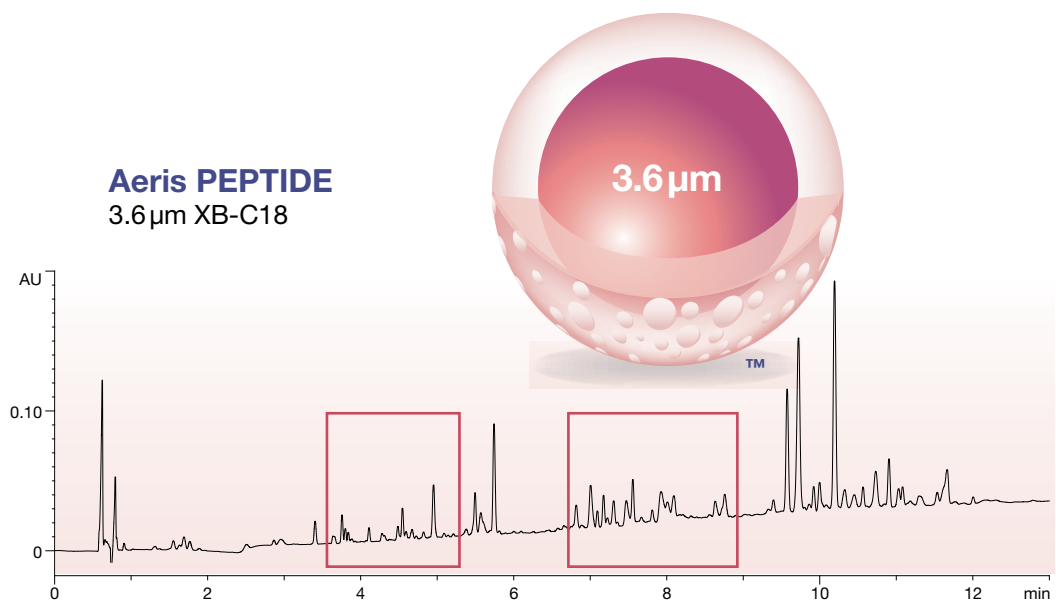
Temperature: 40 °C

Injection Volume: 5 μL

Instrument: Agilent® 1200SL

Detection: UV @ 214 nm (ambient)

Sample: Alpha-Casein Tryptic Digest

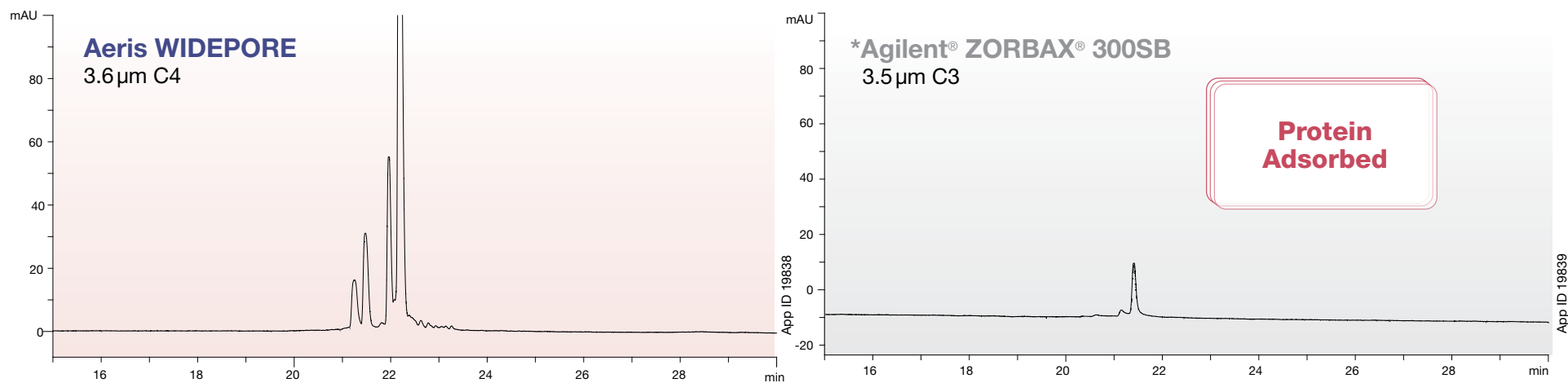


Study was performed using new columns and, to the extent possible, identical experimental conditions were applied. Comparative separations may not be representative of all applications.

Minimize Adsorption and Maximize Recoveries for Accurate Results

Aeris™ phase chemistries and bonding technology create a highly inert surface, leading to greatly reduced irreversible adsorption, higher recoveries, and sharper, narrower peaks, providing high quality and accurate results for each consecutive analysis.

Maximize Recoveries of Hydrophobic Proteins



Conditions for both columns:

Column: Aeris WIDEPORE 3.6 μm C4
ZORBAX® 300SB 3.5 μm C3

Dimensions: 150 x 2.1 mm

Mobile Phase: A: Water with 0.1 % TFA
B: Acetonitrile with 0.1 % TFA

Gradient: A/B (97:3) to A/B (35:65) over 45 min

Flow Rate: 0.3 mL/min

Temperature: 40 °C

Injection Volume: 20 μL

Instrument: Agilent® 1200

Detection: UV @ 214 nm (ambient)

Sample: Human Epidermal Growth Factor

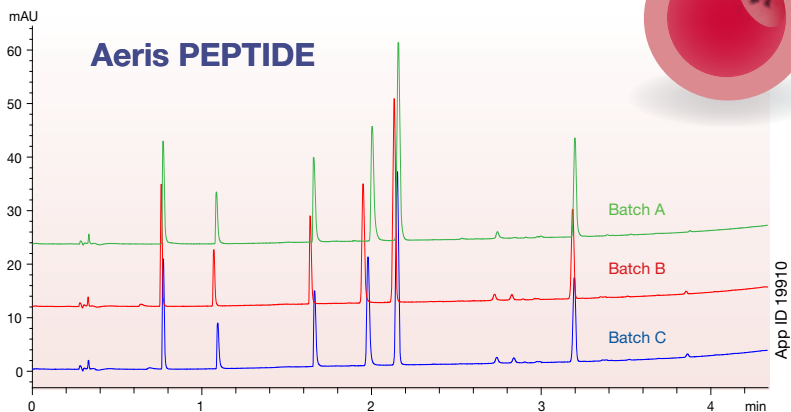
* Agilent and ZORBAX are registered trademarks of Agilent Technologies, Inc. Phenomenex is not affiliated with Agilent Technologies, Inc. Study was performed using new columns and, to the extent possible, identical experimental conditions were applied. Comparative separations may not be representative of all applications.

Tightly Controlled Quality for Reproducible Data



Every Aeris column and batch of media undergoes quality assurance tests for particle size distribution (both solid core and final particle), surface coverage, carbon load, pore diameter, pore size distribution, and other parameters to ensure **exceptional reproducibility for worry-free methods and confident results.**

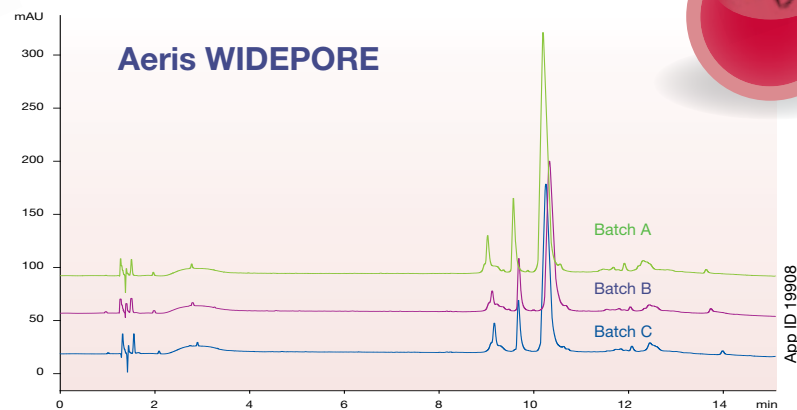
Batch-to-Batch Reproducibility



App ID 19910

Column: Aeris PEPTIDE 1.7 μ m XB-C18
Dimensions: 50 x 4.6 mm
Part No.: 00B-4506-E0
Mobile Phase: A: Water with 0.1% Formic Acid
 B: Acetonitrile with 0.1% Formic Acid
Gradient: A/B (95:5) to A/B (5:95) over 4 min
Flow Rate: 1.85 mL/min
Temperature: 30 °C
Injection Volume: 0.4 μ L
Detection: UV @ 254 nm (ambient)
Sample: Selectivity Test Mixture

Batch-to-Batch Reproducibility



App ID 19908


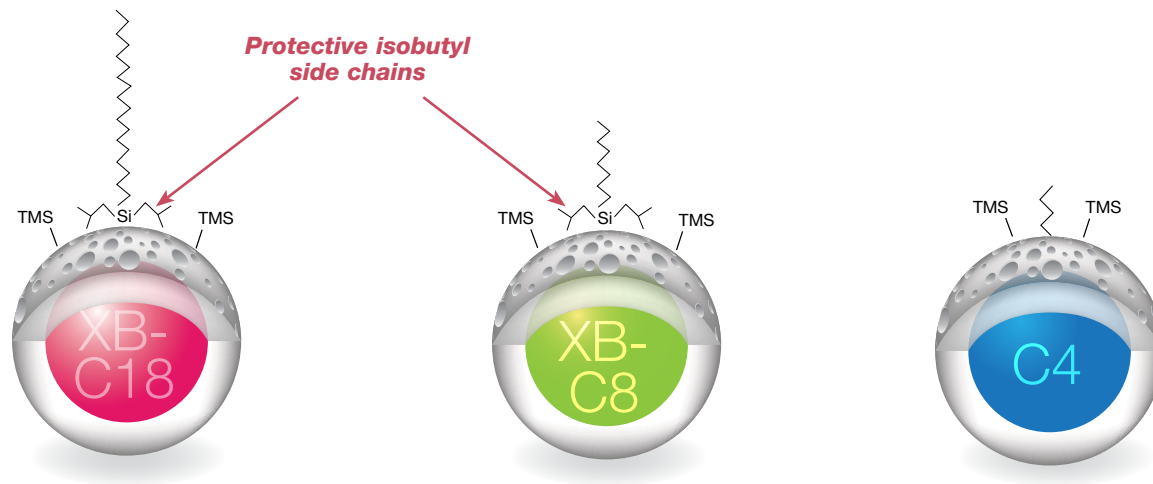
Column: Aeris WIDEPORÉ 3.6 μ m XB-C18
Dimensions: 150 x 4.6 mm
Part No.: 00F-4482-E0
Mobile Phase: A: Water with 0.1% Formic Acid
 B: Acetonitrile with 0.085% Formic Acid
Gradient: A/B (95:5) to A/B (5:95) over 20 min
Flow Rate: 1.0 mL/min
Temperature: 40 °C
Injection Volume: 0.2 μ L
Detection: UV @ 210 nm (ambient)
Sample: Mouse IgG

Greater Method Flexibility with Specialty Surface Chemistries

Aeris™ WIDEPORE columns are available in three surface chemistries (XB-C18, XB-C8, C4) to satisfy applications of all types, ranging from sticky, intact proteins to complex protein digests.

Aeris PEPTIDE columns utilize the XB-C18 chemistry, as it is optimal for peptides and peptide mapping applications.

The unique, sterically protected XB surface ligands are designed by bonding bulky isobutyl chains aside the alkyl chains, and then fully end-capping the surface to cover any remaining exposed silanols.

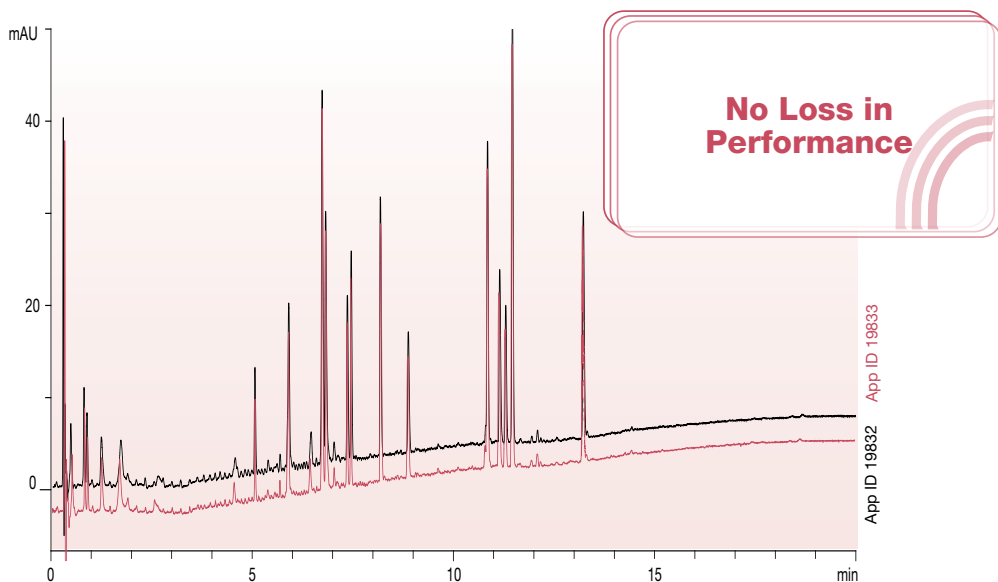


The Aeris WIDEPORE C4 phase does not use the XB chemistry, as shorter chain alkyl phases have higher bonding densities, thus providing steric hindrance. This means that chemical stability, inertness, and low bleed are maintained. The Aeris WIDEPORE C4 phase is an excellent complement to the other phases.

Long Column Lifetimes Under Extreme Method Conditions

Aeris columns provide temperature stability up to 90 °C, and pH stability from 1.5 - 9, giving ample flexibility for method development and excellent column lifetime.

Over 1,000 Injections at 90 °C



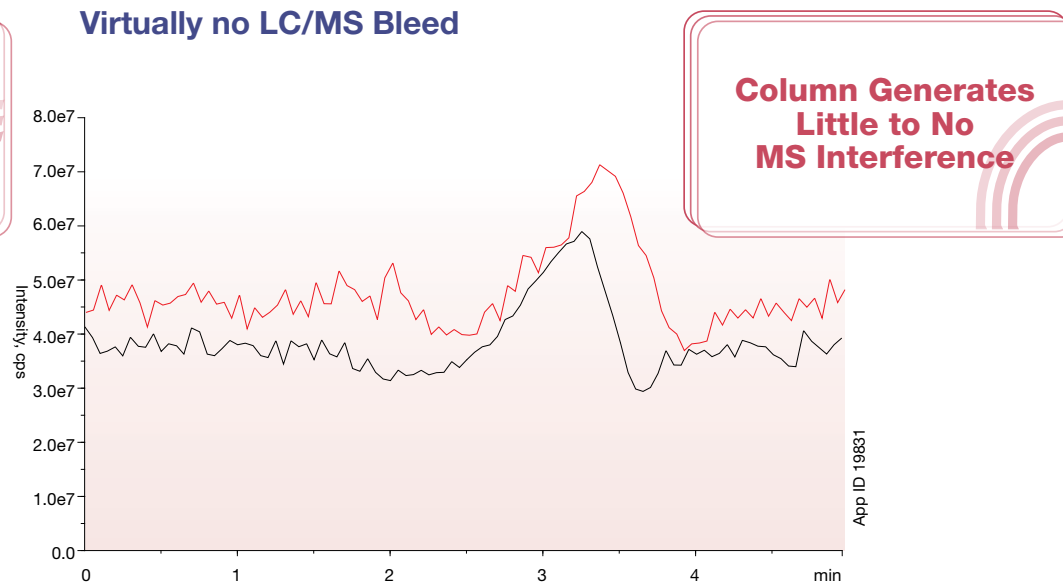
Column: Aeris WIDEPORE 3.6 µm XB-C18
Dimensions: 50 x 4.6 mm
Part No.: 00B-4282-E0
Mobile Phase: A: Water with 0.1 % TFA
 B: Acetonitrile with 0.1 % TFA
Gradient: A/B (97:3) for 3 min, then to A/B (35:65) over 20 min

Flow Rate: 1.5 mL/min
Temperature: 90 °C
Injection Volume: 10 µL
Detection: UV @ 214 nm (ambient)
Sample: Apomyoglobin Digest

Low Column Bleed for Amplified Mass Spec (MS) Sensitivity

Aeris columns show no significant phase bleed under LC/MS conditions, making them very suitable for protein and peptide analysis. Chemists can be assured accurate, dependable, and consistent results, time and time again.

Virtually no LC/MS Bleed



Column: Aeris WIDEPORE 3.6 µm XB-C18
Dimensions: 50 x 2.1 mm
Part No.: 00B-4282-AN
Mobile Phase: A: Water with 0.1 % Formic Acid
 B: Acetonitrile with 0.1 % Formic Acid
Gradient: A/B (95:5) for 2.5 min, to A/B (5:95) hold for 0.5 min, then re-equilibrate

Flow Rate: 0.5 mL/min
Temperature: 25 °C
Detection: MS (API 4000™)
 Positive Ion Mode
 Q1 scan from 75 to 800 amu
Sample: Blank

Study was performed using new columns and, to the extent possible, identical experimental conditions were applied. Comparative separations may not be representative of all applications.

Aeris™ WIDEPORE Columns

for Intact Protein and Polypeptide Separations

Aeris WIDEPORE columns are packed with 3.6 μm core-shell particles that are specially engineered with a thin porous shell, large pores, and sterically protected XB surface chemistry to address the inherent separation challenges of proteins and peptides. This unique mix of features results in low backpressures, fast rates of diffusion, and excellent selectivity, generating exceptional chromatographic resolution on both HPLC and UHPLC systems.

Recommended for...

- Protein structural characterization
- Stability indicating assays
- Post-translational modification identification
- PEGylated proteins, antibodies, biogenics, etc.
- Impurity profiling
- Peptide mapping

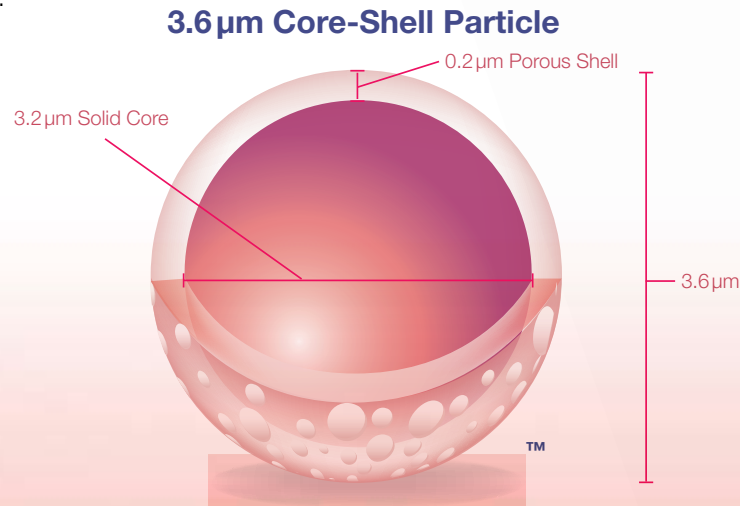
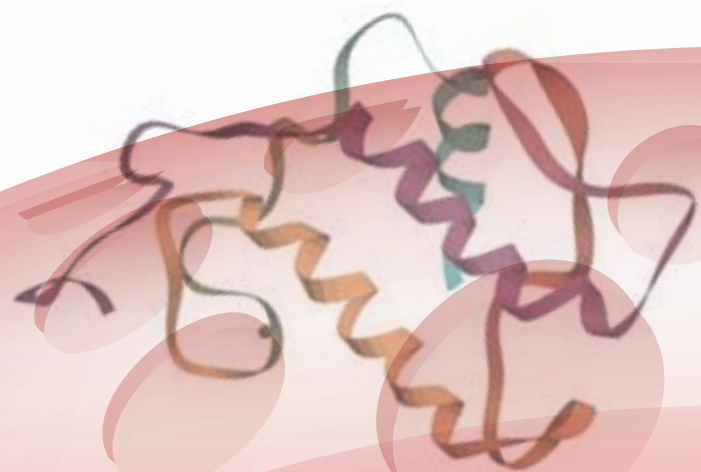


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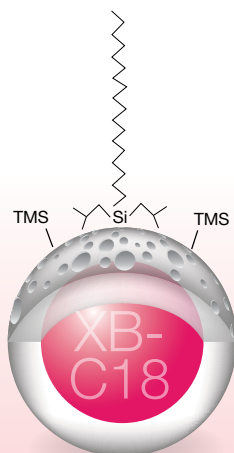
p. 20 Maximize HPLC and UHPLC Resolving Power

p. 22 Applications



Easy Method Development with Three Selectivities

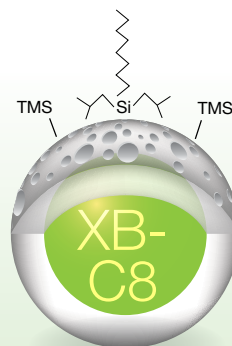
Aeris™ WIDEPORÉ 3.6µm Core-Shell Stationary Phases:



XB-C18

**Maximum hydrophobicity
recommended for:**

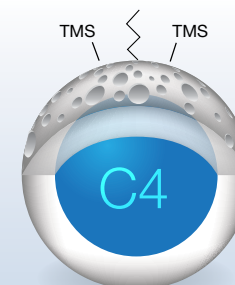
- Proteins
- Hydrophilic proteins
- PEGylated proteins
- High temperature separations
- Alternative selectivity for peptide mapping



XB-C8

**Moderate hydrophobicity
recommended for:**

- Large proteins
- Moderately hydrophobic proteins
- Monoclonal antibodies
- Glycosylated proteins
- High temperature separations



C4

**Low hydrophobicity
recommended for:**

- Very large proteins
- Very hydrophobic proteins
- Membrane proteins
- Least retentive

Want more information on
the novel XB chemistry?

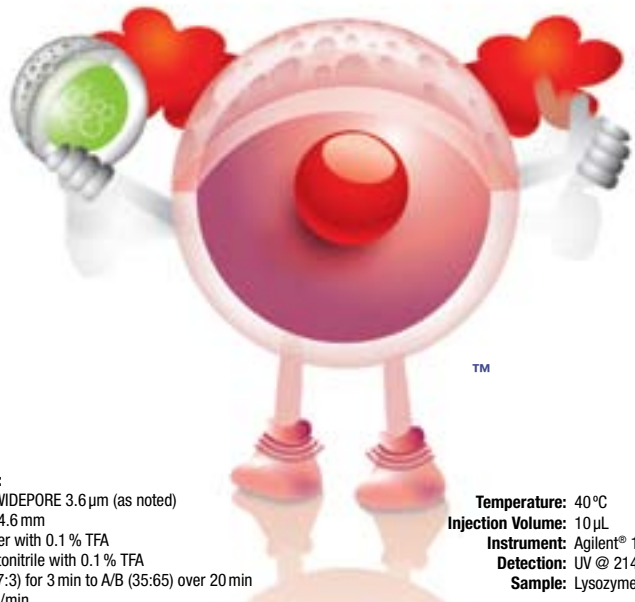
See page 14!



Easy Method Development with Three Selectivities



Because optimal separation conditions are different for each sample, we suggest evaluating all three surface chemistries to uncover the most suitable one for your separation. Once a phase is selected, the method can be further optimized with tweaks to the mobile phase, flow rate, gradient, or column dimension (length, internal diameter).

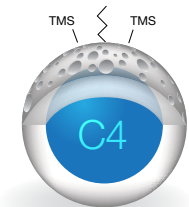
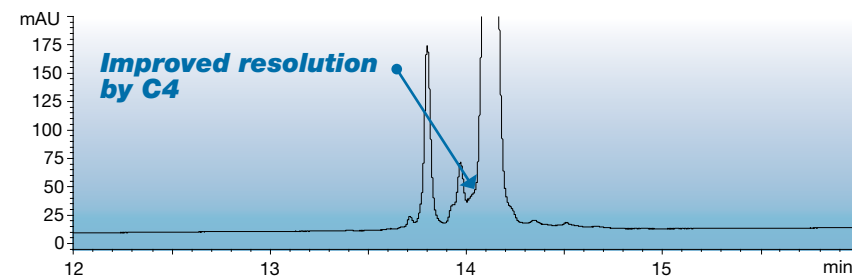
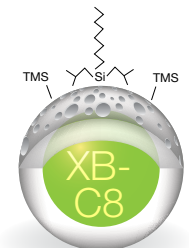
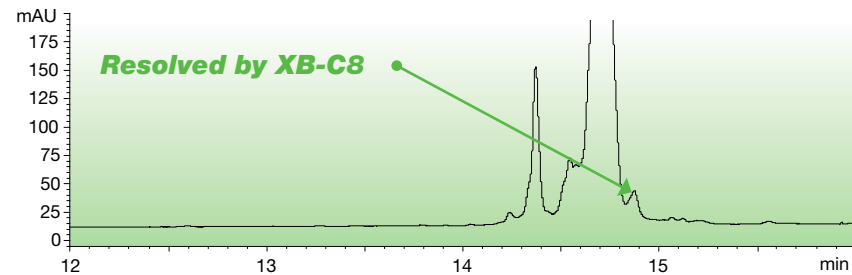
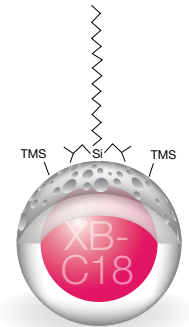
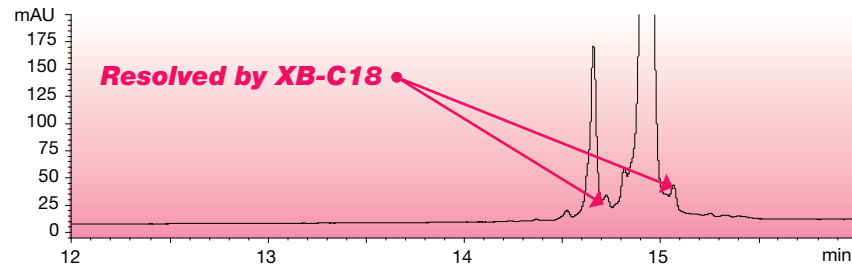


Conditions for all columns:

Column: Aeris WIDEPORE 3.6 μm (as noted)
Dimensions: 100 x 4.6 mm
Mobile Phase: A: Water with 0.1 % TFA
 B: Acetonitrile with 0.1 % TFA
Gradient: A/B (97:3) for 3 min to A/B (35:65) over 20 min
Flow Rate: 1.5 mL/min

Temperature: 40 °C
Injection Volume: 10 μL
Instrument: Agilent® 1200
Detection: UV @ 214 nm (ambient)
Sample: Lysozyme (1 mg/mL)

Aeris Phase Selectivity Differences



Study was performed using new columns and, to the extent possible, identical experimental conditions were applied. Comparative separations may not be representative of all applications.

Maximize HPLC and UHPLC Resolving Power with Unique 3.6 μm Core-Shell Particle

3.6 μm core-shell technology combined with inert surface chemistries and tight packing specifications results in Aeris™ WIDEPORÉ columns **delivering exceptional resolving power at significantly lower backpressures**. Chromatographers now have the ability to generate higher quality data than typically produced by columns packed with fully porous particles for every protein analysis – on HPLC or UHPLC systems.

Conditions for both columns:

Column: ACQUITY® BEH™ 300 1.7 μm C18
Aeris WIDEPORÉ 3.6 μm XB-C18

Dimensions: 150 x 2.1 mm

Mobile Phase: A: Water with 0.1% TFA
B: Acetonitrile with 0.1% TFA

Gradient: A/B (97:3) to A/B (35:65) over 45 min

Flow Rate: 0.3 mL/min

Temperature: 40 °C

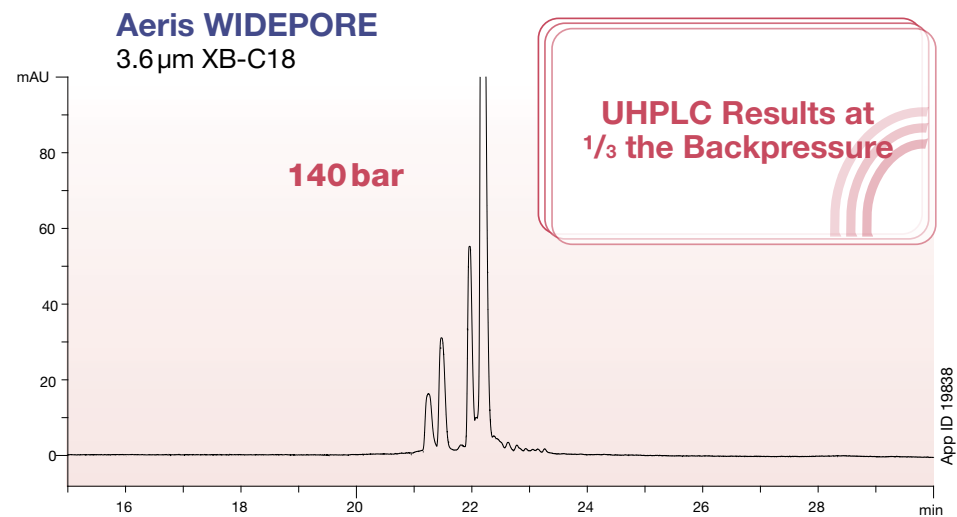
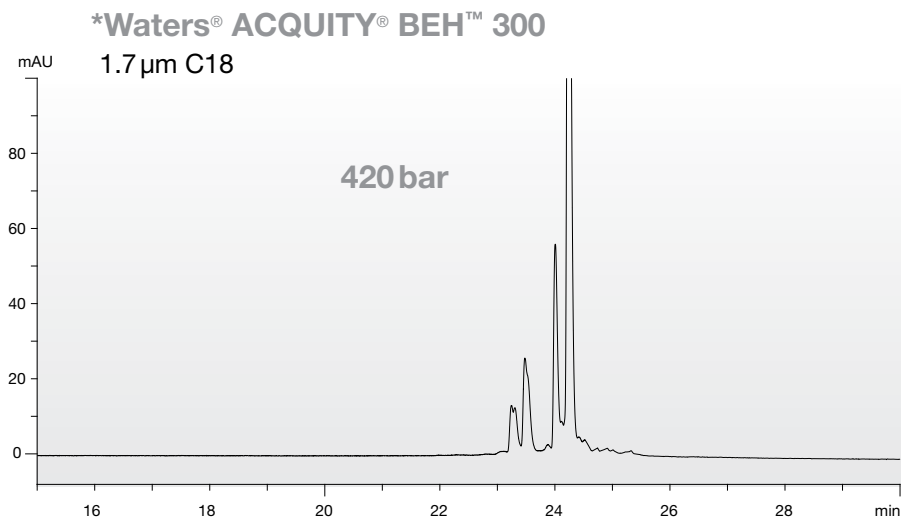
Injection Volume: 10 μL

Instrument: Agilent® 1200

Detection: UV @ 214 nm (ambient)

Sample: Human Epidermal Growth Factor (EGF)

Performance Equivalent to sub-2 μm Particle at Low Backpressure



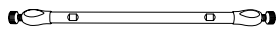
* Waters and ACQUITY are registered trademarks, and BEH Technology is a trademark of Waters Corporation. Phenomenex is not affiliated with Waters Corporation. Study was performed using new columns and, to the extent possible, identical experimental conditions were applied. Comparative separations may not be representative of all applications.

AERIS WIDEPORE

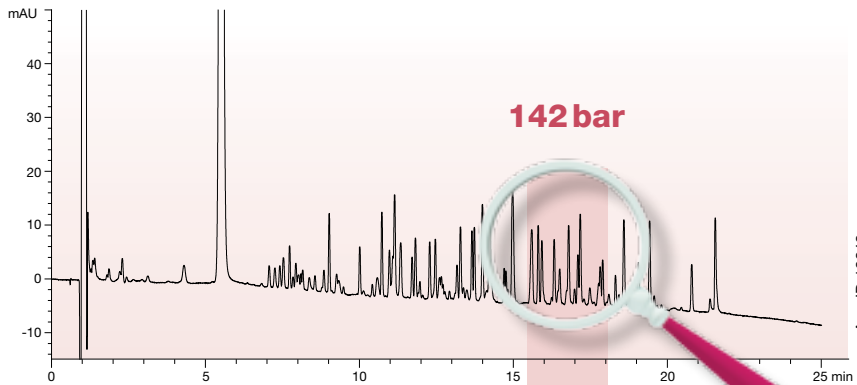


Increase Column Length to Improve Resolving Power

150 x 2.1 mm



Aeris WIDEPORE
3.6 μm XB-C18

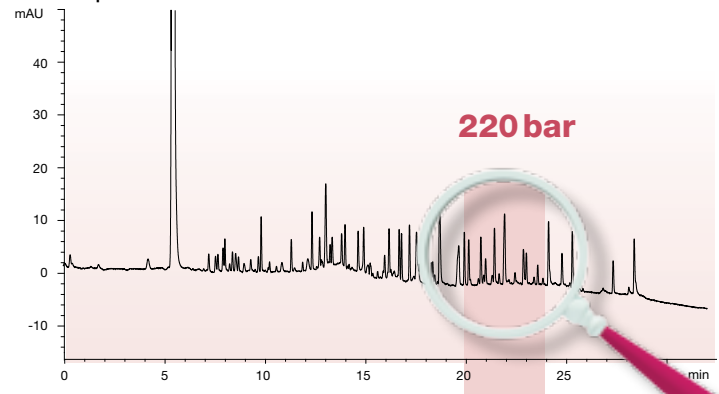


150 mm Length
Zoom-In

250 x 2.1 mm



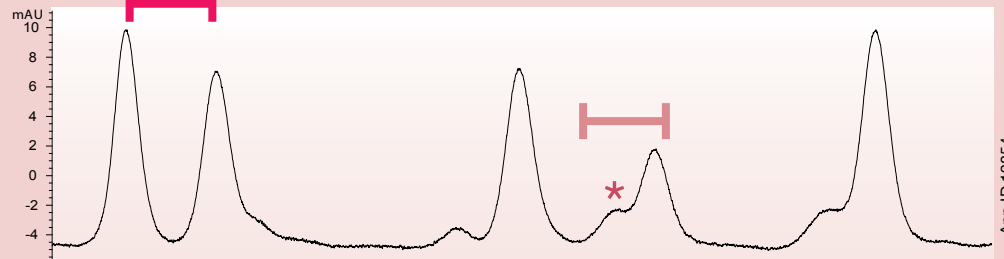
Aeris WIDEPORE
3.6 μm XB-C18



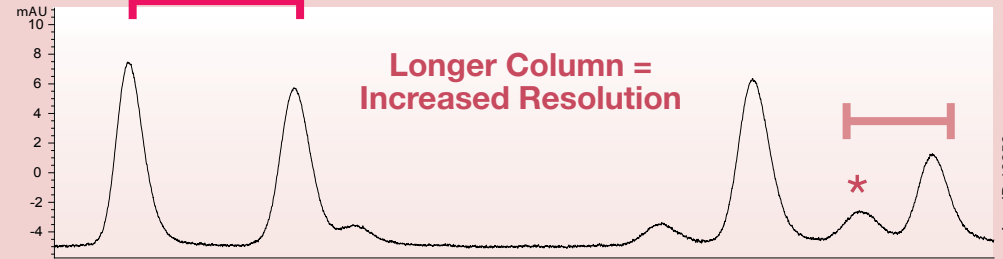
250 mm Length
Zoom-In

Conditions for both columns:

- Column:** Aeris WIDEPORE 3.6 μm XB-C18
- Dimensions:** as noted
- Mobile Phase:** A: Water with 0.1 % TFA
B: Acetonitrile with 0.1 % TFA
- Gradient:** A/B (97:3) for 3 min to A/B (35:65) over 30 min
- Flow Rate:** 0.3 mL/min
- Temperature:** 40 °C
- Injection Volume:** 25 μL
- Instrument:** Agilent® 1200
- Detection:** UV @ 214 nm (ambient)
- Sample:** BSA (Bovine Serum Albumin) Digest



App ID 19854



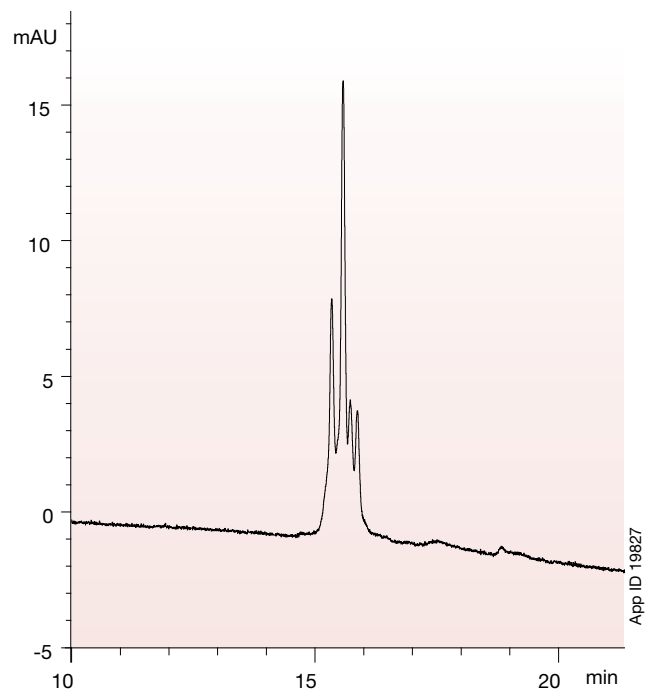
App ID 19856

**Longer Column =
Increased Resolution**

Applications

Intact Protein Characterization

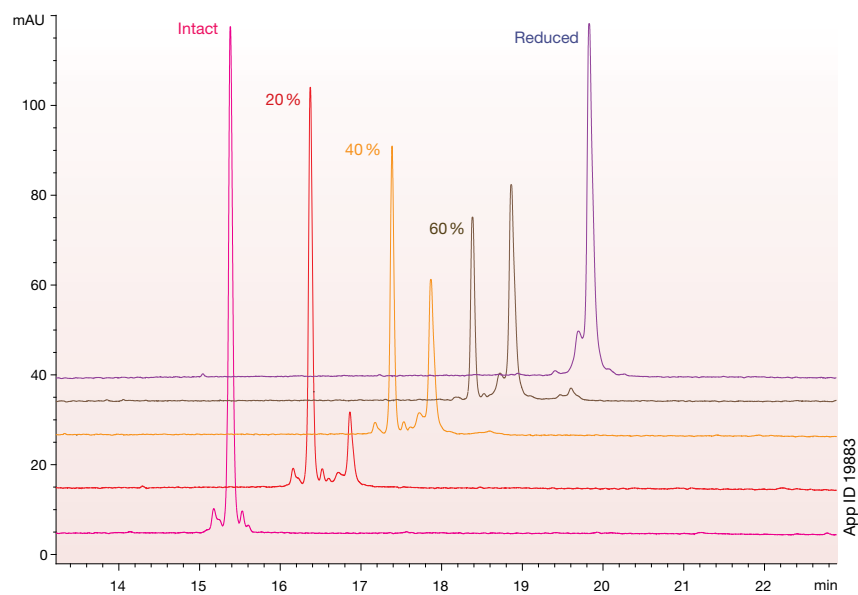
Biogeneric Characterization



Column: Aeris™ WIDEPORE 3.6 μm XB-C8
Dimensions: 150 x 4.6 mm
Part No.: 00F-4481-E0
Mobile Phase: A: Water with 0.1 % TFA
B: Acetonitrile with 0.1 % TFA
Gradient: A/B (70:30) to A/B (35:65) over 30 min

Flow Rate: 1.0 mL/min
Temperature: 22 °C
Injection Volume: 5 μL
Instrument: Agilent® 1200
Detection: UV @ 214 nm (ambient)
Sample: Interferon alpha-2a

Protein Reduction



Column: Aeris WIDEPORE 3.6 μm C4
Dimensions: 150 x 4.6 mm
Part No.: 00F-4505-E0
Mobile Phase: A: Water with 0.1 % TFA
B: Acetonitrile with 0.1 % TFA
Gradient: A/B (97:3) for 3 min to A/B (35:65) over 30 min
Flow Rate: 1.2 mL/min
Temperature: 22 °C
Injection Volume: 20 μL
Instrument: Agilent 1200
Detection: UV @ 214 nm (ambient)
Sample: RNAse subject to reduction
100 % intact
20 % reduced
40 % reduced
60 % reduced
100 % reduced

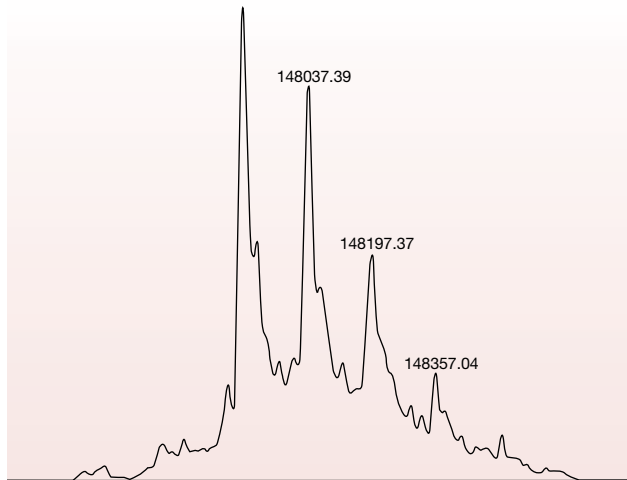
Aeris WIDEPORE 3.6 μm C4 successfully monitors peak shifts due to different reduction states.



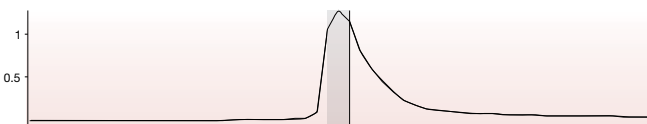
Applications

Intact Monoclonal Antibody (mAb) Separation

Human mAb



App ID 19846



App ID 19846

Column: Aeris WIDEPORE 3.6 μm XB-C18

Dimensions: 50 x 2.1 mm

Part No.: 00B-4482-AN

Mobile Phase: A: Water with 0.1 % Formic Acid

B: Acetonitrile with 0.1 % Formic Acid

Gradient: A/B (90:10) to A/B (10:90) over 6 min

Step No.	Time(min)	% A	% B
1	0	90	10
2	0.7	66	34
3	5	55	45
4	6	10	90

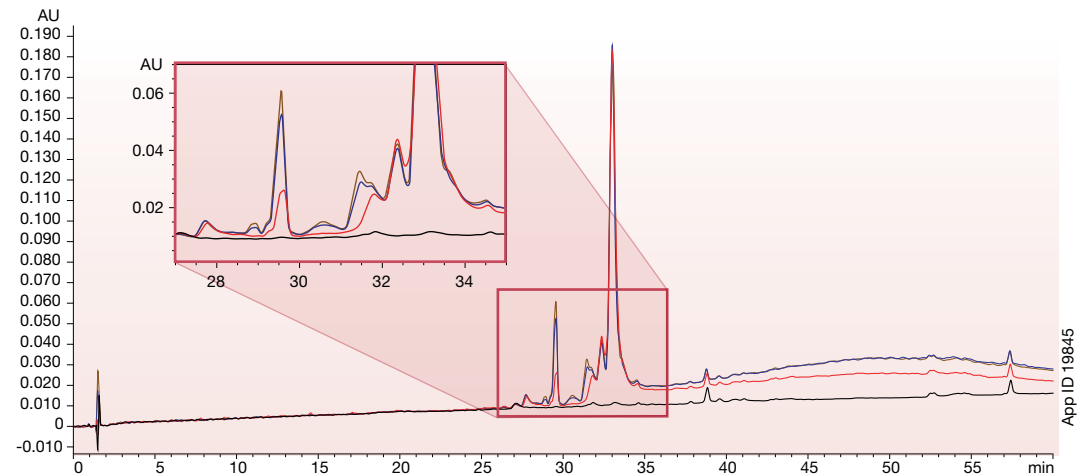
Flow Rate: 0.5 mL/min

Temperature: 22 °C

Detection: UV @ 214 (ambient)

Sample: Monoclonal antibody

Clipped Variants



App ID 19845

Column: Aeris WIDEPORE 3.6 μm XB-C18

Dimensions: 250 x 4.6 mm

Part No.: 00G-4482-E0

Mobile Phase: A: Water with 0.1 % TFA

B: Acetonitrile/IPA (50:50) with 0.1 % TFA

Gradient: A/B (90:10) to A/B (35:65) over 60 min

Flow Rate: 1.0 mL/min

Temperature: 22 °C

Injection Volume: 25 μL

Instrument: Agilent® 1200

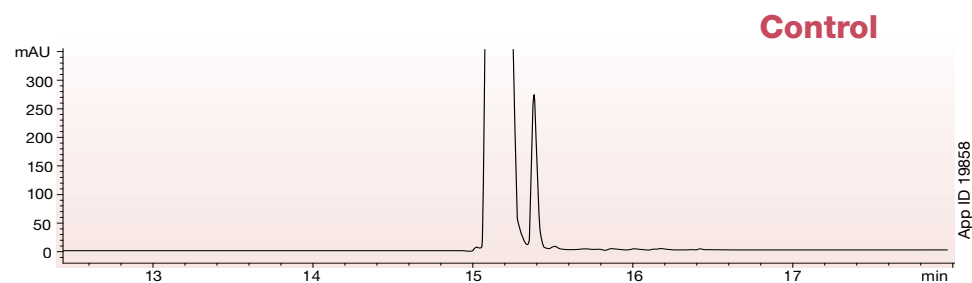
Detection: UV @ 214 nm (ambient)

Sample: Proprietary customer monoclonal antibody with clipped variants

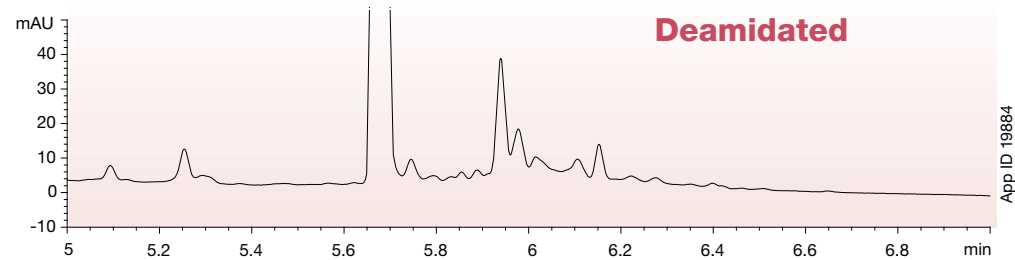
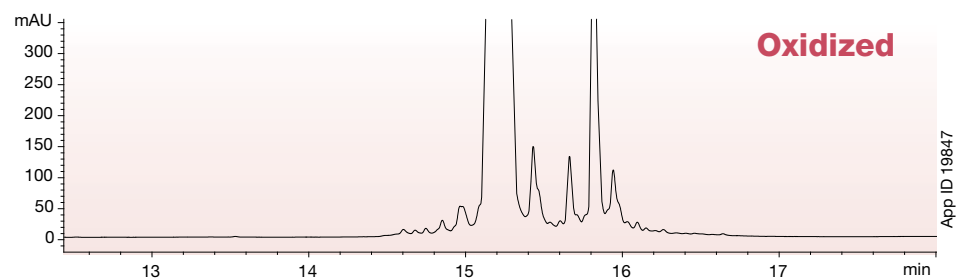
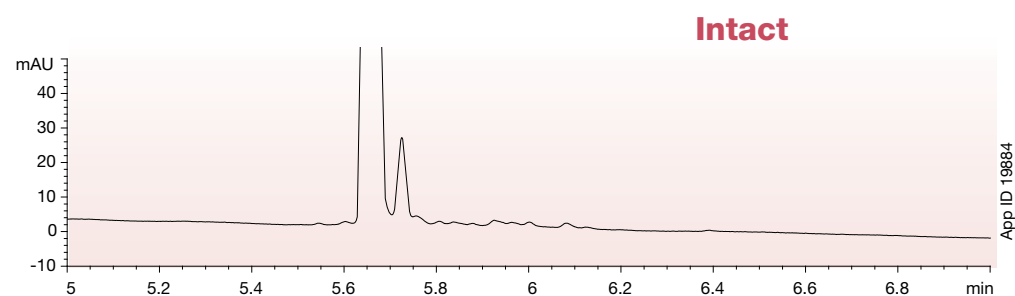
Applications

Post-Translational Modification Analysis

Oxidation



Deamidation



Column: Aeris™ WIDEPORE 3.6µm XB-C18
Dimensions: 100 x 4.6 mm
Part No.: 00D-4482-E0
Mobile Phase: A: Water with 0.1 % TFA
B: Acetonitrile with 0.1 % TFA
Gradient: A/B (97:3) for 3 min to A/B (15:85) over 45 min

Flow Rate: 1.2 mL/min
Temperature: 22°C
Injection Volume: 50 µL
Instrument: Agilent® 1100
Detection: UV @ 214 nm (ambient)
Sample: Insulin oxidized using 3% hydrogen peroxide

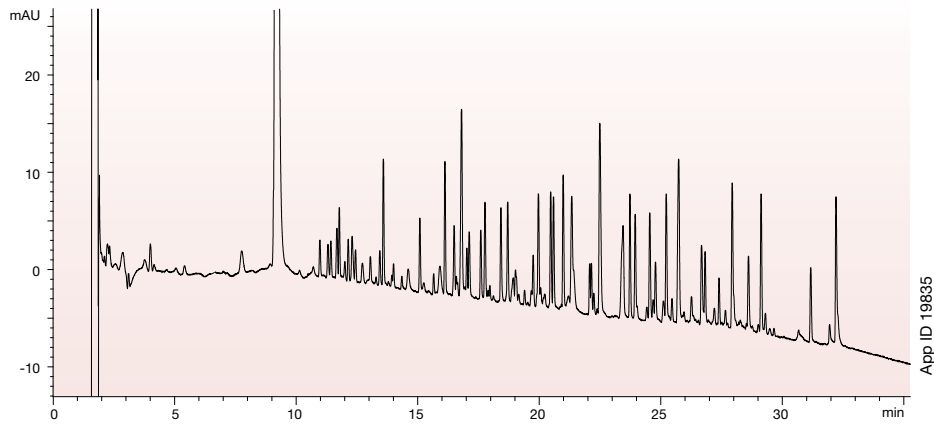
Column: Aeris WIDEPORE 3.6µm XB-C18
Dimensions: 150 x 4.6 mm
Part No.: 00F-4482-E0
Mobile Phase: A: Water with 0.1 % TFA
B: Acetonitrile with 0.085 % TFA
Gradient: A/B (90:10) to A/B (35:65) over 10 min

Flow Rate: 1.2 mL/min
Temperature: 40°C
Injection Volume: 1 µL
Instrument: Agilent® 1100
Detection: UV @ 214 nm (ambient)
Sample: Proprietary intact insulin 6 kDa deamidated

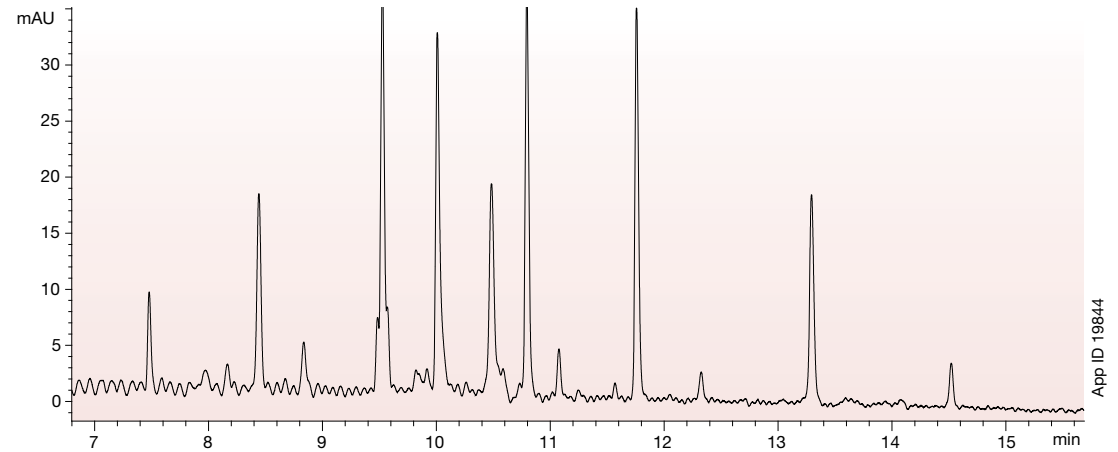
Applications

Peptide Mapping

Bovine Serum Albumin Tryptic Map



Apomyoglobin Digest



Column: Aeris WIDEPORE 3.6 μ m XB-C18
Dimensions: 250 x 2.1 mm
Part No.: 00G-4282-AN
Mobile Phase: A: Water with 0.1 % TFA
 B: Acetonitrile with 0.1 % TFA
Gradient: A/B (97:3) for 3 min to A/B (35:65) over 47 min
Flow Rate: 0.3 mL/min
Temperature: 40 $^{\circ}$ C
Injection Volume: 10 μ L
Instrument: Agilent[®] 1200SL
Detection: UV @ 214 nm (ambient)
Sample: BSA Tryptic Digest

Column: Aeris WIDEPORE 3.6 μ m XB-C18
Dimensions: 150 x 4.6 mm
Part No.: 00F-4282-E0
Mobile Phase: A: Water with 0.1 % TFA
 B: Acetonitrile with 0.1 % TFA
Gradient: A/B (97:3) for 3 min to A/B (35:65) over 30 min
Flow Rate: 1.5 mL/min
Temperature: 22 $^{\circ}$ C
Injection Volume: 20 μ L
Instrument: Agilent[®] 1200
Detection: UV @ 214 nm
Sample: Apomyoglobin Digest

Aeris™ PEPTIDE Columns

for Peptide and Peptide Mapping Separations

Based on core-shell particle technology, Aeris PEPTIDE particles are designed with small pores, inert XB-C18 surface chemistry, and two different particle sizes (3.6 μm and 1.7 μm) to meet the resolution demands of chromatographers performing complex peptide and peptide map separations on HPLC and/or UHPLC systems.

Aeris PEPTIDE columns are built for the following:

- Synthetic peptide impurity analysis
- Peptide mapping
- Identifying protein modifications
 - Glycosylation
 - Substitution
 - Truncation
- Analyzing post-translational modifications
 - Deamidation
 - Oxidation
 - Deletions

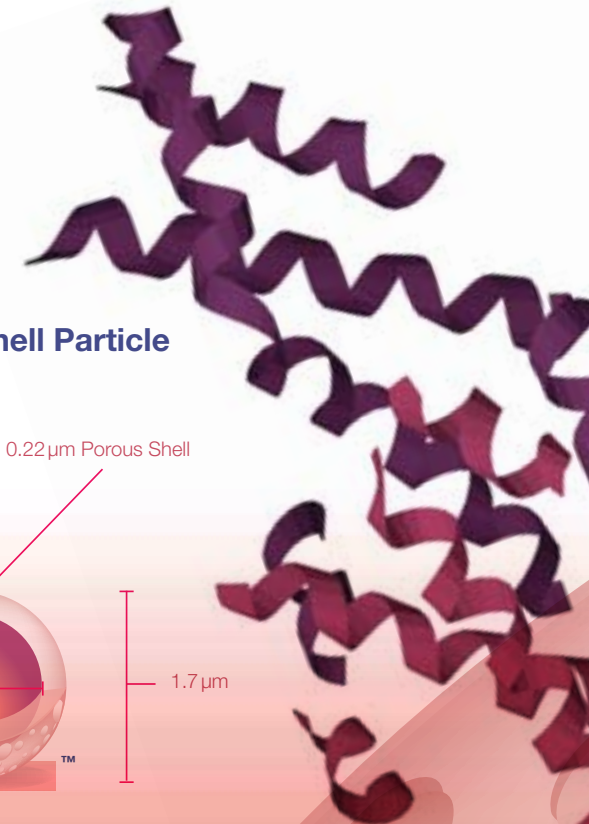
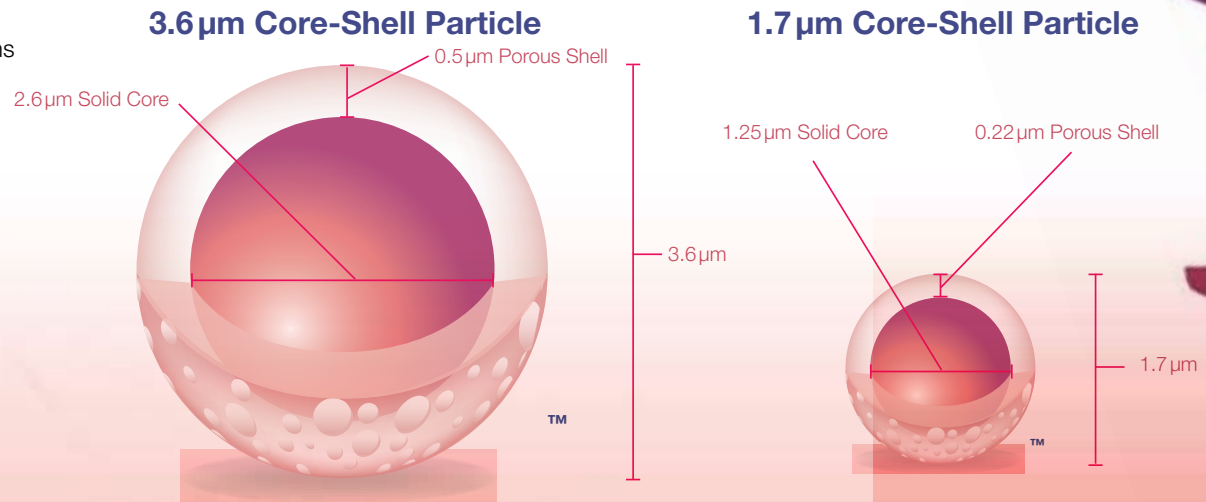
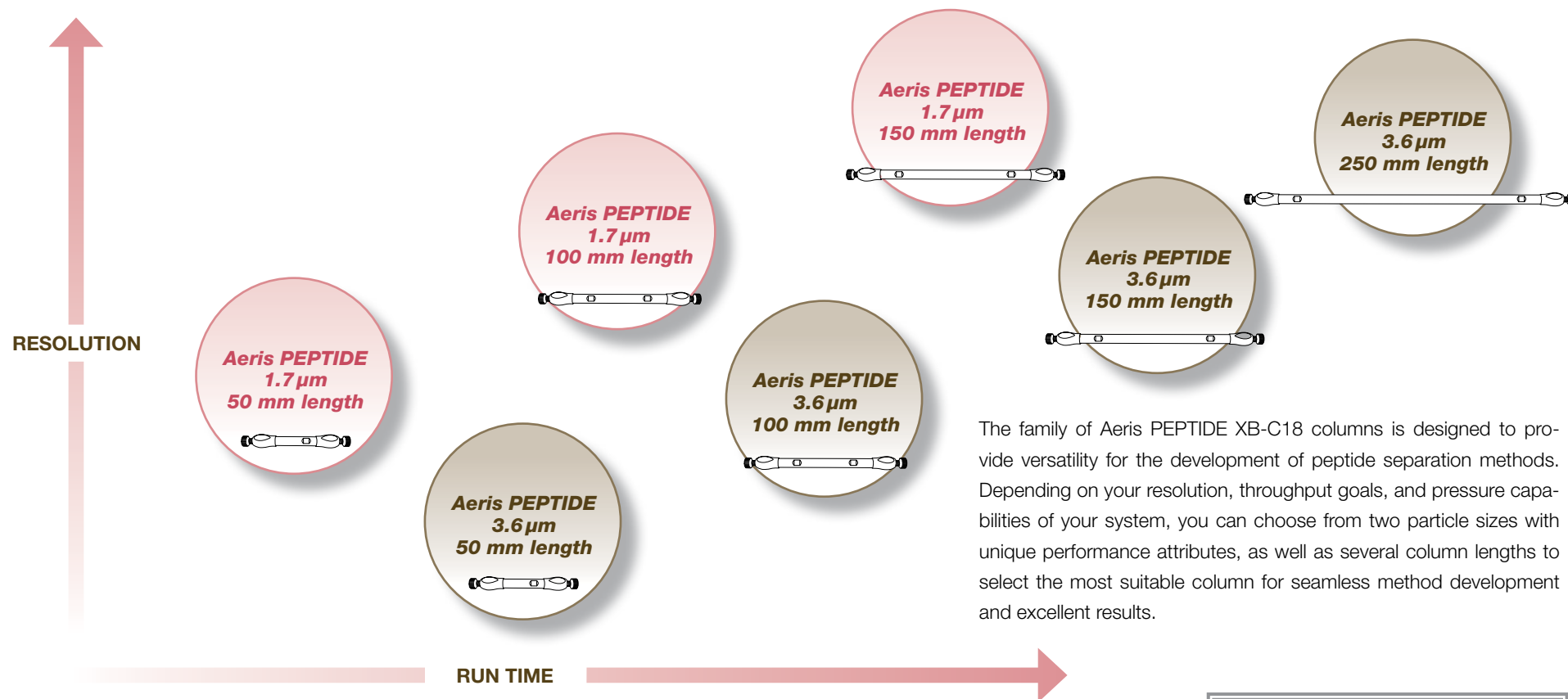




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- p. 28 Select the Most Suitable Aeris PEPTIDE Column**
- p. 29 Maximum Performance on UHPLC Systems**
- p. 30 Ultra-High Resolving Power on HPLC and UHPLC Systems**
- p. 32 Bundle Aeris PEPTIDE with Aeris WIDEPORE for Detailed Peptide Maps**
- p. 33 Applications**

Select the Most Suitable Aeris™ PEPTIDE Column to Achieve Your Separation Goals



The family of Aeris PEPTIDE XB-C18 columns is designed to provide versatility for the development of peptide separation methods. Depending on your resolution, throughput goals, and pressure capabilities of your system, you can choose from two particle sizes with unique performance attributes, as well as several column lengths to select the most suitable column for seamless method development and excellent results.

- UHPLC system required
- HPLC or UHPLC compatible



Maximize Performance on UHPLC Systems with Aeris PEPTIDE 1.7 μm Technology

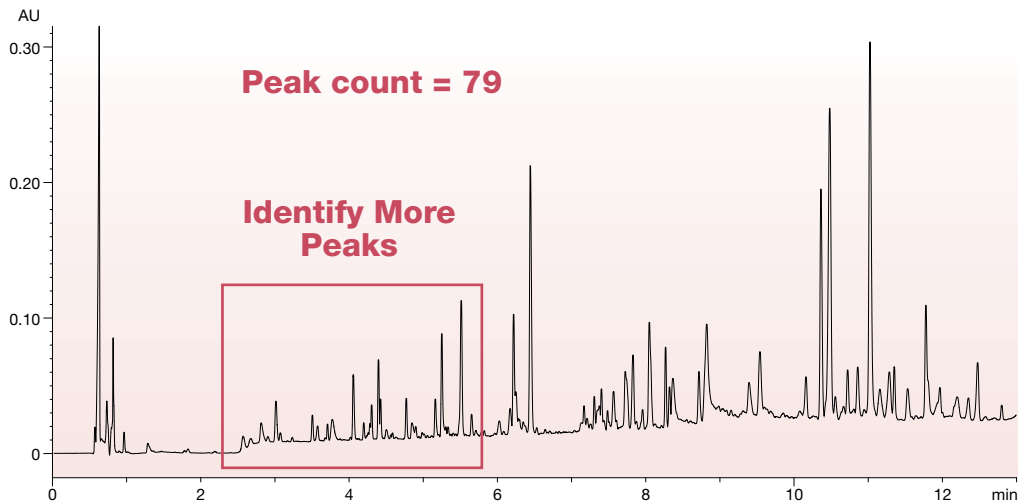
With pressure stability up to 1,000 bar and the high efficiencies brought about by core-shell particle technology, the sub-2 μm Aeris PEPTIDE column produces breakthrough chromatographic performance on UHPLC systems. Use Aeris PEPTIDE 1.7 μm columns to boost the performance of sub-2 μm fully porous peptide mapping methods.

Increase Peak Count with 1.7 μm Aeris Core-Shell Technology

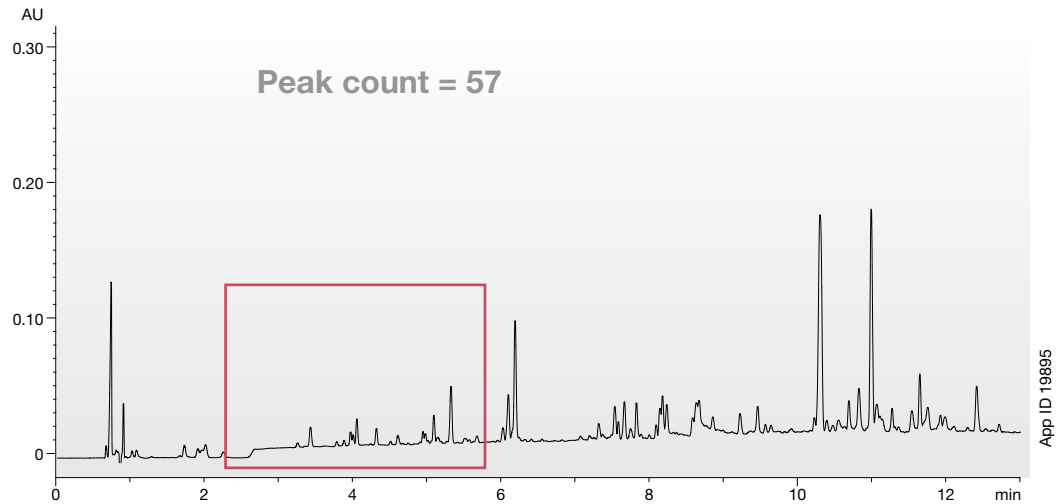
Conditions for both columns:

- Column:** Aeris PEPTIDE 1.7 μm XB-C18
ACQUITY® BEH™ 1.7 μm C18
- Dimensions:** 150 x 2.1 mm
- Mobile Phase:** A: Water with 0.1 % TFA
B: Acetonitrile with 0.1 % TFA
- Gradient:** A/B (97:3) for 1.5 min to A/B (40:60) over 11 min to
A/B (95:5) over 1 min
- Flow Rate:** 0.5 mL/min
- Temperature:** 40 °C
- Injection Volume:** 5 μL
- Instrument:** Agilent® 1200SL
- Detection:** UV @ 214 nm (ambient)
- Sample:** Alpha-Casein Tryptic Digest

Aeris PEPTIDE 1.7 μm XB-C18



*Waters® ACQUITY® BEH™ 1.7 μm C18



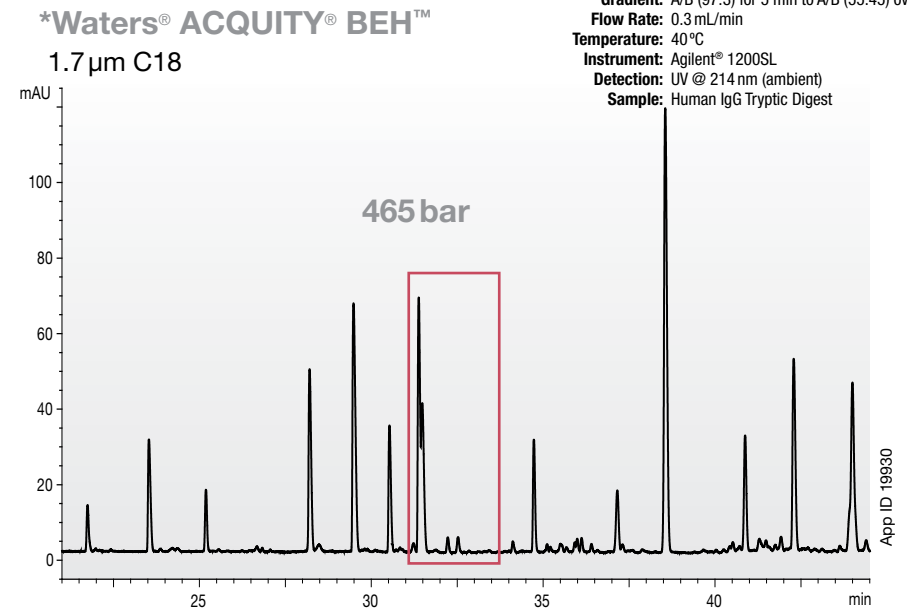
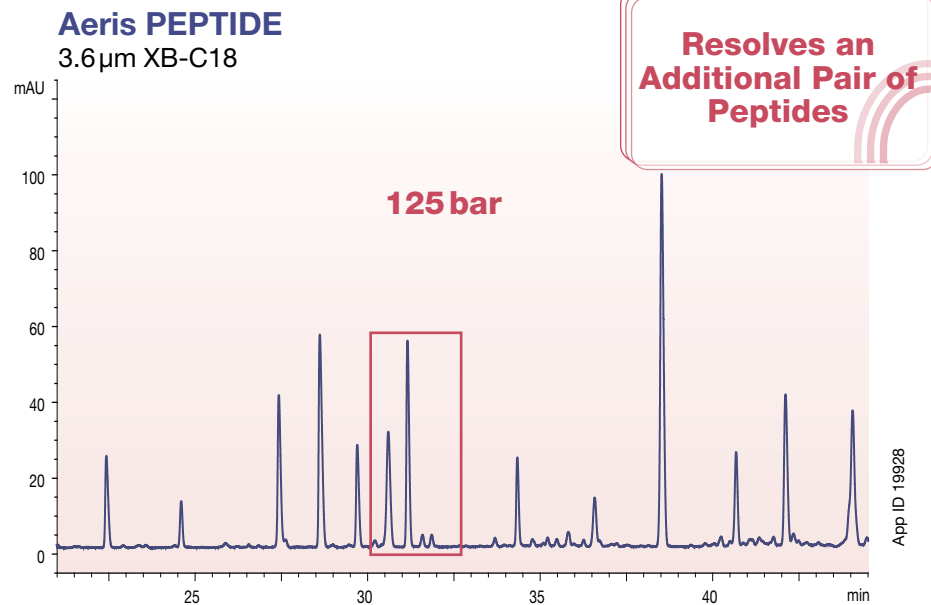
* Waters and ACQUITY are registered trademarks, and BEH Technology is a trademark of Waters Corporation. Phenomenex is not affiliated with Waters Corporation. Study was performed using new columns and, to the extent possible, identical experimental conditions were applied. Comparative separations may not be representative of all applications.

Ultra-High Resolving Power on HPLC and UHPLC Systems with Aeris PEPTIDE 3.6 μm Columns

The Aeris™ PEPTIDE 3.6 μm core shell column was designed with one purpose in mind: to maximize the separation of large numbers of peptides on any HPLC or UHPLC system. Because core shell particles remove the backpressure constraints of HPLC or UHPLC systems, chromatographers can **achieve the ultra-high performance of similar length sub-2 μm columns at a fraction of the backpressure.**

UHPLC Performance at HPLC Compatible Backpressures

Conditions for both columns:
Column: Aeris PEPTIDE 3.6 μm XB-C18
ACQUITY® BEH™ 1.7 μm C18
Dimensions: 150 x 2.1 mm
Mobile Phase: A: Water with 0.1 % TFA
B: Acetonitrile with 0.1 % TFA
Gradient: A/B (97:3) for 5 min to A/B (55:45) over 55 min
Flow Rate: 0.3 mL/min
Temperature: 40 °C
Instrument: Agilent® 1200SL
Detection: UV @ 214 nm (ambient)
Sample: Human IgG Tryptic Digest



* Waters and ACQUITY are registered trademarks, and BEH Technology is a trademark of Waters Corporation. Phenomenex is not affiliated with Waters Corporation. Study was performed using new columns and, to the extent possible, identical experimental conditions were applied. Comparative separations may not be representative of all applications.



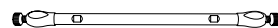
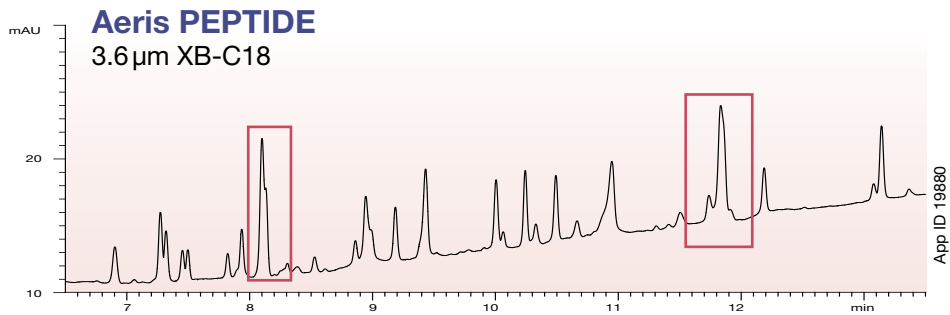
Use longer (or coupled) 3.6 μm columns on UHPLC and HPLC systems to resolve critical peaks

For applications like peptide separations and peptide mapping where resolution is the primary goal, the lower backpressure of Aeris PEPTIDE 3.6 μm core-shell columns allow one to use longer columns for higher resolving power resulting in increased separation of closely eluting peptides.



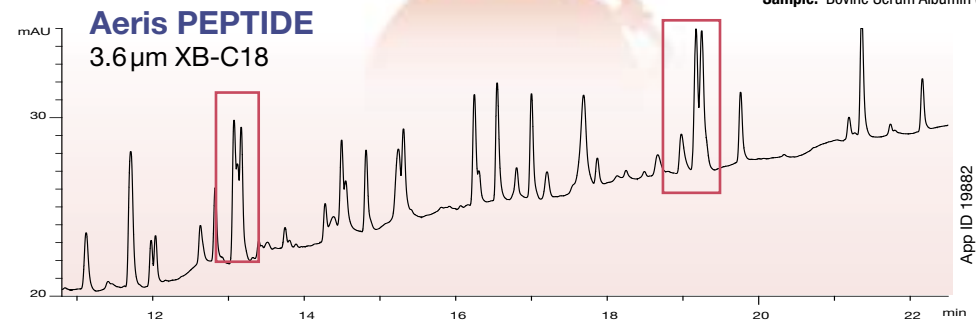
Conditions for both columns:
Column: Aeris PEPTIDE 3.6 μm XB-C18
Dimensions: as noted
Mobile Phase: A: Water with 0.1 % Formic Acid
 B: Acetonitrile with 0.1 % Formic Acid
Gradient: A/B (97:3) for 3 min to A/B (35:65) over 30 min
Flow Rate: 1.2 mL/min
Temperature: 40 °C
Injection Volume: 25 μL
Instrument: Agilent® 1200
Detection: UV @ 214 nm (ambient)
Sample: Bovine Serum Albumin (BSA) Tryptic Digest

Utilize Long Columns to Maximize Separation Power



150 x 4.6 mm

140 bar



250 x 4.6 mm

200 bar

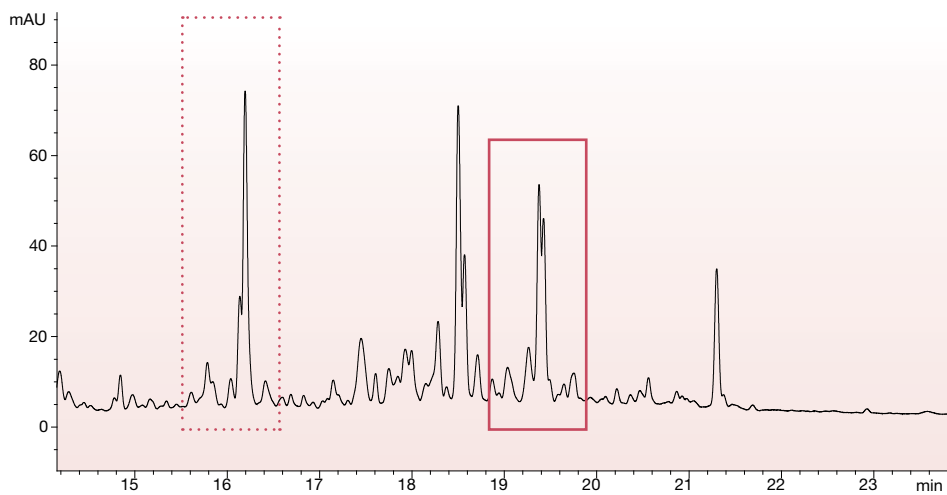
Minimal increase in backpressure

Bundle Aeris™ PEPTIDE with Aeris WIDEPORE for Detailed Peptide Maps

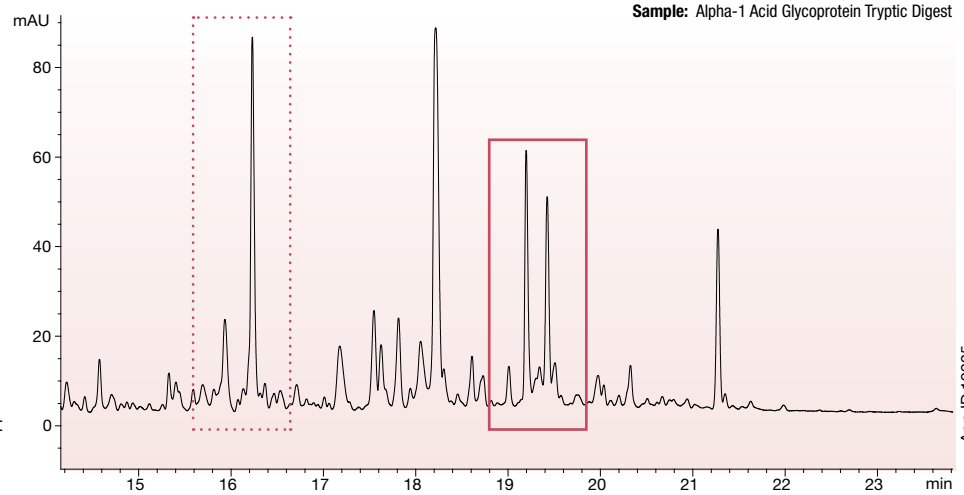
Aeris PEPTIDE 3.6µm XB-C18 and Aeris WIDEPORE 3.6µm XB-C18 are a “must-have” pair for chromatographers who analyze complex peptide mixtures. Because each has a unique pore size and surface area, they exhibit different selectivity. Protein chemists can take advantage of this diversity to achieve the critical resolution of target peptides in various regions of the map, thus simplifying their method development.

Utilize Differences in Small and Large Pore Size Selectivity for Optimal Resolution

Aeris PEPTIDE 3.6µm XB-C18



Aeris WIDEPORE 3.6µm XB-C18



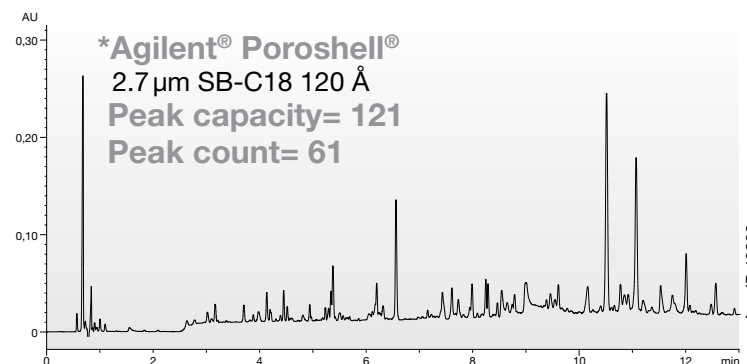
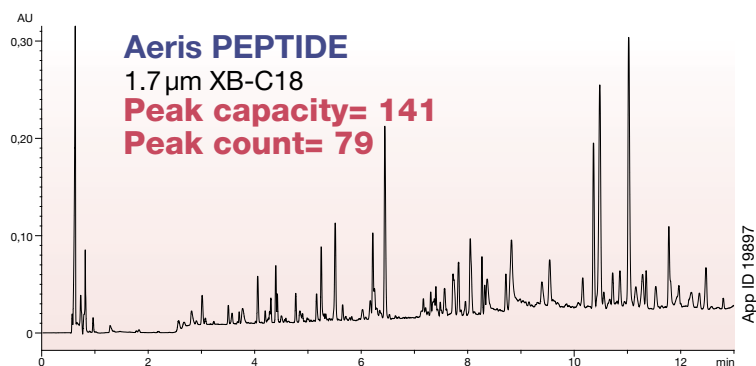
Conditions for both columns:
Column: Aeris PEPTIDE 3.6µm XB-C18
Aeris WIDEPORE 3.6µm XB-C18
Dimensions: 150 x 4.6 mm
Part Nos.: 00F-4507-E0
00F-4482-E0
Mobile Phase: A: Water with 0.1 % TFA
B: Acetonitrile with 0.1 % TFA
Gradient: A/B (97:3) for 3 min to A/B (35:65) over 30 min
Flow Rate: 1.5 mL/min
Temperature: 40 °C
Instrument: Agilent® 1200SL
Detection: UV @ 214 nm (ambient)
Sample: Alpha-1 Acid Glycoprotein Tryptic Digest



Applications

Peptide Mapping on Core-Shell Technologies

Aeris PEPTIDE vs. Other Core-Shell Columns



Conditions same for all columns:

Columns: Aeris PEPTIDE 1.7 μm XB-C18
Poroshell® 2.7 μm SB-C18 120 Å
Ascentis® Express Peptide 2.7 μm C18

Dimensions: 150 x 2.1 mm

Mobile Phase: A: Water with 0.1 % Formic Acid
B: Acetonitrile with 0.08 % Formic Acid

Gradient: A/B (97:3) for 1.5 min to A/B (60:40)
over 11 min to A/B (5:95) over 1 min

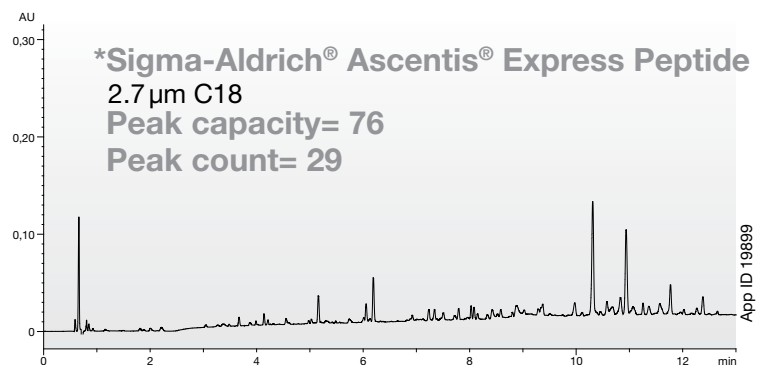
Flow Rate: 0.5 mL/min

Temperature: 40 °C

Instrument: Agilent® 1200SL

Detection: UV @ 214 nm (ambient)

Sample: Alpha-Casein Tryptic Digest



* Agilent and Poroshell are registered trademarks of Agilent Technologies, Inc. Ascentis Express Peptide is a registered trademark of Sigma-Aldrich Biotechnology. Phenomenex is not affiliated with Agilent Technologies, Inc or Sigma-Aldrich Biotechnology. Comparative separations may not be representative of all applications.

Wonder How Aeris™ Will Perform on Your Method? Try PhenoLogix!

A New Era of Technical Support Services
phenomenex.com/phenologix

You already know we're just a phone call away with technical advice and assistance when you need it. But there's more. PhenoLogix offers in-house application development services and support for you and your lab.

We provide the following services:

- Method Development
- Method Optimization
- Pre-validation Services
- Preparative and Process Scale-Up
- On-site Training and Consulting



phenoLogixSM
Your Method. Our Scientists.

For more information on these services or to begin a project today, please contact your local Phenomenex representative or email us at phenologix@phenomenex.com



Ordering Information



Aeris WIDEPORE 3.6 µm Minibore Columns (mm)

	50 x 2.1	100 x 2.1	150 x 2.1	250 x 2.1
XB-C18	00B-4482-AN	00D-4482-AN	00F-4482-AN	00G-4482-AN
XB-C8	00B-4481-AN	00D-4481-AN	00F-4481-AN	00G-4481-AN
C4	00B-4486-AN	00D-4486-AN	00F-4486-AN	00G-4486-AN

Aeris WIDEPORE 3.6 µm Analytical Columns (mm)

	100 x 4.6	150 x 4.6	250 x 4.6
XB-C18	00D-4482-E0	00F-4482-E0	00G-4482-E0
XB-C8	00D-4481-E0	00F-4481-E0	00G-4481-E0
C4	00D-4486-E0	00F-4486-E0	00G-4486-E0

Aeris PEPTIDE 1.7 µm Minibore Columns (mm)

	50 x 2.1	100 x 2.1	150 x 2.1
XB-C18	00B-4506-AN	00D-4506-AN	00F-4506-AN

Aeris PEPTIDE 3.6 µm Minibore Columns (mm)

	50 x 2.1	100 x 2.1	150 x 2.1	250 x 2.1
XB-C18	00B-4507-AN	00D-4507-AN	00F-4507-AN	00G-4507-AN

Aeris PEPTIDE 3.6 µm Analytical Columns (mm)

	100 x 4.6	150 x 4.6	250 x 4.6
XB-C18	00D-4507-E0	00F-4507-E0	00G-4507-E0

Material Characteristics

Packing Material	Total Particle Size (µm)	Porous Shell (µm)	Core Size (µm)	pH Stability	Temp Stability	Pressure Stability
Aeris WIDEPORE	3.6	0.2	3.2	1.5 - 9	90 °C	600 bar
Aeris PEPTIDE	1.7	0.22	1.25	1.5 - 9	90 °C	1000 bar
Aeris PEPTIDE	3.6	0.5	2.6	1.5 - 9	90 °C	600 bar



guarantee

If you are not completely satisfied with your Aeris core-shell columns, send in your comparative data to a similar product within 45 days and **KEEP THE COLUMN FOR FREE.**

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