

Thermo Scientific Synchronis HPLC Columns

Consistent Reproducible Separations, Column after Column, Time after Time. Extensive testing and strong quality control procedures ensure the consistency of Synchronis HPLC columns – column after column.

- Thermo Scientific™ Synchronis™ HPLC columns are manufactured, packed and tested in ISO9000 accredited facilities. Each lot of silica is tested for the physical properties of the silica support and only released for production if it meets the stringent test specifications.
 - Synchronis columns are based on highly pure 100Å silica, with a surface area of 320m²/g, compared to 200m²/g for typical silica based material. This greater surface area ensures good retention of analytes having a range of hydrophobicity, away from the solvent front.
 - Available in three particle sizes: 1.7µm for rapid UHPLC separations plus 3µm and 5µm for the more traditional HPLC analysis.
 - Synchronis reversed phase columns are densely bonded and double endcapped to minimize the number of residual silanols available to interact with basic analytes.
 - Each batch of chromatographic media packed into Synchronis columns is put through a series of diagnostic chromatographic tests, based on those developed by Tanaka¹ to ensure consistent, predictable separations.
- These tests rigorously probe interactions between analytes and the stationary phase, measuring hydrophobicity, shape selectivity and secondary interactions with bases, acids and chelators.
- Enhanced, automated packing methods drive consistency even further and every column is individually tested to ensure that it meets the required quality.



View product information and application notes

For full details on the Synchronis column range, please request or view a copy of our Synchronis technical guide
www.thermoscientific.com/synchronis



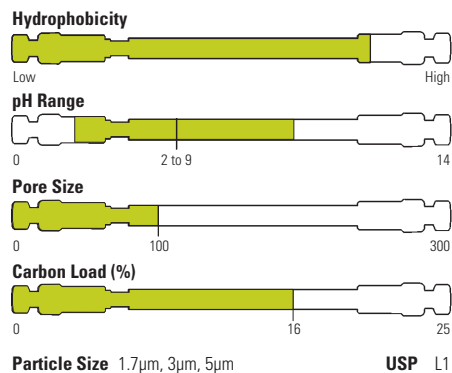
Synchronis C18

Synchronis C18 columns deliver consistent predictable separations, column after column, time after time

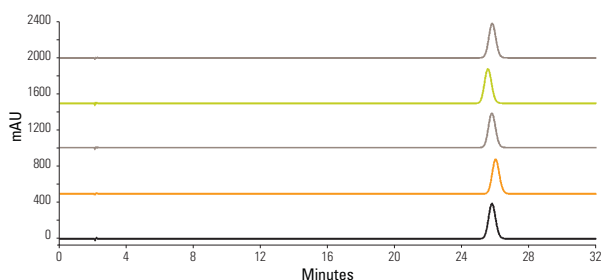
- Highly pure, high surface area silica
- High carbon load for increased retention
- Double endcapped for extra surface coverage
- Highly inert towards basic compounds
- Rigorously tested to ensure quality

When developing a new method, one of the most important goals for the chromatographer is to achieve a consistent, reproducible separation. The selection of a highly reproducible HPLC column is essential to attaining this goal.

Synchronis C18 columns show excellent column to column reproducibility, as illustrated here by the analysis of zidovudine using five separate columns. The reproducibility in terms of retention time and peak area is less than or equal to 0.5%, column to column.



Zidovudine



Column: Synchronis C18, 5µm, 150mm x 4.6mm

Mobile phase: Water:Methanol (4:1)

Flow rate: 1.0mL min⁻¹

Temperature: 25°C

Detection: 265nm

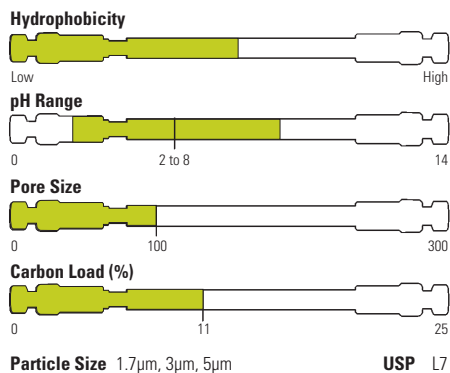
Injection volume: 10µL

1. Zidovudine

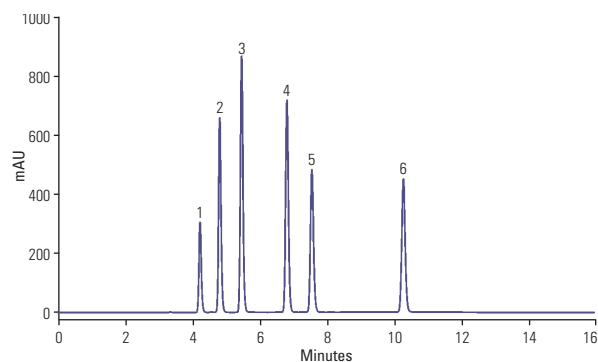
Synchronis C8

Reduces hydrophobic interactions allowing compounds to elute quicker from the column. Recommended for analytes with medium hydrophobicity or when a less hydrophobic phase is required to obtain optimum retention

- Highly pure, high surface area silica
- Less hydrophobic than Synchronis C18
- Double endcapped for extra surface coverage
- Rigorously tested to ensure quality



Uron herbicides



Column: Synchronis C8, 5µm, 150mm x 4.6mm

Mobile phase:	A: Water B: Acetonitrile
Gradient:	35 to 60% B in 10 minutes
Flow rate:	1.0mL/min
Temperature:	30°C
Detection:	240nm
Injection volume:	20µL
	1. Tebuthiuron 2. Metoxuron 3. Monuron 4. Chlorotoluron 5. Diuron 6. Linuron

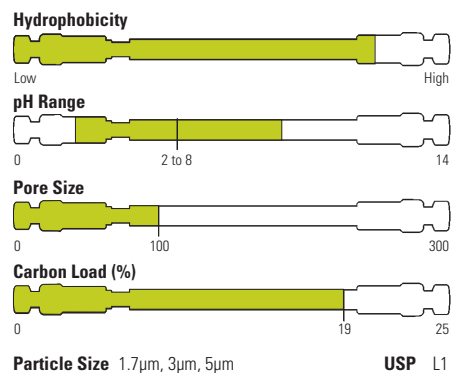


Synchronis aQ

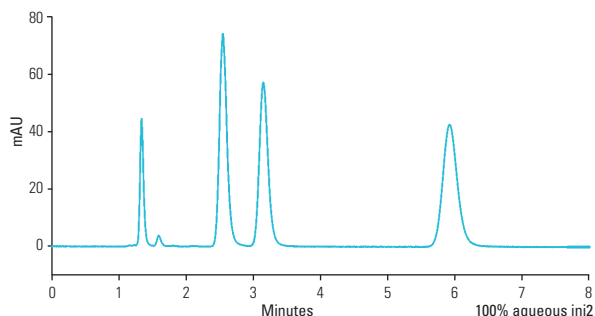
Polar endcapped Synchronis aQ columns provide a controlled interaction mechanism that retains and resolves polar analytes. Stable in 100% aqueous mobile phase

- Stable in 100% aqueous mobile phase
- Enhanced retention of polar compounds
- Rigorously tested to ensure quality

In comparison to a conventionally endcapped C18, the Synchronis aQ polar end-capped C18 stationary phase exhibits superior stability towards aqueous mobile phase. Synchronis aQ shows no degradation in performance after 100 injections in a buffered 100% aqueous eluent.

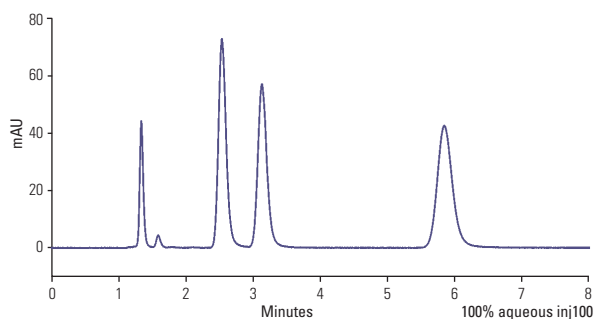


Stability of Synchronis aQ in 100% aqueous mobile phase



Column: Synchronis aQ, 5µm, 100mm x 4.6mm

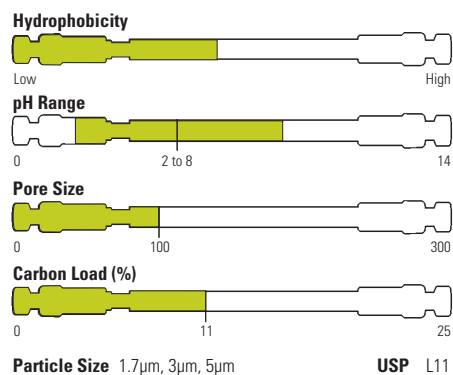
Mobile phase:	50mM Aqueous K ₂ HPO ₄ (pH 6)
Flow rate:	0.7mL/min
Temperature:	30°C
Detection:	260nm
Injection volume:	2µL
1.	Cytidine-5'-diphosphate
2.	Adenosine-5'-triphosphate
3.	Adenosine-5'-diphosphate
4.	Adenosine-5'-monophosphate



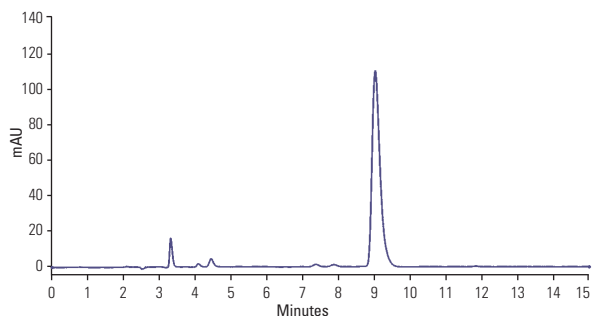
Synchronis Phenyl

Provides an alternative to Synchronis C18 and is particularly useful for retention of aromatic compounds

- Alternative selectivity to Synchronis C18
- Double endcapped for extra surface coverage
- Highly inert towards basic compounds
- Rigorously tested to ensure quality



Oxacillin sodium (USP)



Column: Synchronis Phenyl, 5µm, 300mm x 4.0mm

Mobile phase: Phosphate Buffer: MeCN:MeOH

(70:30:10)

Flow rate: 1.0mL/min (2mL/min in USP method)

Temperature: 25°C

Detection: 225nm

Injection volume: 10µL

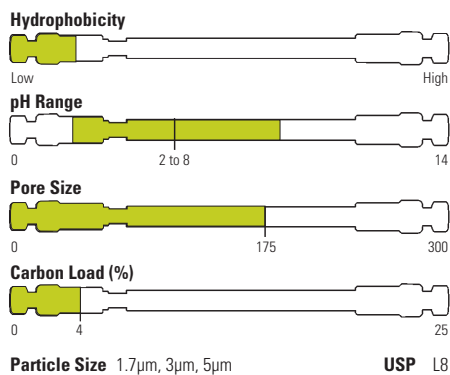
1. Oxacillin Sodium (0.11mg/mL)



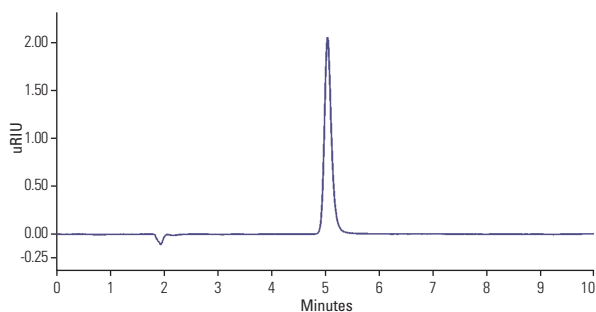
Synchronis Amino

Provides a versatile aminopropyl phase that gives excellent chromatographic properties in four modes: weak anion exchange, reversed phase, normal phase and HILIC

- Highly pure, high surface area silica
- Double endcapped for extra surface coverage
- Rigorously tested to ensure quality



Lactulose



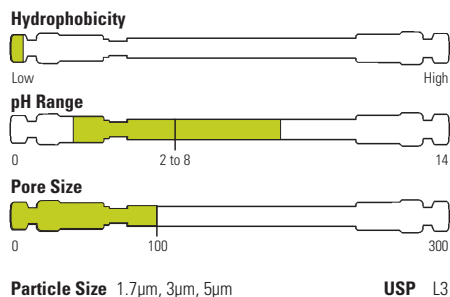
Column: Synchronis Amino 5µm, 150mm x 4.6mm

Mobile phase: Water: MeCN (30:70)
Flow rate: 1.0mL/min
Temperature: 35°C
Detection: RI
Injection volume: 5µL
1. Lactulose

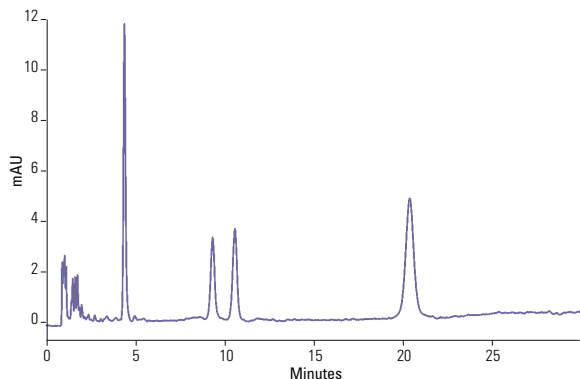
Synchronis Silica

Serves as a powerful and efficient tool for the chromatography of moderately polar organic compounds by normal phase chromatography

- Highly pure, high surface area silica
- Excellent reproducibility for normal phase chromatography
- Rigorously tested to ensure quality



Tocopherols



Column: Synchronis Silica 5µm, 150 x 4.6mm
Part Number: 97005-154630

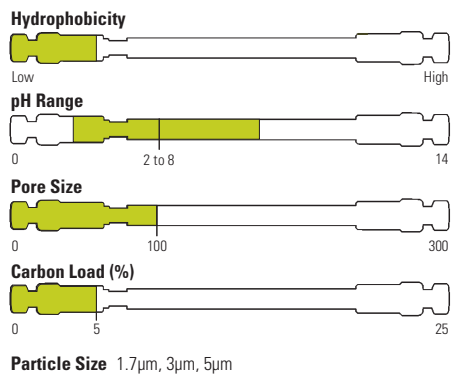
Mobile phase: Hexane +0.2% propan-2-ol (IPA)
 Flow rate: 2.0mL/min
 Temperature: 40°C
 Detection: 254nm
 Injection volume: 10µL
 Sample: Mixture of standards (200-1000 ug/ml) of the following:
 α-tocopherol
 β-tocopherol
 γ-tocopherol
 δ-tocopherol



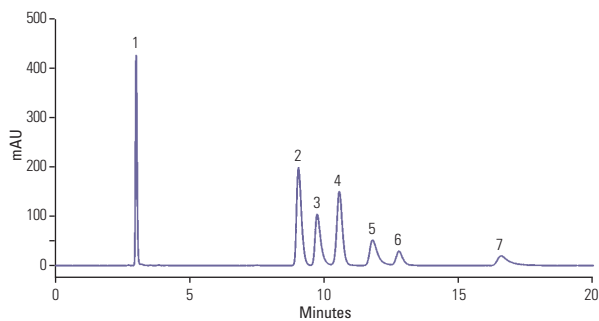
Synchronis HILIC

Provides enhanced retention of polar and hydrophilic analytes

- Alternative selectivity to Synchronis C18
- Improved sensitivity with MS detection
- No need for ion-pair or derivatisation
- Outstanding peak shape and sensitivity
- Highly pure, high surface area silica particles
- Neutral (uncharged), highly polar surface



Catecholamines



Column: Synchronis HILIC, 5µm, 250 x 4.6mm
Part Number: 97505-254630

Mobile phase: water : acetonitrile : 200mM ammonium formate (10.5 : 84.5 : 5)

Flow rate: 1.0mL/min

Temperature: 40°C

Detection: 280nm

Injection volume: 5µL

Sample:

1. catechol
2. 5-HIAA
3. DOPAC
4. serotonin
5. tyrosine
6. dopamine
7. L-DOPA

Synchronis Ordering Guide

Particle Size (µm)	Format	Length (mm)	ID (mm)	C18	C8	aQ	Phenyl			
1.7	UHPLC Column	30	2.1	97102-032130	–	–	–			
			2.1	97102-052130	97202-052130	97302-052130	97902-052130			
		3.0	97102-053030	–	–	–				
		4.6	97102-054630	97202-054630	97302-054630	97902-054630				
	100	2.1	100	2.1	97102-102130	97202-102130	97302-102130	97902-102130		
				3.0	97102-103030	97202-103030	97302-103030	97902-103030		
		3.0	100	3.0	97103-032130	–	–	–		
				2.1	97103-052130	97203-052130	97303-052130	97903-052130		
3	HPLC Column	30	2.1	97103-032130	–	–	–			
			2.1	97103-052130	97203-052130	97303-052130	97903-052130			
		3.0	97103-053030	–	–	–				
		4.6	97103-054630	–	–	–				
	100	2.1	100	2.1	97103-102130	–	–	–		
				3.0	97103-103030	97203-103030	97303-103030	–		
		3.0	100	3.0	97103-104630	97203-104630	97303-104630	97903-104630		
				2.1	97103-152130	–	–	–		
	150	2.1	150	2.1	97103-152130	–	–	–		
				4.6	97103-154630	97203-154630	97303-154630	97903-154630		
		4.6	150	4.6	97105-012101	97205-012101	97305-012101	97905-012101		
				3.0	97105-013001	97205-013001	97305-013001	97905-013001		
5	Drop-in Guard (4/pk)	10	2.1	97105-012101	97205-012101	97305-012101	97905-012101			
			3.0	97105-013001	97205-013001	97305-013001	97905-013001			
			4.0/4.6	97105-014001	97205-014001	97305-014001	97905-014001			
	HPLC Column	30	30	2.1	97105-032130	97205-032130	97305-032130	97905-032130		
				50	2.1	97105-052130	97205-052130	97305-052130	97905-052130	
					3.0	97105-053030	97205-053030	97305-053030	97905-053030	
		4.6	97105-054630		97205-054630	97305-054630	97905-054630			
		100	2.1	100	2.1	97105-102130	97205-102130	97305-102130	97905-102130	
					3.0	97105-103030	97205-103030	97305-103030	97905-103030	
			3.0	100	3.0	97105-104630	97205-104630	97305-104630	97905-104630	
					2.1	97105-152130	97205-152130	97305-152130	97905-152130	
		150	2.1	150	2.1	97105-152130	97205-152130	97305-152130	97905-152130	
					3.0	97105-153030	97205-153030	97305-153030	97905-153030	
					4.0	97105-154030	97205-154030	97305-154030	97905-154030	
			4.6	4.6	150	4.6	97105-154630	97205-154630	97305-154630	97905-154630
						2.1	97105-252130	–	–	–
				3.0	250	3.0	97105-253030	97205-253030	97305-253030	97905-253030
						4.0	97105-254030	97205-254030	97305-254030	97905-254030
		4.6	97105-254630	97205-254630	97305-254630	97905-254630				

Format	Length (mm)	ID (mm)	Cat. No.
UNIGUARD Guard Cartridge Holder	10	2.1	852-00
		3.0	852-00
		4.0/4.6	850-00

Amino	Silica	HILIC
-	-	-
97702-052130	97002-052130	97502-052130
-	-	-
97702-054630	97002-054630	97502-054630
97702-102130	97002-102130	97502-102130
97702-103030	97002-103030	97502-103030
-	-	-
97703-052130	97003-052130	97503-052130
-	-	-
-	-	-
-	-	-
-	-	-
97703-104630	97003-104630	97503-104630
-	-	97503-152130
97703-154630	97003-154630	97503-154630
97705-012101	97005-012101	97505-012101
97705-013001	97005-013001	97505-013001
97705-014001	97005-014001	97505-014001
97705-032130	97005-032130	97505-032130
97705-052130	97005-052130	97505-052130
97705-053030	97005-053030	97505-053030
97705-054630	97005-054630	97505-054630
97705-102130	97005-102130	97505-102130
97705-103030	97005-103030	97505-103030
97705-104630	97005-104630	97505-104630
97705-152130	97005-152130	97505-152130
97705-153030	97005-153030	97505-153030
97705-154030	97005-154030	97505-154030
97705-154630	97005-154630	97505-154630
-	-	-
97705-253030	97005-253030	97505-253030
97705-254030	97005-254030	97505-254030
97705-254630	97005-254630	97505-254630

Thermo Scientific Hypercarb HPLC Columns

100% porous graphitic carbon for extended separation capabilities

- Exceptional retention of very polar analytes
- Separates structurally related substances
- pH stable from 0 to 14
- Ideal for high temperature applications

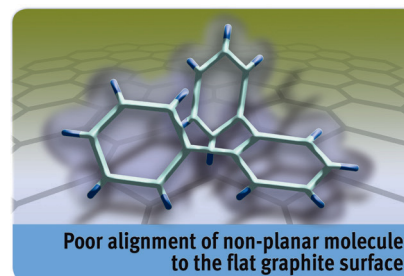
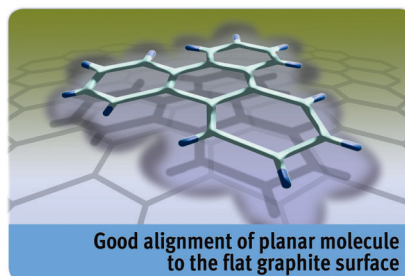
Porous Graphitic Carbon (PGC) is a unique stationary phase composed of flat sheets of hexagonally arranged carbon atoms with a satisfied valence, as in a very large polynuclear aromatic molecule. Thermo Scientific™ Hypercarb™ columns are unlike traditional silica bonded phases in both its structure and retentive properties, allowing for total pH stability and the retention and separation of highly polar species. Hypercarb columns are ideally suited to solve “problem” separations, in both reversed phase and normal phase HPLC and LC/MS applications.

Retention and Resolution

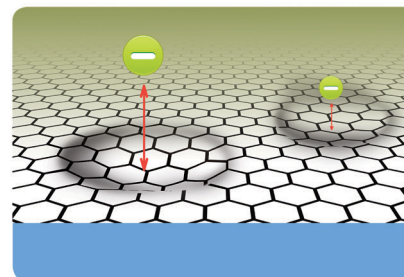
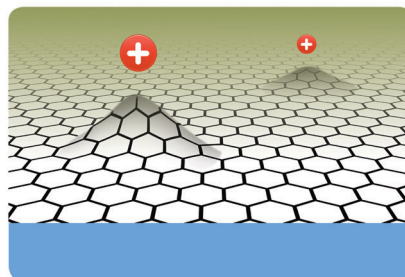
The mechanism of interaction is very dependent upon both the polarity and planarity (shape) of the solute. These specific interaction mechanisms allow the successful retention and resolution of analytes that cannot be separated by typical reversed phase HPLC. Removal of complex buffering systems or ion-pair reagents, and use of increased organic modifier concentration for polar analytes allows greater compatibility with detection techniques such as MS.

The overall retention on Hypercarb columns is a combination of two mechanisms:

1) Adsorption: The strength of analyte interactions with Hypercarb columns is largely dependent on the molecular area in contact with the graphite surface, and also on the type and positioning of the functional groups in relation to the graphite surface at the points of contact. The approach of a planar and a non-planar molecule to the Hypercarb surface is shown in the diagrams above. The strength of the interaction depends upon the size and orientation of the molecular area that is able to come in contact with the flat graphite surface. More planar molecules will show more retention than rigid molecules with a 3-dimensional spatial arrangement.



Schematic representation of molecular area of a planar and non-planar molecule interacting with the Hypercarb surface



Schematic representation of a point charge approaching the Hypercarb surface

2) Charge induced interactions of a polar analyte with the polarizable surface of graphite: The second mechanism, charge-induced dipole, is illustrated above and accounts for the strong retention exhibited by polar analytes. As the polar group with a permanent dipole approaches the surface, an induced dipole is formed, increasing the attraction between the analyte and graphite surface. These charges should not be confused with the overall ionic charge of the molecule, such as a basic compound ionized in acidic pH conditions. The charge-induced dipole mechanism is strictly due to the interaction of the electrostatic charge of the polar molecule with the graphite surface.

The strong mechanisms of interaction with Hypercarb columns usually allows for shorter columns to be used during the method development process. In most cases, 100mm length columns or shorter are sufficient for a separation.

