Shim-pack Scepter PFPP

Analytical columns

Particle Size (µm)	I.D. (mm) / Length (mm)	2.0	2.1	3.0	4.0	4.6	Pressure Tolerance (MPa)
1.9	20	227-31052-05	227-31053-01	-	-	-	100
	30	227-31052-06	227-31053-02	-	-	-	
	50	227-31052-01	227-31053-03	227-31054-01	-	-	
	75	227-31052-02	227-31053-04	227-31054-02	-	-	
	100	227-31052-03	227-31053-05	227-31054-03	-	-	
	150	227-31052-04	227-31053-06	227-31054-04	-	-	
3	20	-	227-31055-01	-	-	-	45
	33	-	227-31055-02	-	-	227-31057-01	
	50	-	227-31055-03	227-31056-01	-	227-31057-02	
	75	-	227-31055-04	227-31056-02	-	227-31057-03	
	100	-	227-31055-05	227-31056-03	-	227-31057-04	
	150	-	227-31055-06	227-31056-04	-	227-31057-05	
	250	-	-	-	-	227-31057-06	
5	20	-	227-31058-01	-	-	-	45
	33	-	227-31058-02	-	-	227-31061-01	
	50	-	227-31058-03	227-31059-01	-	227-31061-02	
	75	-	227-31058-04	227-31059-02	-	227-31061-03	
	100	-	227-31058-05	227-31059-03	-	227-31061-04	
	150	-	227-31058-06	227-31059-04	227-31060-01	227-31061-05	
	250	-	-	-	227-31060-02	227-31061-06	

Analytical Guard cartridge columns

Particle Size (µm)	I.D. (mm) / Length (mm)	2.1	3.0	4.0	Holder
1.9	5	227-31150-01	227-31150-02	-	227-31170-01
3	10	227-31151-01	227-31152-01	227-31153-01	227-31172-03
	20	227-31151-02	227-31152-02	227-31153-02	227-31172-04
5	10	227-31154-01	227-31155-01	227-31156-01	227-31172-03
	20	227-31154-02	227-31155-02	227-31156-02	227-31172-04

Preparative columns

Particle Size (µm)	I.D. (mm) / Length (mm)	10.0	20.0	30.0	Pressure Tolerance (MPa)
5	50	-	227-31111-01	227-31112-01	30
	75	-	-	227-31112-02	
	100	-	227-31111-02	227-31112-03	
	150	227-31110-01	227-31111-03	227-31112-04	
	250	227-31110-02	227-31111-04	227-31112-05	

Prep Guard cartridge columns

Particle Size (µm)	I.D. (mm) / Length (mm)	10.0	Holder
5	10	227-31157-01	227-31171-01

Shim-pack Scepter Phenyl

Analytical columns

Particle Size (µm)	I.D. (mm) / Length (mm)	2.0	2.1	3.0	4.0	4.6	Pressure Tolerance (MPa)
1.9	20	227-31062-05	227-31063-01	-	-	-	100
	30	227-31062-06	227-31063-02	-	-	-	
	50	227-31062-01	227-31063-03	227-31064-01	-	-	
	75	227-31062-02	227-31063-04	227-31064-02	-	-	
	100	227-31062-03	227-31063-05	227-31064-03	-	-	
	150	227-31062-04	227-31063-06	227-31064-04	-	-	
3	20	-	227-31065-01	-	-	-	45
	33	-	227-31065-02	-	-	227-31067-01	
	50	-	227-31065-03	227-31056-01	-	227-31067-02	
	75	-	227-31065-04	227-31066-02	-	227-31067-03	
	100	-	227-31065-05	227-31066-03	-	227-31067-04	
	150	-	227-31065-06	227-31066-04	-	227-31067-05	
	250	-	-	-	-	227-31067-06	
5	20	-	227-31068-01	-	-	-	45
	33	-	227-31068-02	-	-	227-31071-01	
	50	-	227-31068-03	227-31069-01	-	227-31071-02	
	75	-	227-31068-04	227-31069-02	-	227-31071-03	
	100	-	227-31068-05	227-31069-03	-	227-31071-04	
	150	-	227-31068-06	227-31069-04	227-31070-01	227-31071-05	
	250	-	-	-	227-31070-02	227-31071-06	

Analytical Guard cartridge columns

Particle Size (µm)	I.D. (mm) / Length (mm)	2.1	3.0	4.0	Holder
1.9	5	227-31158-01	227-31158-02	-	227-31170-01
3	10	227-31159-01	227-31160-01	227-31161-01	227-31172-03
	20	227-31159-02	227-31160-02	227-31161-02	227-31172-04
5	10	227-31162-01	227-31163-01	227-31164-01	227-31172-03
	20	227-31162-02	227-31163-02	227-31164-02	227-31172-04

Preparative columns

Particle Size (µm)	I.D. (mm) / Length (mm)	10.0	20.0	30.0	Pressure Tolerance (MPa)
5	50	-	227-31114-01	227-31115-01	30
	75	-	-	227-31115-02	
	100	-	227-31114-02	227-31115-03	
	150	227-31113-01	227-31114-03	227-31115-04	
	250	227-31113-02	227-31114-04	227-31115-05	

Prep Guard cartridge columns

Particle Size (µm)	I.D. (mm) / Length (mm)	10.0	Holder
5	10	227-31165-01	227-31171-01

Diol-HILIC

Analytical columns

Particle Size (µm)	I.D. (mm) / Length (mm)	2.0	2.1	3.0	4.0	4.6	Pressure Tolerance (MPa)
1.9	20	-	-	-	-	-	100
	30	-	-	-	-	-	
	50	227-31042-03	227-31043-03	227-31044-03	-	-	
	75	227-31042-01	227-31043-01	227-31044-01	-	-	
	100	227-31042-02	227-31043-02	227-31044-02	-	-	
	150	-	-	-	-	-	
3	20	-	227-31045-01	-	-	-	45
	33	-	227-31045-02	-	-	227-31047-01	
	50	-	227-31045-03	227-31046-01	-	227-31047-02	
	75	-	227-31045-04	227-31046-02	-	227-31047-03	
	100	-	227-31045-05	227-31046-03	-	227-31047-04	
	150	-	227-31045-06	227-31046-04	-	227-31047-05	
	250	-	-	-	-	227-31047-06	
5	20	-	227-31048-01	-	-	-	45
	33	-	227-31048-02	-	-	227-31051-01	
	50	-	227-31048-03	227-31049-01	-	227-31051-02	
	75	-	227-31048-04	227-31049-02	-	227-31051-03	
	100	-	227-31048-05	227-31049-03	-	227-31051-04	
	150	-	227-31048-06	227-31049-04	227-31050-01	227-31051-05	
	250	-	-	-	227-31050-02	227-31051-06	

Analytical Guard cartridge columns

Particle Size (µm)	I.D. (mm) / Length (mm)	2.1	3.0	4.0	Holder
3	10	227-31144-01	227-31145-01	227-31146-01	227-31172-03
	20	227-31144-02	227-31145-02	227-31146-02	227-31172-04
5	10	227-31147-01	227-31148-01	227-31149-01	227-31172-03
	20	227-31147-02	227-31148-02	227-31149-02	227-31172-04

Shim-pack Scepter C4

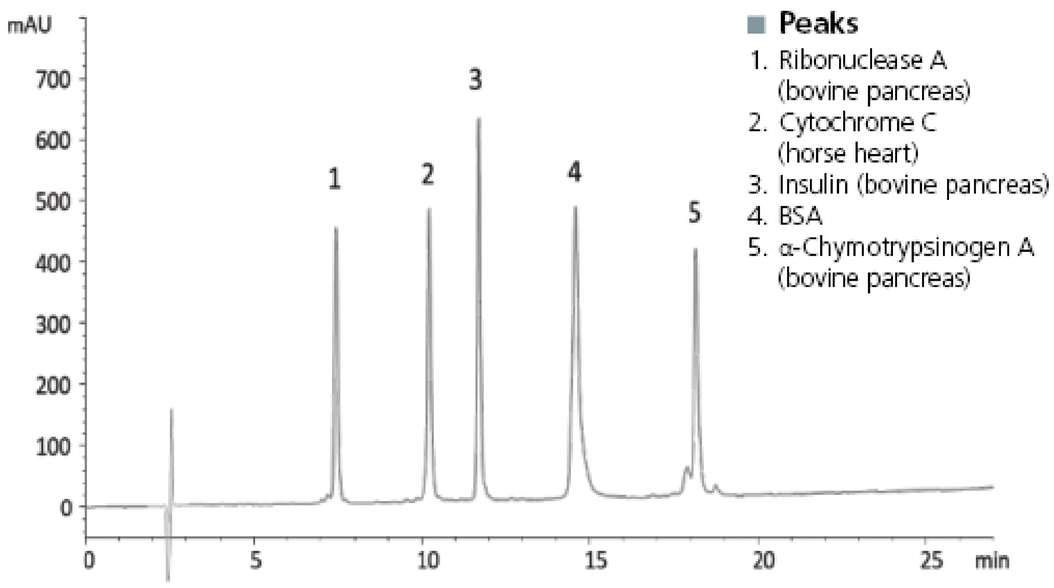
Design for biomolecules separations

Shim-pack Scepter C4 is a wide-bore C4 column that uses an organic silica hybrid base which is suitable for separation of proteins such as monoclonal antibodies. The column can be used for analysis of proteins with a molecular weight of up to approximately 150,000 and is suitable for analysis of antibodies as it is very stable even under acidic or high-temperature conditions because an organic silica hybrid base is used. It is also effective for high-sensitivity analysis on LC/MS as it provides good peak shapes even when using a formic acid mobile phase with low ion paring effect. In addition, it is effective for separation of highly-hydrophobic proteins, nucleotides and small molecules that are hard to separate using a regular C18 column.

Bonded Phase	Butyl Groups
Particle Size	1.9µm, 3µm, 5µm
Pore Size	30 nm
End-capping	Yes
pH Range	1 to 10
USP Code	L26

Analysis Examples

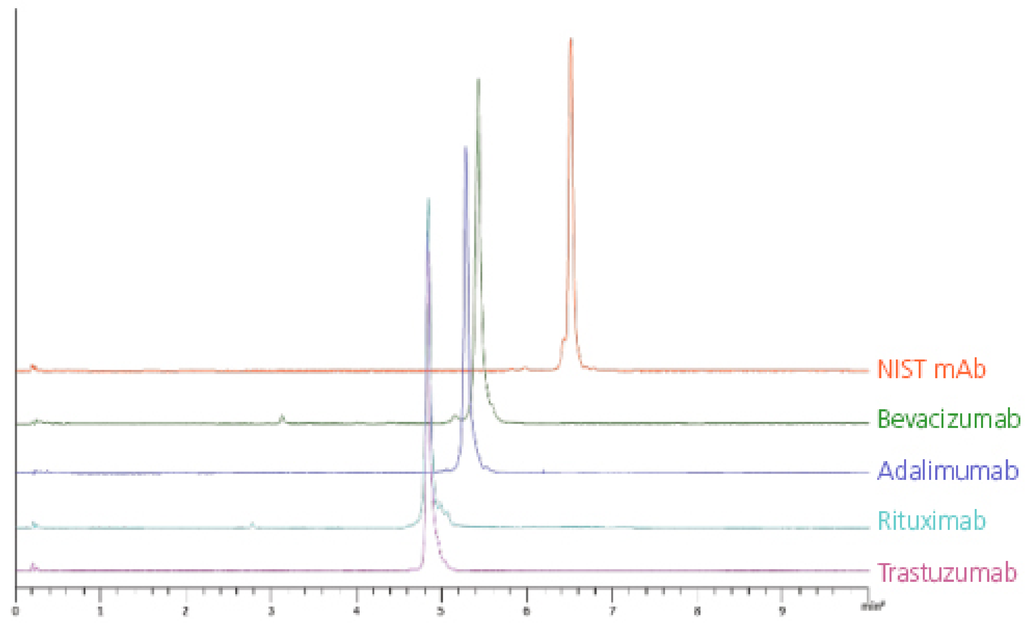
Analysis of Proteins



Conditions

Column	: Shim-pack Scepter C4 (5 µm, 150 x 3.0 mm I.D.) (P/N: 227-31181-04)
Mobile Phase	: A) Water/TFA (100/0.1) B) Acetonitrile/TFA (100/0.1) 20-60%B (0-27 min), 90%B (27-35 min), 20%B (35-50 min)
Flow Rate	: 0.4 mL/min
Col. Temp.	: 70 °C
Detection	: UV at 220 nm
Injection Vol.	: 10 µL (0.25 – 0.50 mg/mL) Column

Analysis of Monoclonal Antibodies



Conditions

Column	: Shim-pack Scepter C4 (1.9 µm, 50 x 2.1 mm I.D.) (P/N: 227-31175-03)
Mobile Phase	: A) Water/TFA (100/0.1) B) Acetonitrile/TFA (100/0.1) 25-45%B (0-10 min)
Flow Rate	: 0.4 mL/min
Col. Temp.	: 80 °C
Detection	: UV at 280 nm
Injection Vol.	: 2 µL
Sample Conc.	: 0.2 mg/mL

Analytical columns

Particle Size (µm)	I.D. (mm) / Length (mm)	2.1	3.0	4.0	4.6	Pressure Tolerance (MPa)
1.9	20	227-31175-01	-	-	-	100
	30	227-31175-02	227-30817-02	-	-	
	50	227-31175-03	227-31176-01	-	-	
	100	227-31175-04	227-31176-02	-	-	
	125	227-31175-05	227-31176-03	-	-	
	150	227-31175-06	227-31176-04	-	-	
3	20	227-31177-01	-	-	-	45
	33	227-31177-02	-	-	227-31179-01	
	50	227-31177-03	227-31178-01	-	227-31179-02	
	75	227-31177-04	227-31178-02	-	227-31179-03	
	100	227-31177-05	227-31178-03	-	227-31179-04	
	150	227-31177-06	227-31178-04	-	227-31179-05	
	250	-	-	-	227-31179-06	
5	20	227-31180-01	-	-	-	45
	33	227-31180-02	-	-	227-31183-01	
	50	227-31180-03	227-31181-01	-	227-31183-02	
	75	227-31180-04	227-31181-02	-	227-31183-03	
	100	227-31180-05	227-31181-03	227-31182-01	227-31183-04	
	150	227-31180-06	227-31181-04	227-31182-02	227-31183-05	
	250	-	-	-	227-31183-06	

Analytical Guard cartridge columns

Particle Size (µm)	I.D. (mm) / Length (mm)	2.1	3.0	4.0	Holder
1.9	5	227-31187-01	227-31187-02	-	227-31170-01
3	10	227-31188-01	227-31189-01	227-31190-01	227-31172-01
	20	227-31188-02	227-31189-02	227-31190-02	227-31172-02
5	10	227-31191-01	227-31192-01	227-31193-01	227-31172-01
	20	227-31191-02	227-31192-02	227-31193-02	227-31172-02

Preparative columns

Particle Size (µm)	I.D. (mm) / Length (mm)	10	20	30	Pressure Tolerance (MPa)
5	50	-	227-31185-01	227-31186-01	30
	75	-	-	227-31186-02	
	100	-	227-31185-02	227-31186-03	
	150	227-31184-01	227-31185-03	227-31186-04	
	250	227-31184-02	227-31185-04	227-31186-05	

Preparative guard cartridges columns

Particle Size (µm)	I.D. (mm) / Length (mm)	10	20	30	Holder
5	10	227-31194-01	227-31195-01	227-31196-01	227-31171-01

Shim-pack Arata LC Columns

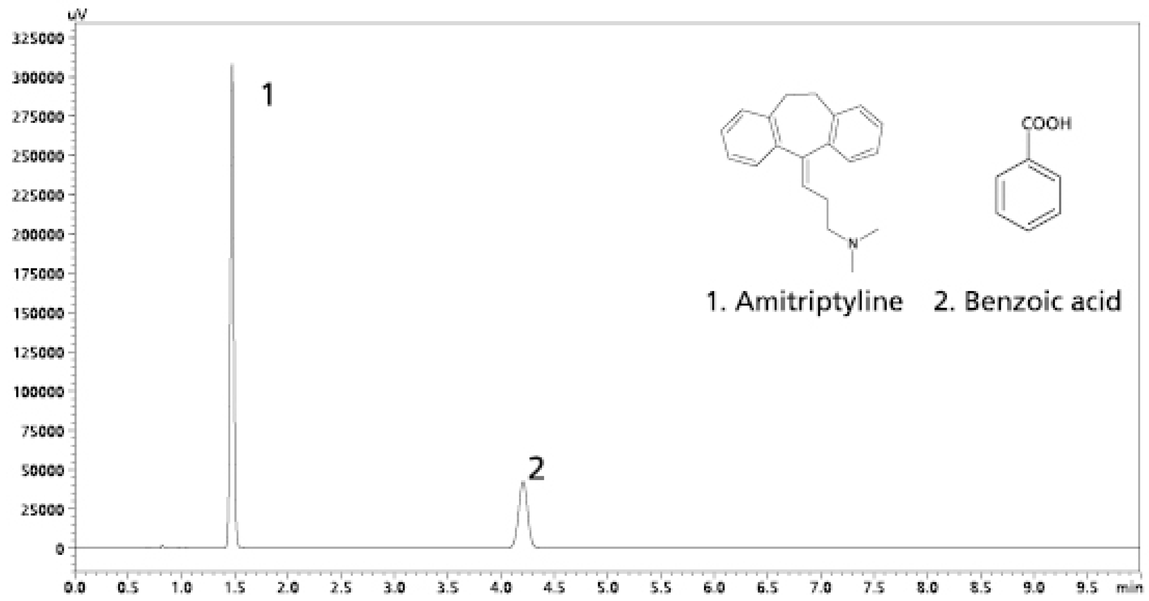
Unprecedented Resolution and Peak Shape of Basic Compounds

Even for LC columns that claim to be designed for basic compounds, adequate resolution often can not be obtained due to problems such as leading of highly polar basic compounds, peak shape deterioration of acidic compounds, or long equilibration time required for low ionic strength acidic mobile phase.

All of these issues have been solved with Shim-pack Arata that was specifically designed to give unmatched peak shape for basic compounds.

Unmatched Peak Shape (Elegantly Designed for A Wide Range of Compounds)

Unmatched peak shape of basic compounds could be achieved while maintaining good peak shape for acidic compounds with Shim-pack Arata LC columns. Even with low ionic strength acidic mobile phase, such as 0.1% formic acid containing mobile phase, excellent peak shape of both amitriptyline (a basic compound) and benzoic acid (an acidic compound) could be achieved.



Analysis of Amitriptyline and Benzoic Acid with The Mobile Phase with 0.1% Formic Acid

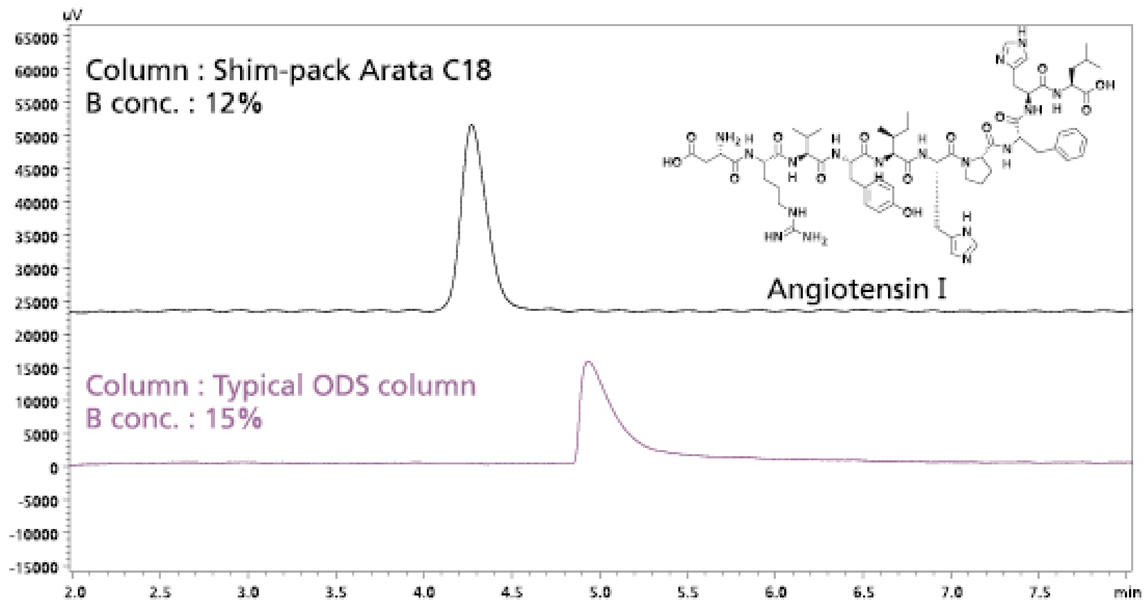
Analytical Conditions

Column	:	Shim-pack Arata C18
Mobile Phase	:	0.1% HCOOH in H2O / CH3CN = 70 / 30
Flow Rate	:	0.4 mL/min
Detection	:	254 nm
Column Temp.	:	40 °C
Inj. Volume	:	2 µL

* Gel Lot QC test analytical condition

Excellent Separation Performance for Peptides (Even with Weak Ion Paring Acids)

In order to obtain good peak shape of peptides under reversed phase chromatography, TFA containing mobile phases are frequently used which the ion pairing effect is relatively strong. However, TFA could cause ion suppression in LC/MS (/MS) analysis. Excellent peak shape and separation performance for peptides could be achieved on the Shim-pack Arata LC column even with 0.1 % formic acid (weak ion paring acid) containing mobile phase.



Analysis of Angiotensin I Using Isocratic Mobile Phase
with 0.1% Formic Acid (Shim-pack Arata C18 vs. Typical ODS)

Analytical Conditions

Column	:	Shim-pack Arata C18
Mobile Phase	:	A: 0.1% HCOOH in H2O
	:	B: 0.1% HCOOH in CH3CN
Flow Rate	:	0.4 mL/min
Detection	:	214 nm
Column Temp.	:	40 °C
Inj. Volume	:	1 µL
Sample	:	Angiotensin
Vial	:	TORAST-H™ Bio Vial

* Gel Lot QC test analytical condition

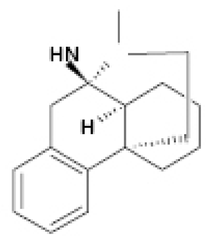
Column	Asymmetry
Shim-pack Arata C18	1.26
Typical ODS column	6.94

* Peptide is usually analyzed using gradient condition. Isocratic condition was used for this application in order to show the difference of LC columns more clearly. Result using gradient condition on Shim-pack Arata C18 was also evaluated and it was confirmed that angiotensin was fully eluted from the column with isocratic condition.

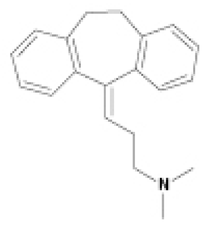
** Acetonitrile concentration was adjusted in order that the retention time of peptide on each column become similar.

Rapid Equilibration (Even with Low Ionic Strength Acidic Mobile Phases)

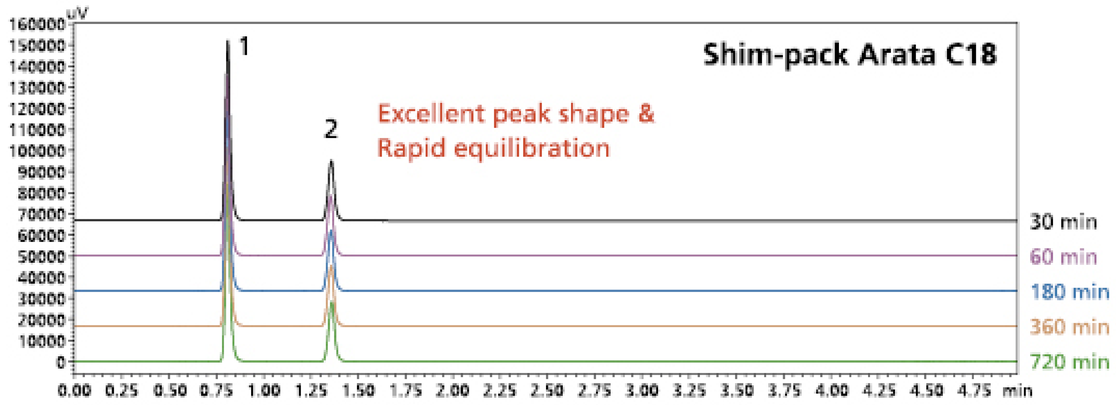
When analyzing basic compounds on a typical ODS column with low ionic strength acidic mobile phase, peak shape and long equilibration times are common problems. Shim-pack Arata LC columns can be rapidly equilibrated in low ionic strength acidic mobile phases yielding excellent peak shape and stable retention times.



1. Dextromethorphan



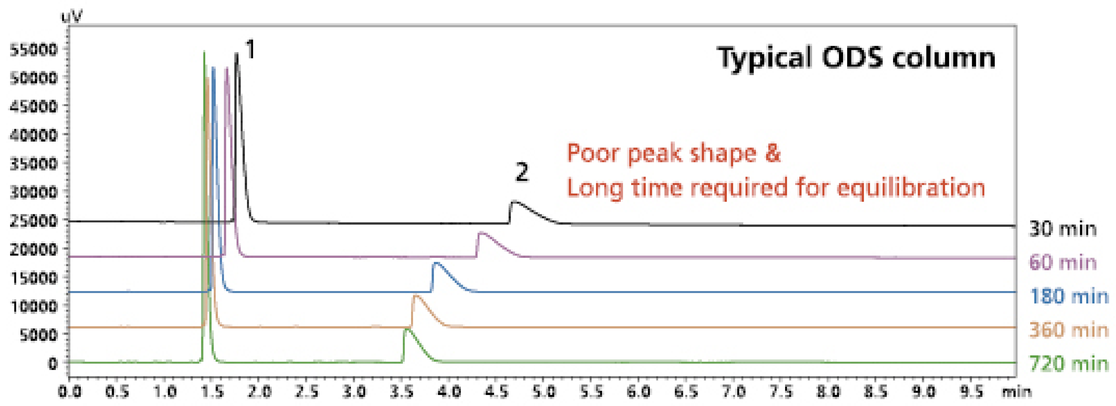
2. Amitriptyline



■ **Analytical Conditions**

Instruments	:	NexeraX2MP_M30A (STD Cell)
Column	:	Shim-pack Arata C18 (3.0 × 75 mm, 2.2 µm) Typical ODS column (3.0 × 75 mm, sub 2 µm),
Mobile Phase	:	0.1% HCOOH in H2O / CH3CN = 70 / 30
Flow Rate	:	0.4 mL/min
Detection	:	280 nm
Column Temp.	:	40 °C
Inj. Volume	:	2 µL
Sample	:	Amitriptyline, Dextromethorphan

	Compounds	Equilibration Time (min)	10	30	60	120	180	240	360	480	600	720	CV(%)
1	Dextromethorphan	Retention Time (min)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.2
		Symmetry Factor	1.20	1.19	1.19	1.18	1.18	1.18	1.18	1.18	1.18	1.18	0.6
2	Amitriptyline	Retention Time (min)	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	0.3
		Symmetry Factor	1.06	1.07	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	0.3



* Both were new columns (shipping solvent : acetonitrile) and equilibrated with mobile phase without any conditioning. Basic drugs were analyzed after a certain period of time of equilibration and RT and symmetry factor of the drugs were compared.

	Compounds	Equilibration Time (min)	10	30	60	120	180	240	360	480	600	720	CV(%)
1	Dextromethorphan	Retention Time (min)	1.9	1.8	1.7	1.6	1.5	1.5	1.5	1.4	1.4	1.4	10.4
		Symmetry Factor	3.28	3.14	3.01	2.70	2.63	2.56	2.51	2.49	2.56	2.49	10.2
2	Amitriptyline	Retention Time (min)	5.3	4.7	4.3	4.0	3.9	3.8	3.7	3.6	3.5	3.6	13.5
		Symmetry Factor	4.23	4.23	4.35	4.22	4.13	4.17	4.09	4.02	3.99	3.90	3.1

Comparison of Column Equilibration in The Mobile Phase with 0.1% Formic Acid (Shim-pack Arata C18 vs. Typical ODS Column)

Shim-pack Arata C18

Particle Size (µm)	I.D. (mm) / Length (mm)	2.0	3.0	4.6
2.2	50	227-32801-01	227-32802-01	-
	75	227-32801-02	227-32802-02	-
	100	227-32801-03	227-32802-03	-
	150	227-32801-04	227-32802-04	227-32805-04
	250	-	-	227-32805-05
5.0	50	227-32803-01	227-32804-01	227-32805-01
	75	227-32803-02	227-32804-02	227-32805-02
	100	227-32803-03	227-32804-03	227-32805-03
	150	227-32803-04	227-32804-04	227-32805-04
	250	-	-	227-32805-05

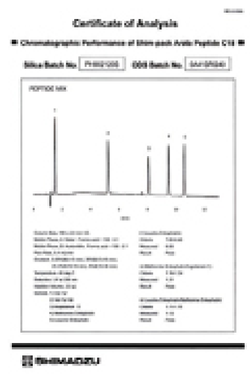
Shim-pack Arata Peptide Columns

Excellent Seperation Performance of Peptides

Typically, in order to obtain good peak shape of peptides under reversed phase chromatography, TFA containing mobile phases are frequently used which the ion pairing effect is relatively strong. However, TFA could cause ion suppression in LC/MS(/MS) analysis. Excellent peak shape and separation performance for peptides could be achieved on the Shim-pack Arata LC column even under formic acid (weak ion paring acid) containing mobile phase conditions, which are suitable for LC/MS(/MS) without the use of typical ion pairing agents.

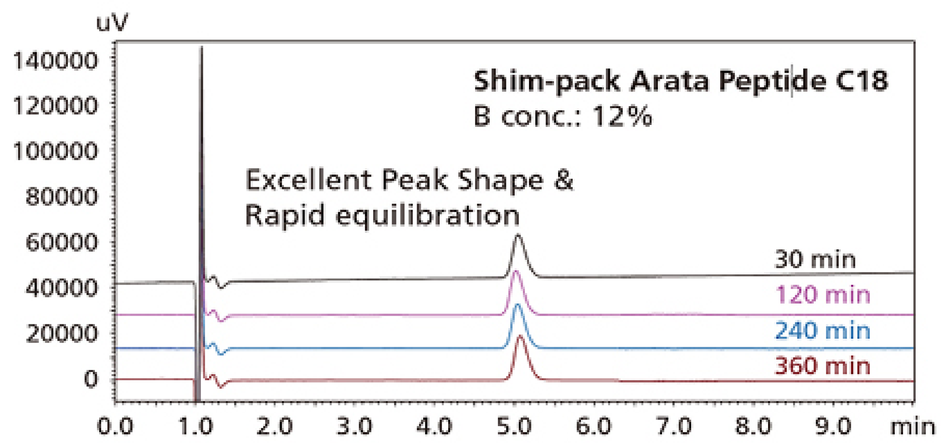
Increased Assurance of Peptide Analysis ~ Shim-pack Arata Peptide C 18 column ~

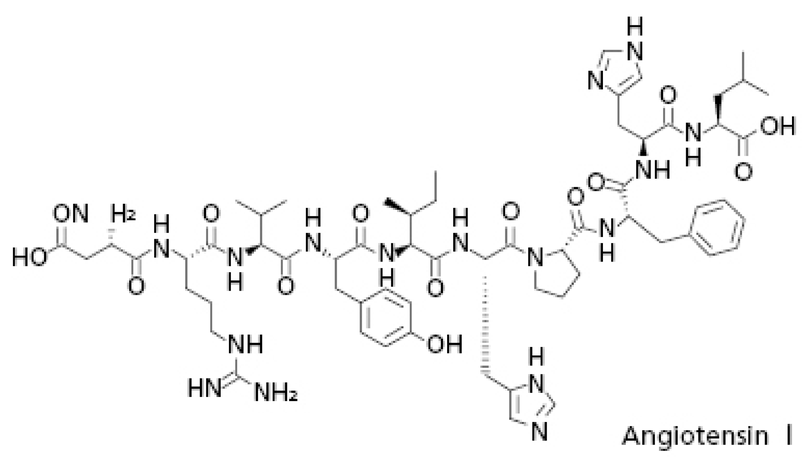
In order to ensure lot-to-lot reproducibility in peptide analysis, each lot of Shim-pack Arata Peptide C18material is tested using a mixture of peptide standards in addition to the standard Shim-pack Arata C18 lot QCtest. This test is carried out under severe condition using 0.1 % formic acid mobile phase to help ensure consistent column performance for requirements of customers under regulated requirements.use of typical ion pairing agents.



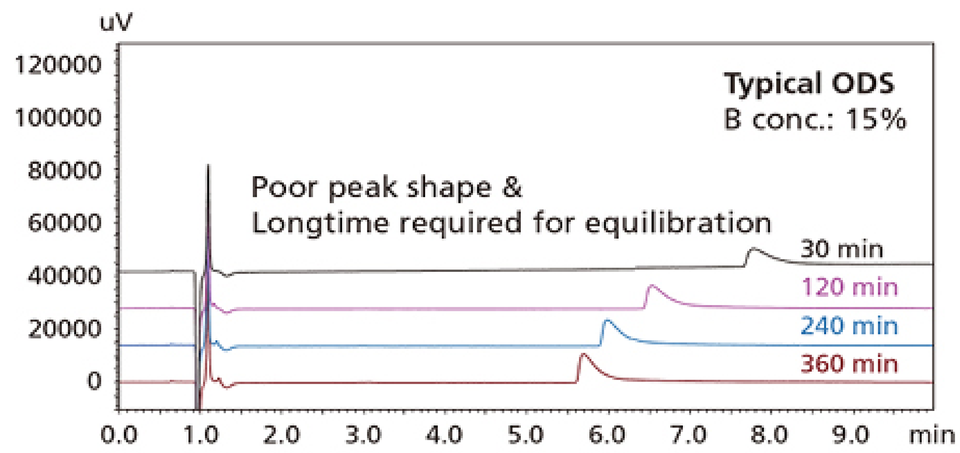
Excellent Seperation Performance of Peptides

When analyzing peptides on a typical ODS column with 0.1% formic acid mobile phase, not only poor peak shape but also long equilibration time required to obtain stable retention times and area is a common problem. Shim-pack Arata Peptide C18 columnscan be rapidly equilibrated even in 0.1% formic acid containing mobile phase, achieving excellent peak shape, stable retention andarea of peptides at the same time.





Compounds	Equilibration time (min)	30	60	120	180	240	360	CV
Angiotensin I	Retention time (min)	5.05	5.03	5.03	5.03	5.04	5.06	0.3
	Symmetry factor	1.26	1.24	1.25	1.25	1.24	1.25	0.4
	Area	2.17×10^5	2.13×10^5	2.26×10^5	2.25×10^5	2.23×10^5	2.24×10^5	1.9



Analytical Conditions
LC system : NexeraX2 MP_SPD20A (Semi-micro Cell)
LC column :
Shim-pack Arata Peptide C18 (3.0 × 75 mm, 2.2 µm)
Typical ODS (3.0 × 75 mm, Sub 2 µm)
Mobile Phase A : 0.1% HCOOH in H2O
Mobile Phase B : 0.1% HCOOH in CH3CN
Flow rate : 0.4 mL/min

Detection : 214 nm
Column temp. : 40 °C
Injection volume : 1 µL
Sample : Angiotensin I
Vial : Torast-H Bio Vial

*Peptide is usually analyzed using gradient conditions. Isocratic condition was used for this application in order to show the difference of LC columns more clearly. Acetonitrile concentration was adjusted in order that the retention time of peptide on each column become similar.

Compounds	Equilibration time (min)	30	60	120	180	240	360	CV
Angiotensin I	Retention time (min)	7.78	7.15	6.53	6.20	5.98	5.82	11.0
	Symmetry factor	4.89	4.38	4.85	4.87	4.93	4.92	3.9
	Area	1.65×10^5	1.58×10^5	1.76×10^5	1.78×10^5	1.83×10^5	1.84×10^5	5.3

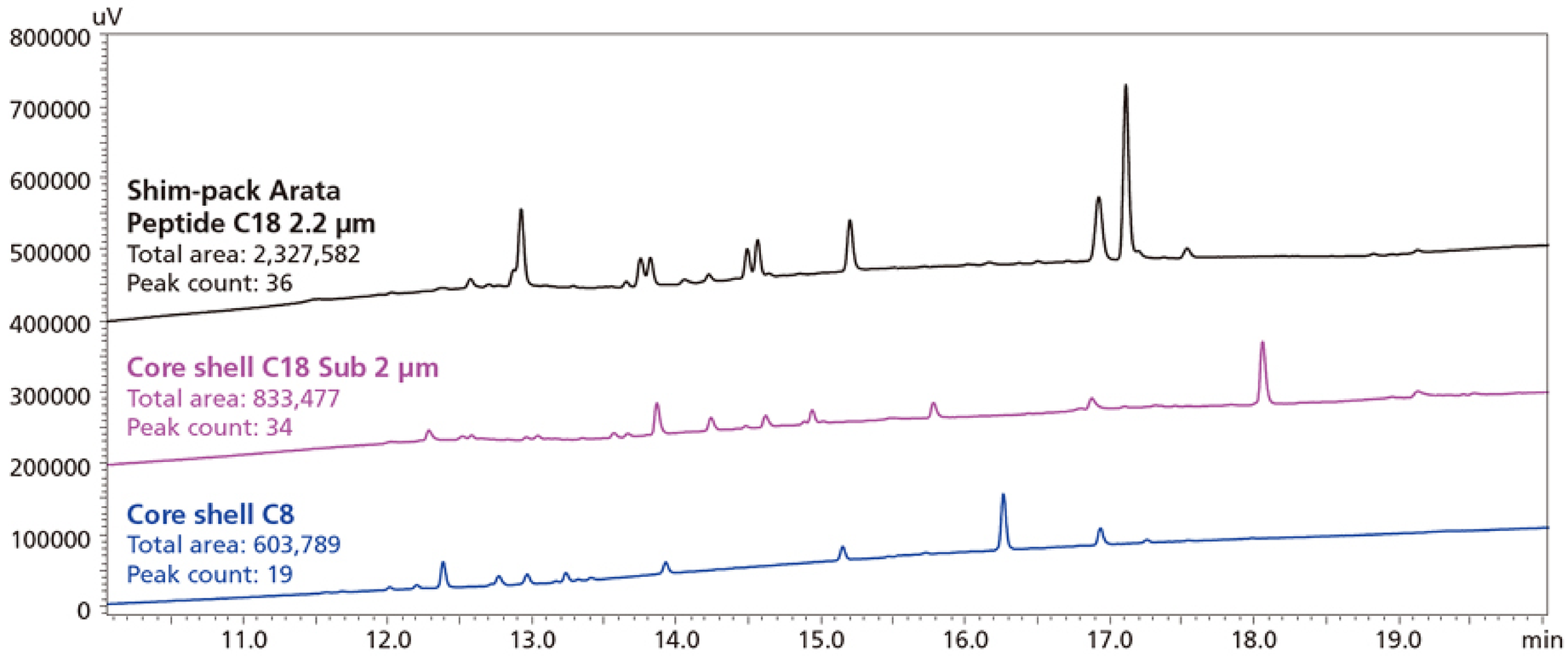
Both columns were new columns (shipping solvent: acetonitrile) and equilibrated with mobile phase without any conditioning. Angiotensin I was analyzed after a certain period of equilibration and retention time, symmetry factor and area of Angiotensin I were compared. The typical ODS showed poor peak symmetry and unstable retention time even after 360 minutes of equilibration. In contrast, Shim-pack Arata peptide C18 already showed stable retention after 30 minutes of equilibration and excellent peak shape was obtained.

High Peptide Recovery enabled by Shim-pack Arata technology

Since the adsorption of peptides to particles is minimized, high recovery of peptides is ensured and excellent peptide analysis can be provided by Shim-pack Arata Peptide C18 column.

Analysis of Tryptic Digest of Myoglobin

Peptides are known to show non-specific adsorption to particles of LC columns. A Shim-pack Arata Peptide C18 column showed high recovery of peptides.



Analytical Conditions

LC System : NexeraX2MP_M30A (STD Cell)
LC Column : Shim-pack Arata Peptide C18 (2.0 × 150 mm, 2.2 µm)
Core shell Peptide C18 (2.1×150 mm, sub 2 µm)
Core shell C8 (2.1 ×150 mm, sub 4 µm)
Mobile Phase A : 0.1% HCOOH in H2O
Mobile Phase B : 0.1% HCOOH in CH3CN
Gradient : 2%B (0-5 min)→45%B (20 min)→100%B (20.01 – 25 min)
→2%B (25.01 – 30 min)

Detection : 214 nm
Column temp. : 40 °C
Injection volume : 1 µL
Sample : Angiotensin I
Vial : Torast-H Bio Vial

Tryptic digest of myoglobin was analyzed using Shim-pack Arata Peptide C18 (2.2 µm), Core shell C18 (sub 2 µm) and a Core shell C8 (sub 4 µm). Compared to the other two columns, Shim-pack Arata Peptide C18 showed significantly larger peak area, which suggests that higher recovery could be obtained with Shim-pack Arata Peptide C18 column.

Shim-pack Arata Peptide C18

Particle Size (µm)	I.D. (mm) / Length (mm)	2.0
2.2	50	227-32806-01
	100	227-32806-02
	150	227-32806-03

Shim-pack XR Series

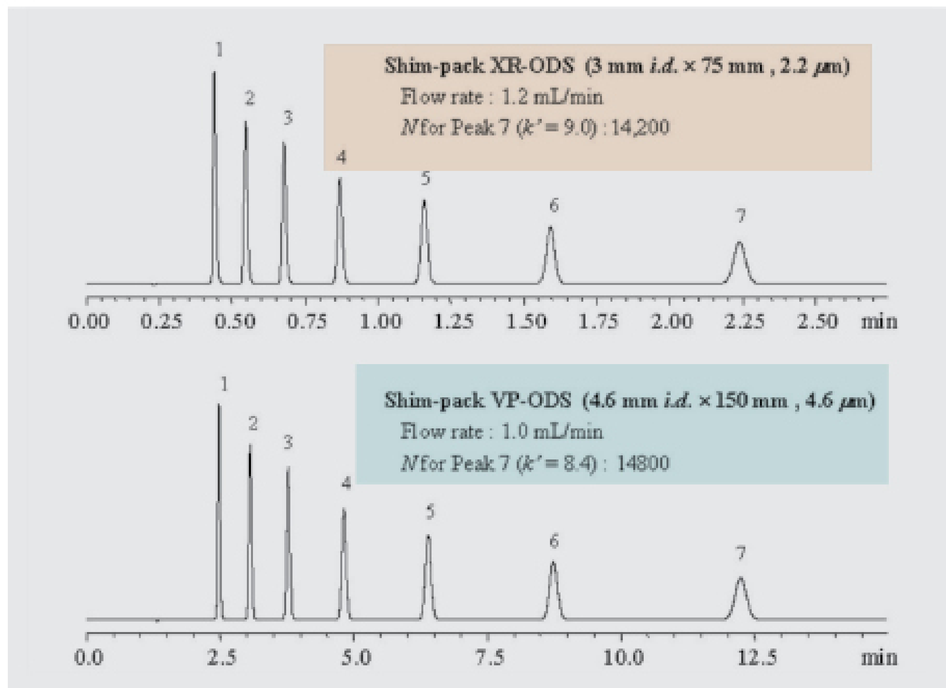
Shim-pack XR Series Columns Offer Versatility and Fast Analysis

Shim-pack XR Series columns use a 2.2 µm packing particle size and offer a skillful balance between resolution efficiency and pressure. An XR Series column provides resolution equivalent to a general-purpose column with 5 µm packing particle size (Shim-pack VP-ODS), but significantly reduces the analysis time. The pressure on the column under many analysis conditions does not exceed 35 MPa. Consequently, ultrafast analysis can be comfortably performed on an existing instrument.

	Shim-pack XR-ODS	Shim-pack XR-C8	Shim-pack XR-Phenyl	Shim-pack XR-SIL
Particle Size (µm)	2.2	2.2	2.2	2.2
Pore Size (nm)	12	12	12	12
Surface Area (m2/g)	340	340	340	340
Carbon Loading	18%	11%	11%	–
Pressure Tolerance (MPa)	35	35	35	20
Pore Volume (mL/g)	1.05	1.05	1.05	1.05
End-capping	Yes	Yes	Yes	–
Bonding Type	Monomeric	Monomeric	Monomeric	–
pH Range	2 - 7.5	2 - 7.5	2 - 7.5	–
USP Code	L1	L7	L11	L3

Shim-pack XR-ODS Permits Simple Switching from Conventional Analysis

The two chromatograms to the right show differences in analysis times when using different columns. The lower chromatogram is the result of analysis using a Shimadzu Shim-pack VP-ODS general-purpose column. The upper chromatogram is from analysis with a Shim-pack XR-ODS fast analysis column. As both Shim-pack VP-ODS and Shim-pack XR-ODS offer identical resolution properties, Shim-pack XR-ODS maintains the resolution while significantly reducing analysis times.



For more information of smooth transfer of methods from high-speed analysis to conventional analysis, please refer to page A-34

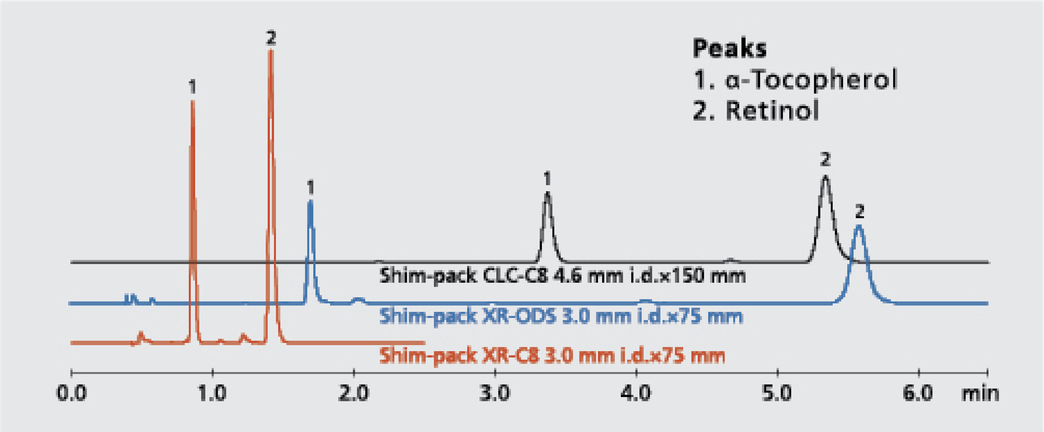
Shim-pack XR Series Comprehensive Product Range

In addition to the versatile Shim-pack XR-ODS that is bonded with the C18 group, the comprehensive Shim-pack XR Series product range includes the Shim-pack XR-C8 that is bonded with the C8 group to give different retention behavior to ODS, Shim-pack XR-Phenyl that is bonded with the phenylpropyl group, and the normal-phase Shim-pack XR-SIL silica column that achieves higher speeds.

Analysis Examples

Analysis of Fat-Soluble Vitamins

The fat-soluble vitamins E (tocopherol) and A (retinol) were analyzed. The Shim-pack XR-C8 column achieves higher speed than a conventional C8 column.

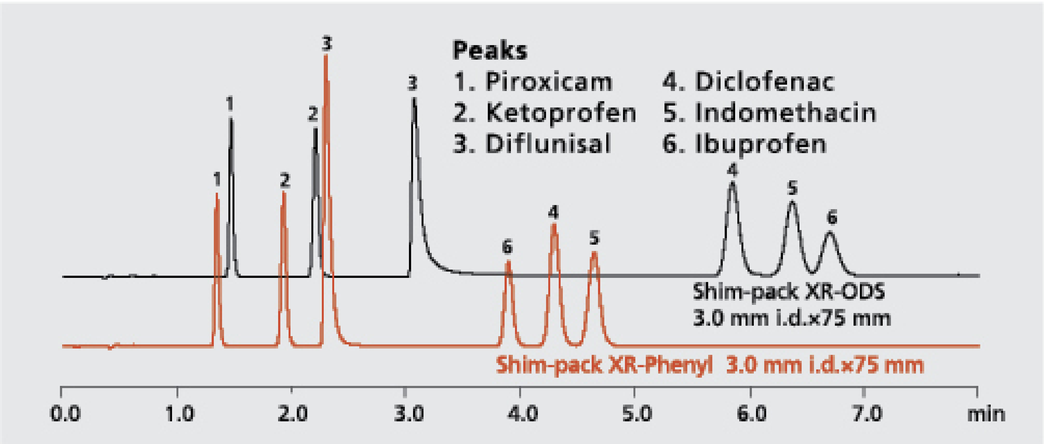


■ **Conditions**

Column	: Shim-pack XR-C8 (75 mmL. × 3.0 mmI.D., 2.2 µm) (P/N: 228-59902-93)
Mobile Phase	: Methanol
Flow Rate	: 1.0 mL/min
Col. Temp.	: 40 °C
Detection	: UV 290 nm

Analysis of Non-Steroidal Anti-Inflammatory Drug

The column was switched from Shim-pack XR-ODS to Shim-pack XR-Phenyl to improve the resolution.
The difference in retention properties between the ODS group and the phenylpropyl group improves the peak shape, controls the resolution, and reduces the analysis time.

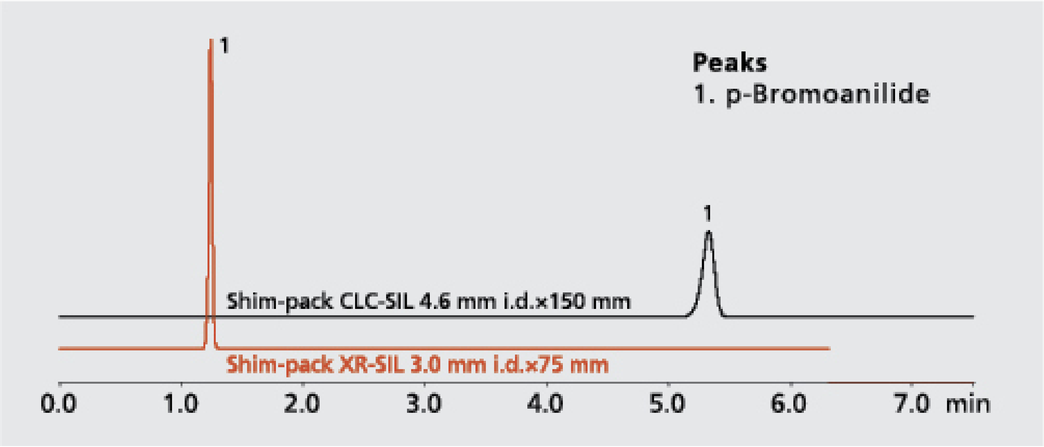


■ **Conditions**

Column	: Shim-pack XR-Phenyl (75 mmL. × 3.0 mmI.D., 2.2 µm) (P/N: 228-59904-93)
Mobile Phase	: A) 20 mmol/L Phosphate buffer solution (pH 2.5) B) Acetonitrile A/B = 30/20 (v/v)
Flow Rate	: 1.0 mL/min
Col. Temp.	: 40 °C
Detection	: UV 220 nm

Fast Normal-Phase Analysis

Organic solvents are used as the mobile phase for normal-phase analysis. Due to environmental considerations, it is necessary to reduce the consumption of mobile phase compared with normal reversed-phase analysis. The Shim-pack XR-SIL silica column increases the speed of normal-phase analysis while reducing the consumption of mobile phase. In this example, the analysis time is reduced by 80 % while maintaining the flow rate, thereby reducing the overall mobile phase consumption to 20 % or less.



■ **Conditions**

Column	: Shim-pack XR-SIL (75 mmL. × 3.0 mmI.D., 2.2 µm) (P/N: 228-59906-92)
Mobile Phase	: Hexane / Ethanol = 90/10 (v/v)
Flow Rate	: 1.0 mL/min
Col. Temp.	: 40 °C
Detection	: UV 254 nm

Shim-pack XR Series

Shim-pack XR Series, Shim-pack XR-ODS II and XR-ODS III High-Pressure Columns for Higher Resolution and Sensitivity

While the Shim-pack XR-ODS II and XR-ODS III use the same 2.2 µm packing particle size as the Shim-pack XR Series columns, they have higher 60 and 100MPa pressure tolerance. This allows them to achieve high-resolution fast analysis in a long column using a water/methanol mobile phase. This column significantly extends the range of applications of high-resolution fast analysis to include analysis near room temperature. The Shim-pack XR-ODSII and XR-ODS III columns are ideal for the Nexera UHPLC or Prominence UFLC. This combination achieves both faster speed and higher resolution.

	Shim-pack XR-ODS II	Shim-pack XR-ODS III	
Length (mm)	30, 50, 75, 100, 150	50, 75	150, 200
Particle Size (µm)	2.2	1.6	2.2
Pore Size (nm)	8	7.5	8
Surface Area (m2/g)	470	500	470
Carbon Loading	20%	22%	20%
Pressure Tolerance (MPa)	60	100	100
Pore Volume (mL/g)	1	0.95	1
End-capping	Yes	Yes	Yes
Bonding Type	Monomeric	Monomeric	Monomeric
pH Range	2 - 7.5	2 - 7.5	2 - 7.5
USP Code	L1	L1	L1

Extensive product range, including 1.5 mmI.D. column to reduce mobile phase consumption

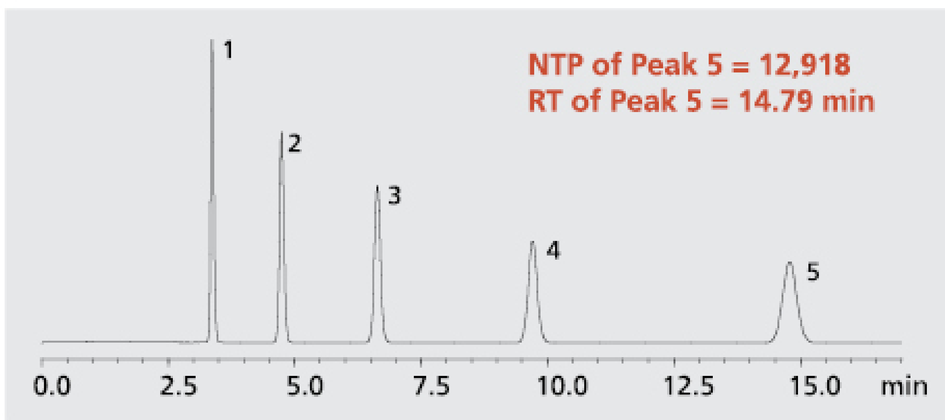
The Shim-pack XR-ODS II range includes a 1.5 mmI.D. model in addition to normal 2 mm and 3 mmI.D. columns. With an optimal flow rate of 0.2 to 0.3 mL/min, the 1.5 mmI.D. column offers the optimal flow rate for LC/MS and reduces mobile phase consumption.

Select a column to suit your purpose, whether shorter analysis times or high resolution

The Shim-pack XR-ODS III lineup features two columns: a short one utilizing a packing material with a particle size of 1.6 µm and a long one utilizing a 2.2 µm particle size, which is equivalent to the conventional XR column. This extensive lineup allows users to select a column according to analysis objectives, whether it's a short size to further shorten analysis times, or a long size to achieve high resolution while retaining the ease of use of the conventional XR column.

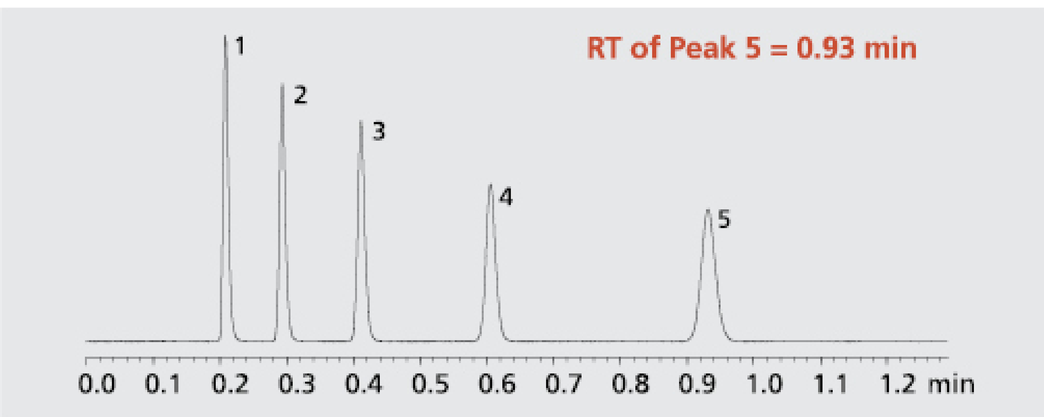
Shim-pack VP-ODS (150 mmL. × 4.6 mmI.D., 5 µm, P/N: 228-34937-91)

Peaks
1. Acetophenone
2. Propiophenone
3. Butyrophenone
4. Valerophenone
5. Hexanophenone



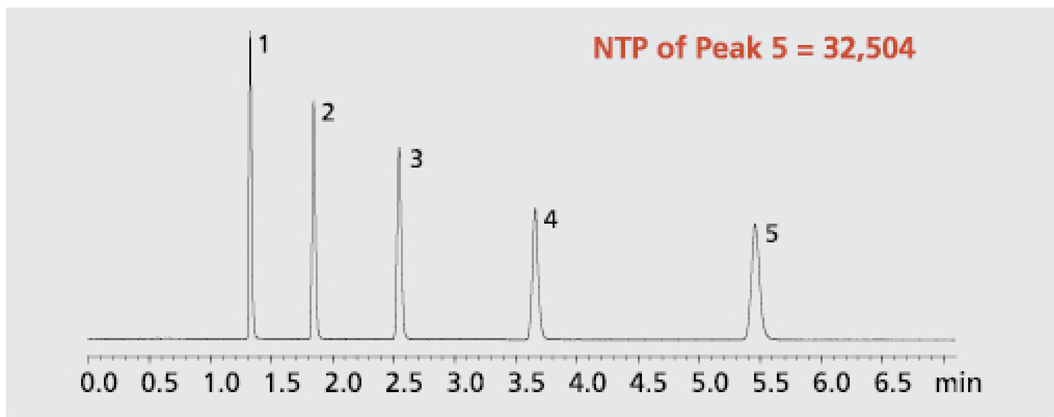
Conditions
Mobile Phase : 55 % Aqueous Acetonitrile Solution
Flow Rate : 1.0 mL/min
Col. Temp. : 40 °C
Injection Vol. : 5 µL

Shim-pack XR-ODS III (50 mmL. × 2 mmI.D., 1.6 µm, P/N: 228-59922-91)



Conditions
Mobile Phase : 55 % Aqueous Acetonitrile Solution
Flow Rate : 1.1 mL/min
Col. Temp. : 40 °C
Injection Vol. : 5 µL

Shim-pack XR-ODS III (200 mmL. × 2 mmI.D., 2.2 µm, P/N: 228-59910-92)



Conditions
Mobile Phase : 55 % Aqueous Acetonitrile Solution
Flow Rate : 0.6 mL/min
Col. Temp. : 50 °C
Injection Vol. : 5 µL