

HPLC for Small Molecules

Discovery®: Discovery® RP-AmideC16

I.D. (mm)	L (cm)	Cat. No.	Qty
4.0	25	505064-40	1 ea
4.6	5	505005	1 ea
4.6	10	569323-U	1 ea
4.6	12.5	569332-U	1 ea
4.6	15	50501321 505013	1 ea 1 ea
4.6	25	505064	1 ea
10.0	25	569324-U	1 ea
21.2	25	569326-U	1 ea

Discovery® RP-AmideC16 Supelguard™ Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.1	2	505110	2 ea
2.1	2	505102	1 kit
3.0	2	59578-U	2 ea
3.0	2	59577-U	1 kit
4.0	2	505099	2 ea
4.0	2	505080	1 kit

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

Discovery® RP-Amide C16 Validation Pack

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
4.6	25	55709-U	3 ea

Pack includes 3 columns, each from a different lot of bonded phase.

Discovery® Selectivity Pack

You can conveniently order the four Discovery® column chemistries - RP-AmideC16, C18, C8, and Cyano - in your choice of column dimensions, in a single kit. Quickly evaluate mobile phases on all four columns to find the optimal combination of chemistries for your separation. The Discovery HPLC Column Selectivity Pack gives you a powerful tool for rapid, efficient, simple pharmaceutical method development.

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.1	15	55722-U21	1 kit

Discovery® Zirconia

Developing Methods on Discovery® Zr

Reversed-phase, zirconia-based particles expand your HPLC method development options by leveraging the unique selectivity and retention provided by pH and temperature extremes.

Discovery® Zr comprises four phase chemistries bonded to porous, spherical, 3 and 5 micron zirconia particles. Zirconia particles have exceptional pH and thermal stability compared to silica and alumina particles. Compared to polymer particles, zirconia does not shrink or swell with changes in temperature, ionic strength, or organic concentration, and has exceptional mechanical strength. The presence of controlled, predictable reversed-phase and ion-exchange retention modes combined with thermal and pH stability open up your method development options.

Discovery® Zr uses all the reversed-phase method development tools you use for developing methods on silica. However, Discovery® Zr gives you four new tools that silica does not allow:

- The full power of pH: to control the ionization state of acids and bases
- The power of temperature: to adjust selectivity and to decrease analysis time

- The power of ionic strength: to alter selectivity, efficiency, and retention
- The power of Lewis acid-base interactions: to give unique selectivity over silica for ionic compounds

The Members of the Discovery® Zr Family

Discovery® Zr-PBD: Polybutadiene-modified zirconia particles give separations most similar to C18-silica, but with benefits of high pH and temperature stability.

Discovery® Zr-PS: Polystyrene modified zirconia particles are ideal for separations of hydrophobic compounds and amines.

Discovery® Zr-CarbonC18: Octadecyl-modified carbon-clad zirconia for universal separations of acids, bases, and neutrals. Very different selectivity relative to C18-silica.

Discovery® Zr-Carbon: Carbon-clad zirconia for separations of geometric isomers and diastereomers.

Discovery Zirconia-based Phases

Specification	Discovery Zr-PS	Discovery Zr-PBD	Discovery Zr-Carbon	Discovery Zr-CarbonC18
USP Code:		L49		
Phase:	Cross-linked polystyrene	Cross-linked polybutadiene	Graphitic-like carbon	Octadecylphenyl modified carbon
Endcap:	No	No	No	No
Particle Platform:	Zirconia	Zirconia	Zirconia	Zirconia
Particle Shape:	Spherical	Spherical	Spherical	Spherical
Particle Sizes (µm):	3 & 5	3 & 5	3 & 5	3 & 5
Pore Size (Å):	300	300	300	300
Surface Area (m ² /g):	30	30	30	30
Packing Density (g/mL):	2.21	2.21	2.21	2.21
% C:	2	2	1	3
Coverage (µmoles/m ²):	n/a	n/a	n/a	2.8
pH Range:	1 to 13	1 to 13	1 to 14	1 to 14
Temperature Range:	≤100 °C ^(a)	≤100 °C ^(a)	≤100 °C ^(b)	≤100 °C ^(b)

^(a)special hardware for operation between 100 °C and 150 °C is available

^(b)special hardware for operation between 100 °C and 200 °C is available

Discovery® Zr-PBD HPLC Column

Discovery® Zr-PBD comprises spherical, porous zirconia particles with a durable coating of polybutadiene. It operates via a reverse-phase mechanism, but is less hydrophobic, so less organic solvent is required for elution. Discovery Zr-PBD complements the selectivity offering of the other zirconia and silica-based Discovery phases, and allows the use of a wide range of mobile phase pH from pH 1 to 13.

Features and Benefits

- General purpose zirconia phase
- Selectivity similar to C18-silica

suitable for L49 per USP

loading 2% Carbon
 particle platform zirconia, spherical, porous
 bonding phase cross-linked polybutadiene
 surface area 30 m²/g
 endcapped No
 no pore size 300 Å
 operating pH range 1 - 13
 temp. range ≤100 °C (up to 150 °C with special hardware)

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
2.1	5	65713-U	1 ea
2.1	7.5	65714-U	1 ea
2.1	15	65715-U	1 ea
4.6	5	65716-U	1 ea
4.6	15	65718-U	1 ea

HPLC for Small Molecules

Discovery® Zirconia: *The Members of the Discovery® Zr Family*

Discovery® Zr-PBD HPLC Column (continued)

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.1	5	65719-U	1 ea
2.1	15	65720-U	1 ea
4.6	5	65722-U	1 ea
4.6	15	65723-U	1 ea
4.6	25	65724-U	1 ea

Discovery® Zr-PBD Supelguard™ Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
2.1	1	65812-U	2 ea
2.1	1	65811-U	1 kit
4.0	1	65814-U	2 ea
4.0	1	65813-U	1 kit
particle size 5 µm			
2.1	1	65816-U	2 ea
2.1	1	65815-U	1 kit
4.0	1	65818-U	2 ea
4.0	1	65817-U	1 kit

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

Discovery® Zr-CarbonC18 HPLC Column

Discovery® Zr-CarbonC18 comprises spherical, porous carbon-clad zirconia particles covalently modified with octadecyl (C18) groups. It complements the selectivity offering of the other zirconia- and silica-based Discovery phases, and allows the use of the full range of mobile phase pH from pH 1 to 14.

Features and Benefits

- Partitioning mechanism
- Shape selectivity
- Resistant to phase hydrolysis

loading 3% Carbon
 base material zirconia, spherical, porous
 bonding phase octadecylphenyl modified carbon
 surface area 30 m²/g
 endcapped No
 pore size 300 Å
 operating pH range 1 - 14
 temp. range ≤100 °C (up to 200 °C with special hardware)

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
2.1	5	65701-U	1 ea
2.1	7.5	65702-U	1 ea
2.1	15	65703-U	1 ea
4.6	7.5	65705-U	1 ea
4.6	15	65706-U	1 ea
particle size 5 µm			
2.1	5	65707-U	1 ea
4.6	5	65710-U	1 ea
4.6	15	65711-U	1 ea

Discovery® Zr-CarbonC18 Supelguard™ Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
2.1	1	65801-U	1 kit
2.1	1	65802-U	2 ea
4.0	1	65803-U	1 kit

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.1	1	65806-U	2 ea
2.1	1	65805-U	1 kit
4.0	1	65807-U	1 kit

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

Discovery® Zr-Carbon HPLC Column

Discovery Zr-Carbon comprises spherical, porous carbon-coated zirconia particles. It is ideal for the reversed-phase separation of positional isomers and diastereomers. It complements the selectivity offering of the other zirconia- and silica-based Discovery phases, and allows the use of the full range of mobile phase pH from pH 1 to 14. It is a great alternative when C18 does not work.

Features and Benefits

- Excellent separation of geometric isomers and diastereomers.
- Very hydrophobic surface.
- Most different retention compared to other Discovery Zr phases for non-ionic compounds.
- Similar to porous graphitic carbon, but with added ion-exchange interactions.

Avoid fused-ring aromatics as they are too strongly retained by Discovery Zr-Carbon.

loading 1% Carbon
 particle platform zirconia, spherical, porous
 bonding phase graphitic-like carbon
 surface area 30 m²/g
 endcapped No
 pore size 300 Å
 operating pH range 1 - 14
 temp. range ≤100 °C (up to 150 °C with special hardware)

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
2.1	5	65725-U	1 ea
2.1	15	65727-U	1 ea
4.6	15	65730-U	1 ea
particle size 5 µm			
2.1	5	65731-U	1 ea
2.1	15	65732-U	1 ea
4.6	15	65735-U	1 ea

Discovery® Zr-Carbon Supelguard™ Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
2.1	1	65822-U	2 ea
2.1	1	65821-U	1 kit
particle size 5 µm			
2.1	1	65827-U	2 ea
4.0	1	65829-U	2 ea
4.0	1	65828-U	1 kit

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

Discovery® Zr-PS HPLC Column

Discovery® Zr-PS comprises spherical, porous zirconia particles modified with cross-linked polystyrene. It operates via a reversed-phase mechanism, but is less retentive. It has unique selectivity, especially for aromatic compounds. Discovery Zr-PS complements the selectivity offering of the other zirconia- and silica-based Discovery phases, and allows the use of the full range of mobile phase pH from pH 1 to 13.

Features and Benefits

- Good for very hydrophobic compounds
- Good for basic compounds

HPLC for Small Molecules

Discovery® Zirconia: *The Members of the Discovery® Zr Family*

loading 2% Carbon
 particle platform zirconia, spherical, porous
 bonding phase cross-linked polystyrene
 surface area 30 m²/g
 endcapped No
 pore size 300 Å
 operating pH range 1 - 13
 temp. range ≤100 °C (up to 150 °C with special hardware)

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
2.1	5	65737-U	1 ea
2.1	7.5	65738-U	1 ea
2.1	15	65739-U	1 ea
4.6	5	65740-U	1 ea
4.6	7.5	65741-U	1 ea
4.6	15	65742-U	1 ea
particle size 5 µm			
2.1	5	65743-U	1 ea
2.1	15	65744-U	1 ea
4.6	5	65746-U	1 ea
4.6	15	65747-U	1 ea
4.6	25	65748-U	1 ea

Discovery® Zr-PS Supelguard™ Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
2.1	1	65842-U	2 ea
2.1	1	65841-U	1 kit
4.0	1	65844-U	2 ea
4.0	1	65843-U	1 kit
particle size 5 µm			
2.1	1	65845-U	1 kit
4.0	1	65848-U	2 ea
4.0	1	65847-U	1 kit

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

Discovery® Zr-SAX HPLC Column

Features and Benefits

- Efficient strong anion-exchanger useful for inorganic and organic anions. Stable from pH 1-12.
- Ideal for the separation of water-soluble vitamins.
- Useful for the separation of bio-molecules such as nucleotides, nucleosides, oligonucleotides, oligodeonucleotides, amino acids and peptides.
- High anion-exchange capacity that can be controlled by the amount of polymer deposited on the porous zirconia substrate.
- Does not shrink or swell as a function of anionic strength or organic modifier content of the mobile phase.
- Extremely stable amino phase for normal phase separation of carbohydrates.
- Thermally stable up to 80°C, which causes different selectivity and high speed separations with lower ionic strength mobile phases. This is very important in the preparation of RNA and DNA samples used for further studies.
- Mixed-mode separation modes may be exploited to optimize separations, including Lewis acid-base interactions, hydrophobic interactions and ion-exchange interactions. These modes may be attenuated by adjusting the strong Lewis base content, organic content and ionic strength of the mobile phase, respectively.

loading 25% Carbon
 particle platform zirconia spherical, porous
 bonding phase polyethyleneimine
 surface area 30 m²/g
 pore size 300 Å
 operating pH range 1 - 12
 temp. range <80 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
4.6	5	65709-U	1 ea
4.6	10	65712-U	1 ea
4.6	15	65721-U	1 ea

Discovery® Zr-SAX Supelguard™ Cartridge

loading 25% Carbon
 particle platform (zirconia, spherical, porous)
 bonding phase polyethyleneimine
 surface area 30 m²/g
 pore size 300 Å
 operating pH range 1 - 12
 temp. range 80 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
4.0	1	65733-U	2 ea

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

Discovery® ZR Column Holder

	Cat. No.	Qty
Discovery® ZR Column Holder for use with Discovery ZR Columns	65621-U	1 ea

SUPELCOSIL™

Hydrophobic Phases

SUPELCOSIL™ LC-18 HPLC Column

A general purpose hydrophobic alkyl phase that is very retentive and gives good peak shape for a wide variety of compounds.

suitable for L1 per USP

loading 11.0% carbon
 particle platform silica gel, spherical
 phase octadecyl
 surface coverage 3.1 µmol/m²
 surface area 170 m²/g
 endcapped Yes
 pore size 120 Å
 pH range 2 - 7.5
 temp. limit ≤70 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
2.1	25	57942	1 ea
3.0	3.3	58977C30	1 ea
3.0	5	58973C30	1 ea
3.0	15	58985C30	1 ea
4.0	7.5	58984C40	1 ea
4.0	15	58985C40	1 ea
4.6	3.3	58977	1 ea
4.6	5	58973	1 ea
4.6	7.5	58984	1 ea
4.6	15	58985	1 ea
particle size 5 µm			
1.0	30	57982	1 ea
2.1	15	57934	1 ea
2.1	25	57935	1 ea
3.0	10	59209C30	1 ea
3.0	15	58230C30	1 ea
3.0	25	58298C30	1 ea
4.0	5	58239C40	1 ea
4.0	15	58230C40	1 ea
4.0	25	58298C40	1 ea