macmod chiral

Featuring Innovative Chiral Selectors

made in USA

macmod
chiral

SFC, NPLC and RPLC Columns for Analytical and Preparative SFC/HPLC Applications

CONTACT US

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Technical Support: technical@mac-mod.com

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Chadds Ford, PA 19317

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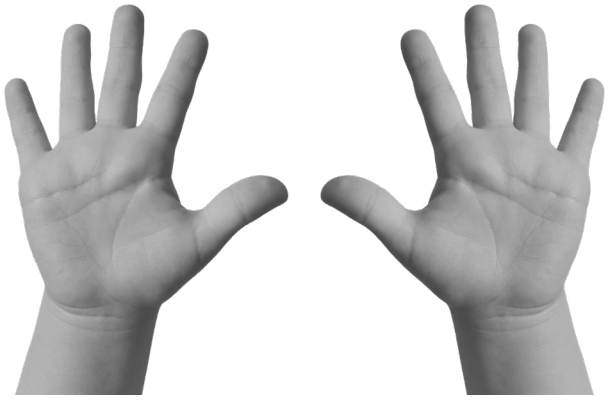
What is Chiral Chromatography?

Chiral Chromatography is the separation of enantiomers that are non-superimposable “mirror-images”.

These “mirror-images” can have negative unintended consequences from the original indication of the intended chemical product. Thus, it is necessary to qualify, quantify and separate the mirror images from each other in order to isolate and/or purify them from the bulk material.



Key Application Areas include:

Pharmaceutical/Biopharmaceutical

Agricultural

Academic Research

Why choose MAC-MOD Chiral Columns?

12 Innovative Coated Chiral Selectors

- MAC-MOD offers **five coated versions of commonly used Immobilized chiral selectors**
  - Amy-4
  - Amy-6
  - Amy-8
  - Cel-4
  - Cel-9
- MAC-MOD offers **four fluorinated chiral selectors**
  - Amy-4F
  - Cel-2F
  - Cel-4F
  - Cel-FT
- MAC-MOD offers **three blended coated chiral selectors**
  - Amy-1,3-B
  - Amy-3,5-B
  - Cel-2,Cl-E

7 Established Coated Chiral Selectors

- 4 Amylose Coated CSPs
  - Amy-1
  - Amy-2
  - Amy-3
  - Amy-5
- 3 Cellulose Coated CSPs
  - Cel-1
  - Cel-2
  - Cel-3

8 Established Immobilized Chiral Selectors

- 4 Amylose Immobilized CSPs
  - Im-Amy-1
  - Im-Amy-3
  - Im-Amy-5
  - Im-Amy-6
- 4 Cellulose Immobilized CSPs
  - Im-Cel-1
  - Im-Cel-C
  - Im-Cel-2
  - Im-Cel-9

Scalable separations from analytical to preparative applications (including SFC and HPLC applications)

100% proudly manufactured in the USA

- All columns manufactured in the USA for excellent quality, reproducibility, and fast delivery

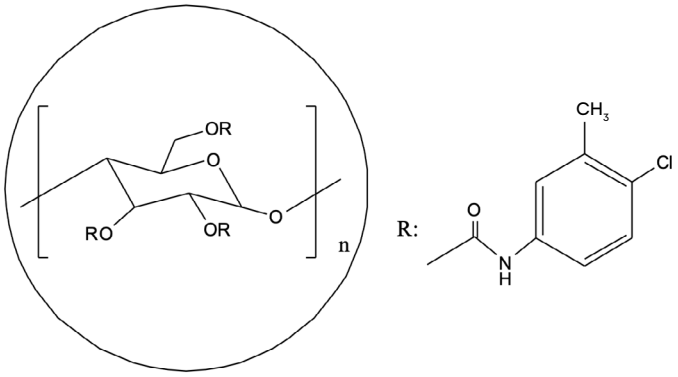
Available globally through MAC-MOD's network of distributors to ensure method integrity across different manufacturing sites

Innovative Amylose and Cellulose Coated Chiral Selectors

macmod chiral

MAC-MOD Amy-4:

CSP: tris-(4-chloro-3-methylphenylcarbamate)



Physicals:

Coating	Immobilized (Yes/No)	Particle Sizes	Pore Size (Å)	pH Range	Pressure Limit (bar)
Amylose	No	3 5	Proprietary	2-8	400

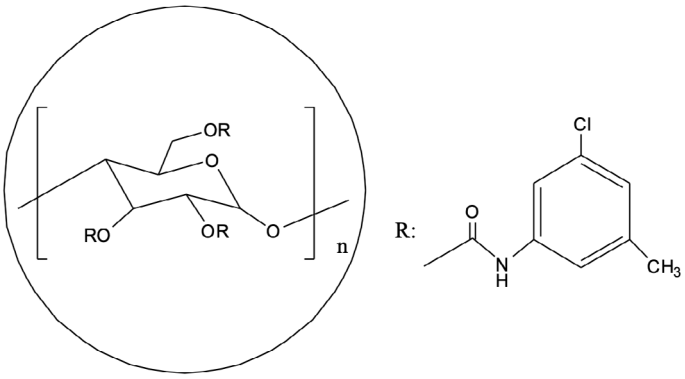
Equivalence:

MAC-MOD Chiral	Daicel/Chiral Technologies	Phenomenex	Regis	Dr. Maisch	ES Industries
Amy-4	-	-	-	-	-

Important:
Normally packed in Normal-Phase Solvents for NPLC or SFC Applications
Available to be packed in Reversed-Phase Solvents
Provides different selectivity to coated equivalents from other manufacturers

MAC-MOD Amy-6:

CSP: *tris*-(3-chloro-5-methylphenylcarbamate)



Physicals:

Coating	Immobilized (Yes/No)	Particle Sizes	Pore Size (Å)	pH Range	Pressure Limit (bar)
Amylose	No	3 5	Proprietary	2-8	400

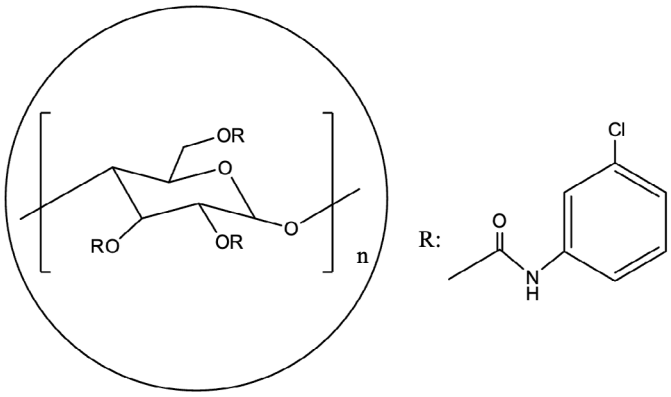
Equivalence:

MAC-MOD Chiral	Daicel/Chiral Technologies	Phenomenex	Regis	Dr. Maisch	ES Industries
Amy-6	-	-	-	-	-

Important:
Normally packed in Normal-Phase Solvents for NPLC or SFC Applications
Available to be packed in Reversed-Phase Solvents
Coated equivalent to Daicel CHIRALPAK® IG Immobilized Chemistry

MAC-MOD Amy-8:

CSP: *tris*-(3–chlorophenylcarbamate)



Physicals:

Coating	Immobilized (Yes/No)	Particle Sizes	Pore Size (Å)	pH Range	Pressure Limit (bar)
Amylose	No	3 5	Proprietary	2-8	400

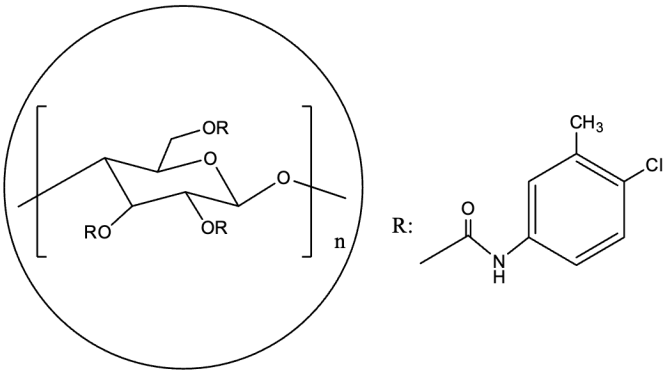
Equivalence:

MAC-MOD Chiral	Daicel/Chiral Technologies	Phenomenex	Regis	Dr. Maisch	ES Industries
Amy-8	-	-	-	-	-

Important:
Normally packed in Normal-Phase Solvents for NPLC or SFC Applications
Available to be packed in Reversed-Phase Solvents
Coated equivalent to Daicel CHIRALPAK® ID Immobilized Chemistry

MAC-MOD Cel-4:

CSP: *tris*-(4-chloro-3-methylphenylcarbamate)



Physicals:

Coating	Immobilized (Yes/No)	Particle Sizes	Pore Size (Å)	pH Range	Pressure Limit (bar)
Cellulose	3 5	no	Proprietary	2-8	400

Equivalence:

MAC-MOD Chiral	Daicel/Chiral Technologies	Phenomenex	Regis	Dr. Maisch	ES Industries
Cel-4	CHIRALCEL® OX	Lux-Cellulose-4	-	ReproSil Chiral-XM	ChromegaChiral CC4

Important:
Normally packed in Normal-Phase Solvents for NPLC or SFC Applications
Available to be packed in Reversed-Phase Solvents
Provides different selectivity to coated equivalents from other manufacturers

MAC-MOD Cel-4:

NPLC

Figure 1: amino acid isomers

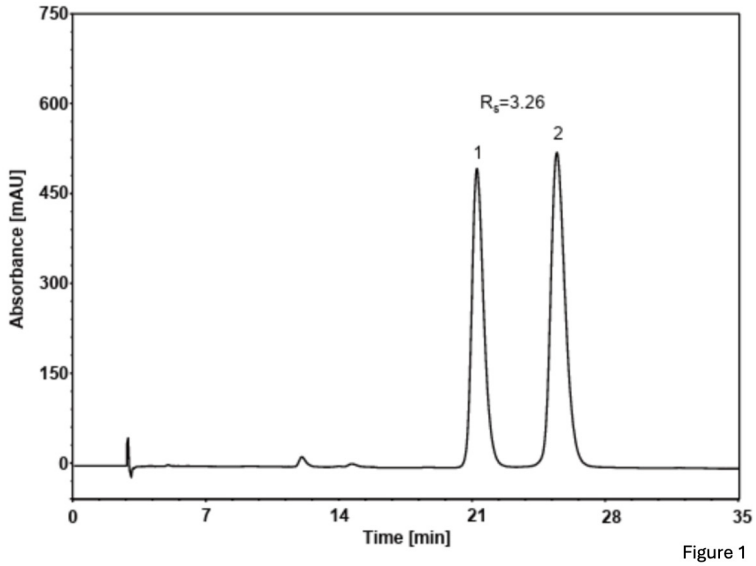


Figure 1

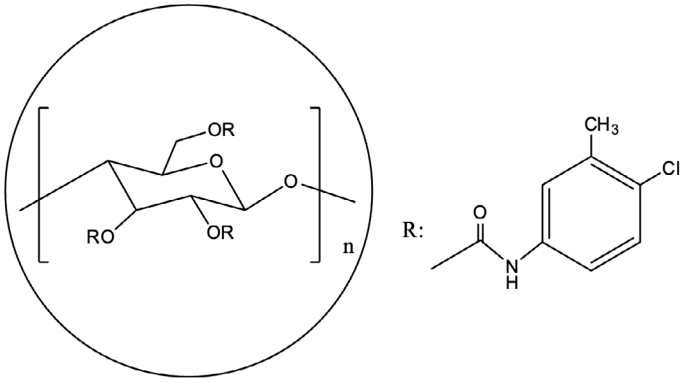
Conditions:

Column:	MMC422546
Description:	MAC-MOD Chiral Cel-4, 5 µm, 4.6 x 250 mm Coated HPLC/SFC Column
Mobile Phase:	85/15/0.1 v/v/v Hexane/EtOH/DEA
Flow Rate:	1.0 mL/min
Temperature:	Room Temperature
Injection Volume:	5 µL
Detection:	UV 270 nm
Analyte ID:	(0.5 mg/mL, dissolved in EtOH)

In this separation, MAC-MOD Cel-4 is used to provide unique selectivity for pharmaceutical ingredients comprised of amino acids to separate enantiomers via Normal Phase HPLC mode.

MAC-MOD Cel-9:

CSP: *tris*-(3-chloro-5-methylphenylcarbamate)



Physicals:

Coating	Immobilized (Yes/No)	Particle Sizes	Pore Size (Å)	pH Range	Pressure Limit (bar)
Cellulose	No	3 5	Proprietary	2-8	400

Equivalence:

MAC-MOD Chiral	Daicel/Chiral Technologies	Phenomenex	Regis	Dr. Maisch	ES Industries
Cel-9	-	-	-	-	-

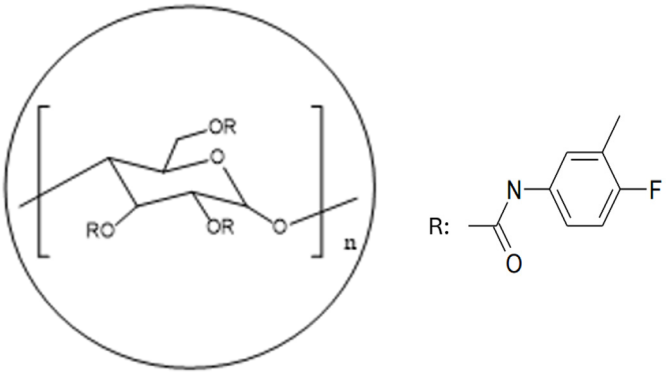
Important:
Normally packed in Normal-Phase Solvents for NPLC or SFC Applications
Available to be packed in Reversed-Phase Solvents
Coated equivalent to Daicel CHIRALCEL® IK Immobilized Chemistry

Innovative Fluorinated Amylose and Cellulose Coated Chiral Selectors

macmod chiral

MAC-MOD Amy-4F:

CSP: 4-fluoro 3-methylphenylcarbamate



Physicals:

Coating	Immobilized (Yes/No)	Particle Sizes	Pore Size (Å)	pH Range	Pressure Limit (bar)
Amylose	No	3 5	Proprietary	2-8	400

Equivalence:

MAC-MOD Chiral	Daicel/Chiral Technologies	Phenomenex	Regis	Dr. Maisch	ES Industries
Amy-4F	-	-	-	-	Chromegachiral CCA F4

Important:
Normally packed in Normal-Phase Solvents for NPLC or SFC Applications
Available to be packed in Reversed-Phase Solvents

MAC-MOD Amy-4F:

Figure 2: R,S 2,2,2-trifluoro-1-(9-anthryl)ethanol

SFC

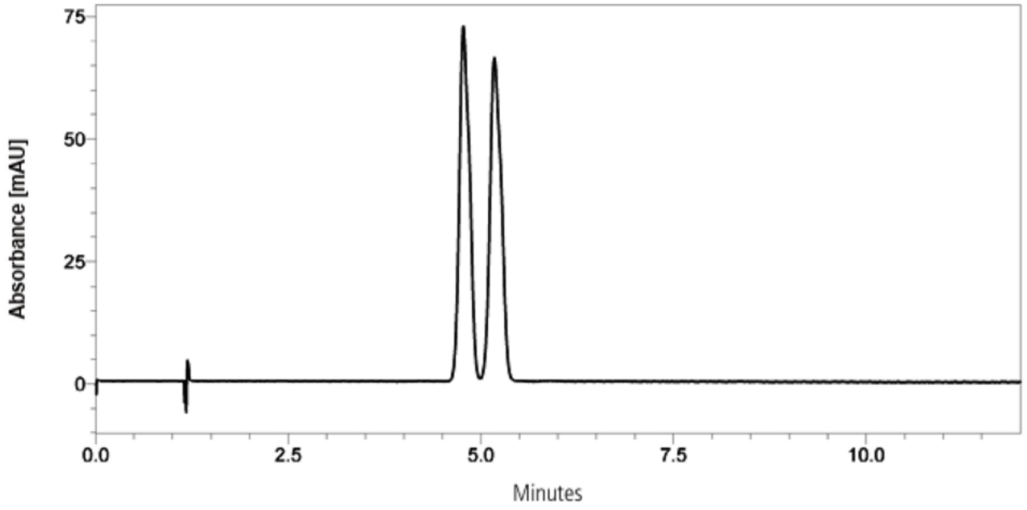


Figure 2

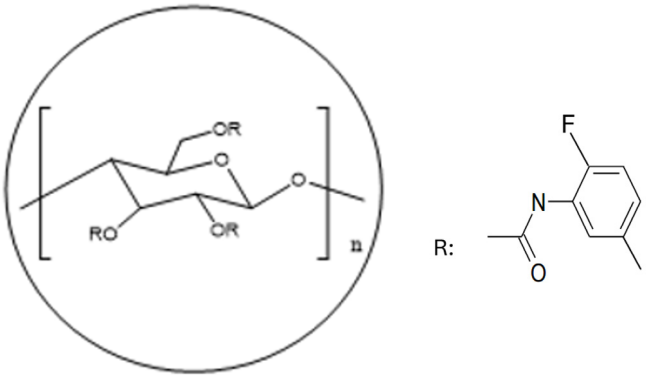
Conditions:

Column:	MMA4F22546
Description:	MAC-MOD Chiral Amy-4F, 5 µm, 4.6 x 250 mm Coated SFC/HPLC Column
Mobile Phase:	5% Methanol/CO2
Flow Rate:	3.0 mL/min
Temperature:	40 oC
Injection Volume:	5 µL
Detection:	UV 254 nm
Analyte ID:	R,S 2,2,2-Trifluoro-1-(9-anthryl)ethanol

In this separation, a highly fluorinated organic compound interacts well with the unique amylose fluorinated phase (MAC-MOD Amy-4F) to separate enantiomeric mirror images utilizing SFC mode.

MAC-MOD Cel-2F:

CSP: 2-Fluoro 5-methylphenylcarbamate



Physicals:

Coating	Immobilized (Yes/No)	Particle Sizes	Pore Size (Å)	pH Range	Pressure Limit (bar)
Cellulose	No	3 5	Proprietary	2-8	400

Equivalence:

MAC-MOD Chiral	Daicel/Chiral Technologies	Phenomenex	Regis	Dr. Maisch	ES Industries
Cel-2F	-	-	-	-	Chromegachiral CCO F2

Important:
Normally packed in Normal-Phase Solvents for NPLC or SFC Applications
Available to be packed in Reversed-Phase Solvents

MAC-MOD Cel-2F:

NPLC

Figure 3: trans-stilbene oxide (tso)

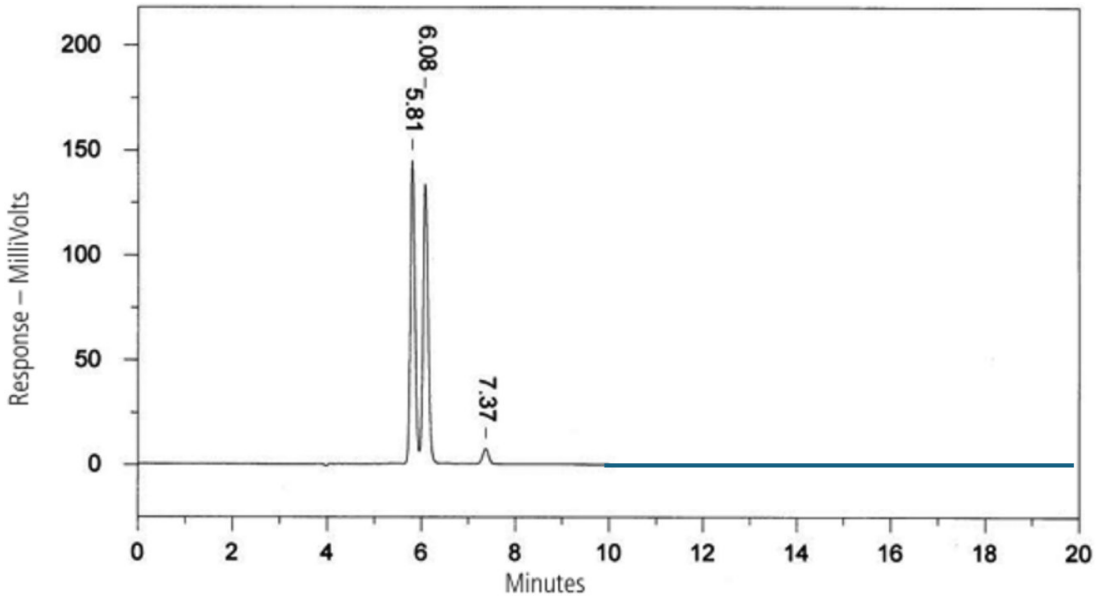


Figure 3

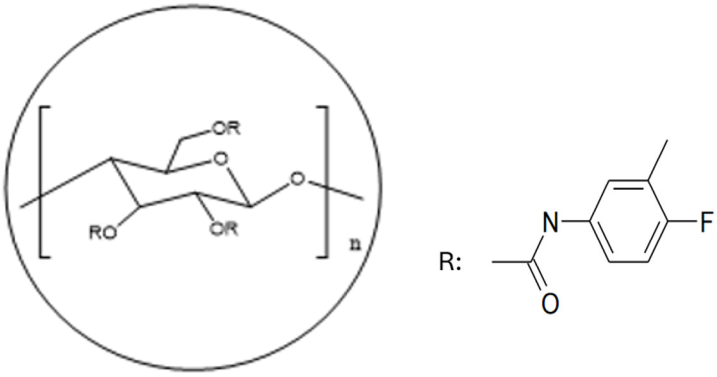
Conditions:

Column:	MMC2F22546
Description:	MAC-MOD Chiral Cel -2F, 5 µm, 4.6 x 250 mm Coated SFC/HPLC Column
Mobile Phase:	90% Hexane/10% IPA
Flow Rate:	1.0 mL/min
Temperature:	25 oC
Injection Volume:	5 µL
Detection:	UV 254 nm
Analyte ID:	TSO

In this separation, trans-stilbene oxide (TSO) a common chiral marker is used to confirm chiral enantiomeric selecitivty with the MAC-MOD Cel-2F phase chemistry.

MAC-MOD Cel-4F:

CSP: 4-Fluoro 3-methylphenylcarbamate



Physicals:

Coating	Immobilized (Yes/No)	Particle Sizes	Pore Size (Å)	pH Range	Pressure Limit (bar)
Cellulose	No	3 5	Proprietary	2-8	400

Equivalence:

MAC-MOD Chiral	Daicel/Chiral Technologies	Phenomenex	Regis	Dr. Maisch	ES Industries
Cel-4F	-	-	-	-	Chromegachiral CCO F4

Important:
Normally packed in Normal-Phase Solvents for NPLC or SFC Applications
Available to be packed in Reversed-Phase Solvents

MAC-MOD Cel-4F:

Figure 4: difluoromethylbenzoate isomers

SFC

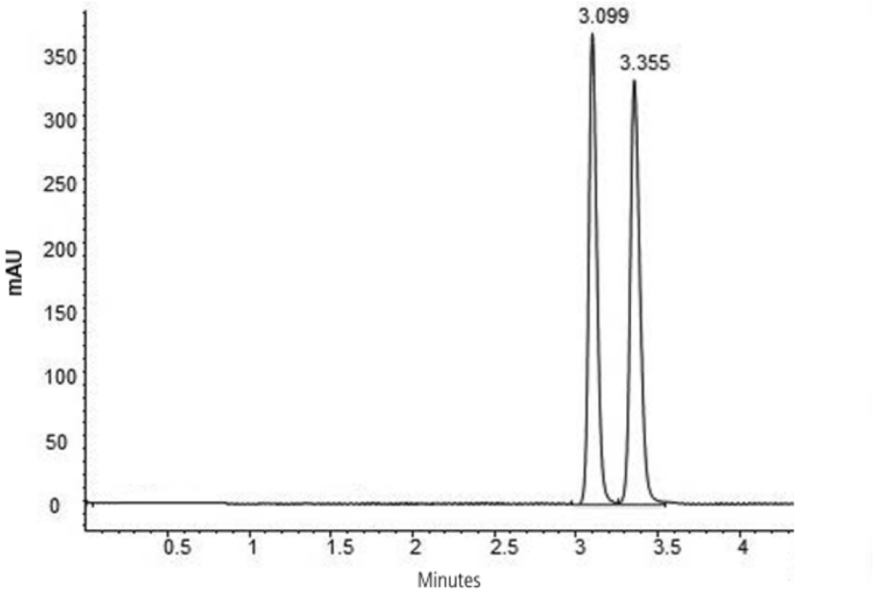


Figure 4

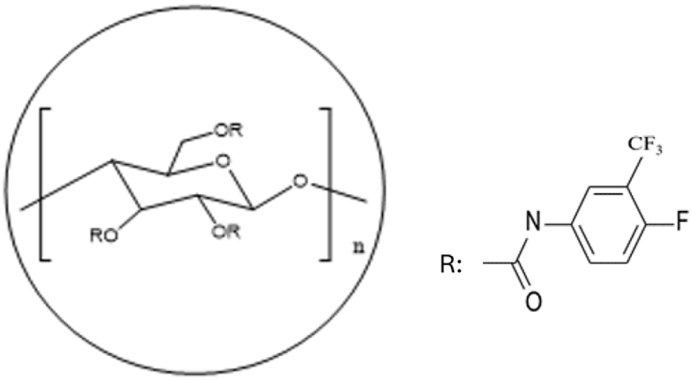
Conditions:

Column:	MMC4F22546
Description:	MAC-MOD Chiral Cel -4F, 5 µm, 4.6 x 250 mm Coated SFC/HPLC Column
Mobile Phase:	100% CO2
Flow Rate:	3.5 mL/min
Temperature:	sub-ambient
Injection Volume:	5 µL
Detection:	UV 254 nm
Analyte ID:	difluorobenzoate isomers

In this separation, a highly fluorinated benzoate isomer interacts well with the unique cellulose fluorinated phase (MAC-MOD Cel-4F) to separate enantiomeric mirror images utilizing SFC mode.

MAC-MOD Cel-FT:

CSP: 4-Fluoro 3-trifluoromethylphenylcarbamate



Physicals:

Coating	Immobilized (Yes/No)	Particle Sizes	Pore Size (Å)	pH Range	Pressure Limit (bar)
Cellulose	No	3 5	Proprietary	2-8	400

Equivalence:

MAC-MOD Chiral	Daicel/Chiral Technologies	Phenomenex	Regis	Dr. Maisch	ES Industries
Cel-FT	-	-	-	-	Chromegachiral CCO F4 T3

Important:
Normally packed in Normal-Phase Solvents for NPLC or SFC Applications
Available to be packed in Reversed-Phase Solvents

MAC-MOD Cel-FT:

Figure 5: verapamil

SFC

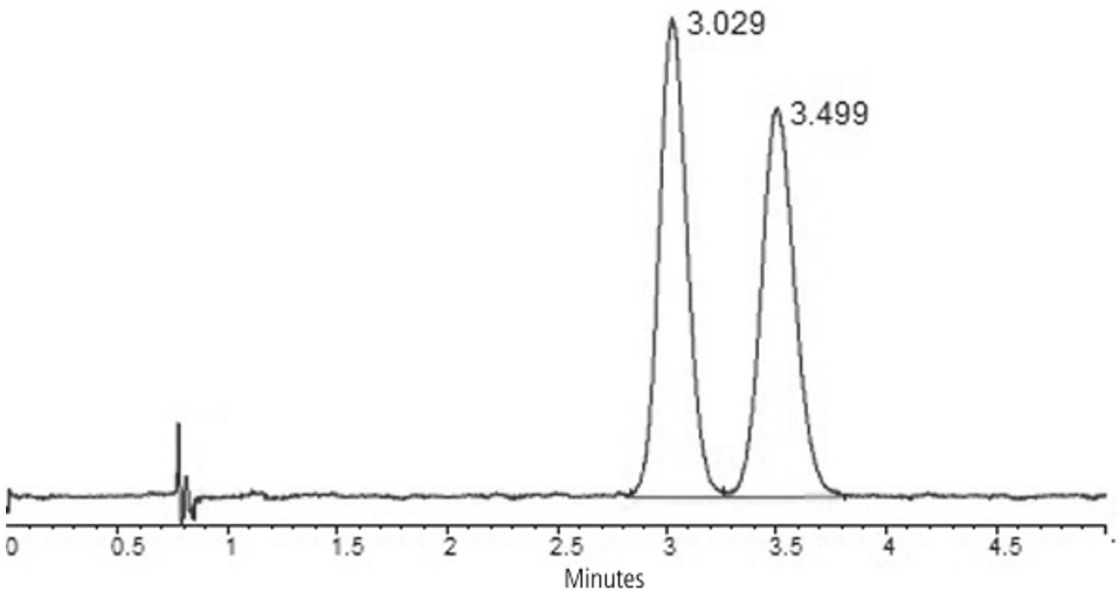


Figure 5

Conditions:

Column:	MMCFT22546
Description:	MAC-MOD Chiral Cel-FT, 5 µm, 4.6 x 250 mm Coated SFC/HPLC Column
Mobile Phase:	25% 20 nM AMF in MeOH/CO2
Flow Rate:	3.0 mL/min
Temperature:	45 oC
Injection Volume:	5 µL
Detection:	UV 254 nm
Analyte:	verapamil

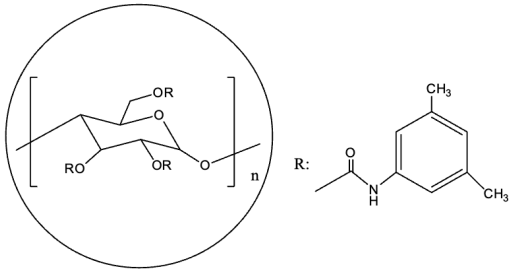
In this separation, verapamil is separated into it's R and S versions showing the chiral selection power of the MAC-MOD Cel-FT phase even when the molecule doesn't contain Fluroines. Verapamil R and S versions are well separated rapidly via SFC mode.

Innovative Blended Amylose and Cellulose Coated Chiral Selectors

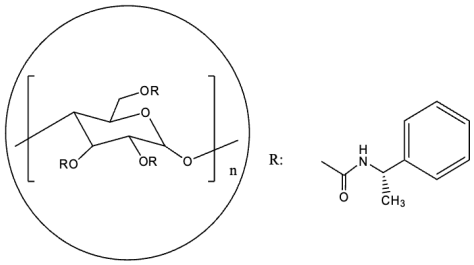
macmod chiral

MAC-MOD Amy-1-3B:

CSP: Blended Amy-1 (*tris*-(3,5 – dimethylphenylcarbamate)) and Amy-3 (*tris*-(3,5 – dimethylphenylcarbamate))



MAC-MOD Amy-1



MAC-MOD Amy-3

Physicals:

Coating	Immobilized (Yes/No)	Particle Sizes	Pore Size (Å)	pH Range	Pressure Limit (bar)
Amylose	No	3 5	Proprietary	2-8	400

Equivalence:

MAC-MOD Chiral	Daicel/Chiral Technologies	Phenomenex	Regis	Dr. Maisch	ES Industries
Amy-1-3B	-	-	-	-	Chromegachiral CCX

Important:
Normally packed in Normal-Phase Solvents for NPLC or SFC Applications
Available to be packed in Reversed-Phase Solvents

MAC-MOD Amy-1-3B:

SFC

Figure 6: methaqualone

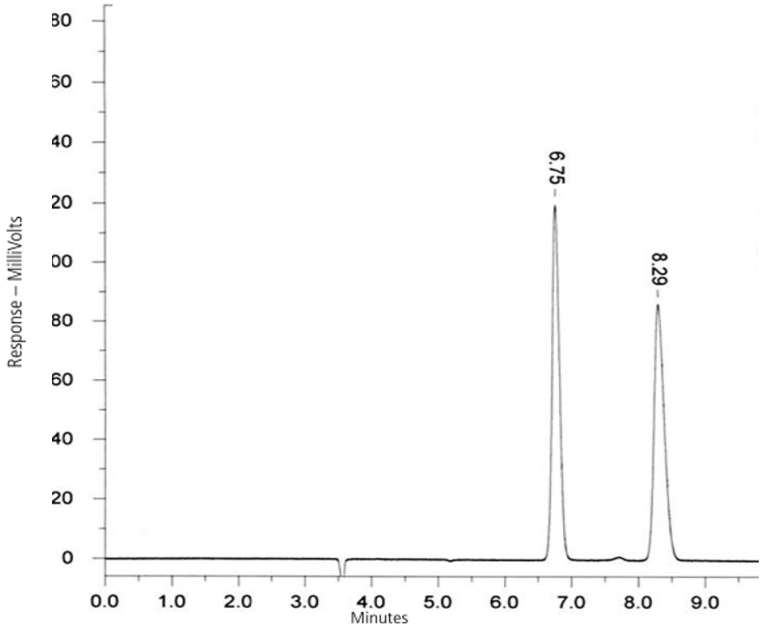


Figure 6

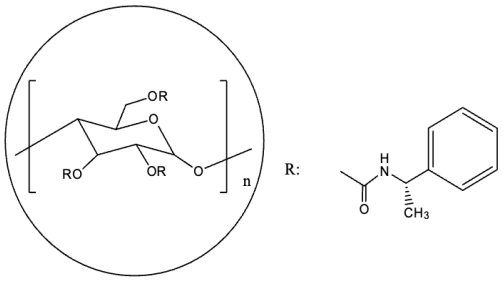
Conditions:

Column:	MMA13B22546
Description:	MAC-MOD Chiral Amy-1,3B, 5 µm, 4.6 x 250 mm Coated SFC/HPLC Column
Mobile Phase:	20% MeOH/80% CO2
Flow Rate:	4.0 mL/min
Temperature:	45 oC
Injection Volume:	5 µL
Detection:	UV 254 nm
Analyte:	methaqualone

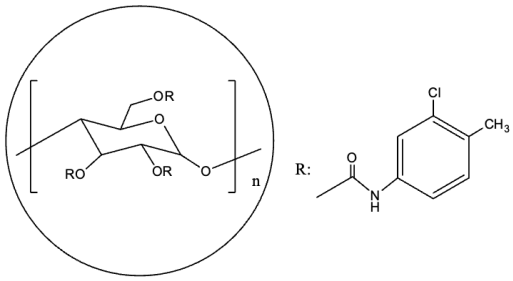
In this example, MAC-MOD Amy-1-3B, which comprises blended chiral selectors of MAC-MOD Amy-1 and MAC-MOD Amy-3 separates methaqualone which exhibits unique axial chirality versus a traditional tetrahedral stereocenter. In this way, the blended MAC-MOD Amy-1-3B improves the separation of the enantiomers versus MAC-MOD Amy-1 or MAC-MOD Amy-3 alone via SFC mode.

MAC-MOD Amy-3-5B:

CSP: Blended Amy-3 (*tris*-[(s)-α-methylbenzylcarbamate)) and Amy 5 (*tris*-(3-chloro-4-methylphenylcarbamate))



MAC-MOD Amy-3



MAC-MOD Amy-5

Physicals:

Coating	Immobilized (Yes/No)	Particle Sizes	Pore Size (Å)	pH Range	Pressure Limit (bar)
Amylose	No	3 5	Proprietary	2-8	400

Equivalence:

MAC-MOD Chiral	Daicel/Chiral Technologies	Phenomenex	Regis	Dr. Maisch	ES Industries
Amy-3-5B	-	-	-	-	Chromegachiral CCU

Important:
Normally packed in Normal-Phase Solvents for NPLC or SFC Applications
Available to be packed in Reversed-Phase Solvents

MAC-MOD Amy-3-5B:

Figure 7: benoxacor

SFC

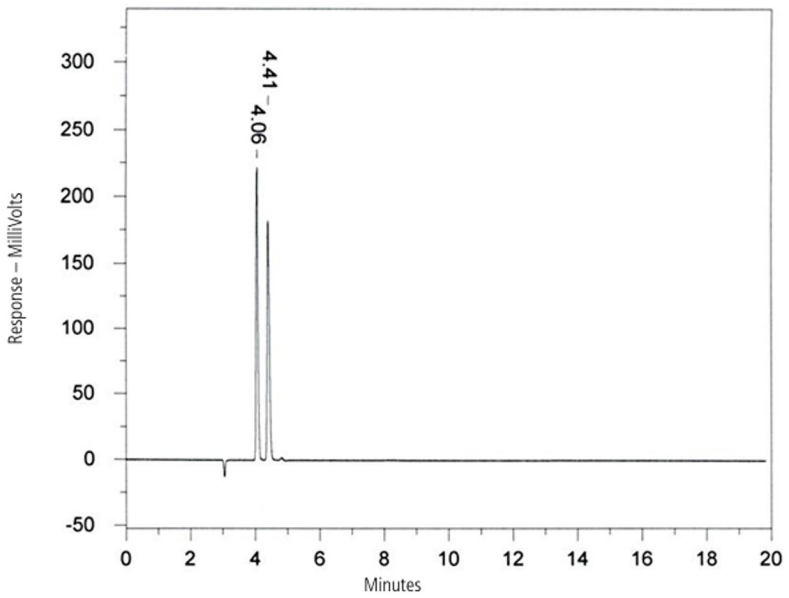


Figure 7

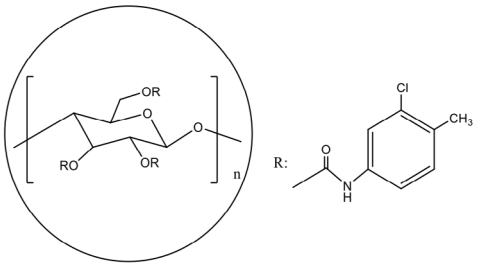
Conditions:

Column:	MMA35B22546
Description:	MAC-MOD Chiral Amy-3,5B, 5 µm, 4.6 x 250 mm Coated SFC/HPLC Column
Mobile Phase:	10% MeOH, 90% CO2
Flow Rate:	4.0 mL/min
Temperature:	40 oC
Injection Volume:	5 µL
Detection:	UV 254 nm
Analyte:	benoxacor

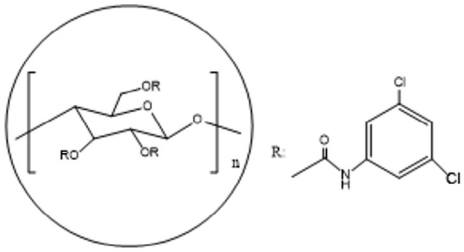
In this separation the enanitomers of benoxacor are baseline separated via SFC mode using the blended MAC-MOD Amy-3-5B phase chemistry.

MAC-MOD Cel-2,Cl-E:

CSP: Blended Cel-2 (*tris*-(3-chloro-4-methylphenylcarbamate)) with 3,5-dichlorophenylcarbamate



MAC-MOD Cel-2



3,5-dichlorophenylcarbamate

Physicals:

Coating	Immobilized (Yes/No)	Particle Sizes	Pore Size (Å)	pH Range	Pressure Limit (bar)
Cellulose	No	3 5	Proprietary	2-8	400

Equivalence:

MAC-MOD Chiral	Daicel/Chiral Technologies	Phenomenex	Regis	Dr. Maisch	ES Industries
Cel-2,Cl-E	-	-	-	-	Chromegachiral CCC

Important:
Normally packed in Normal-Phase Solvents for NPLC or SFC Applications
Available to be packed in Reversed-Phase Solvents

MAC-MOD Cel-2,Cl-E :

SFC

Figure 8: trans-stilbene oxide (tso)

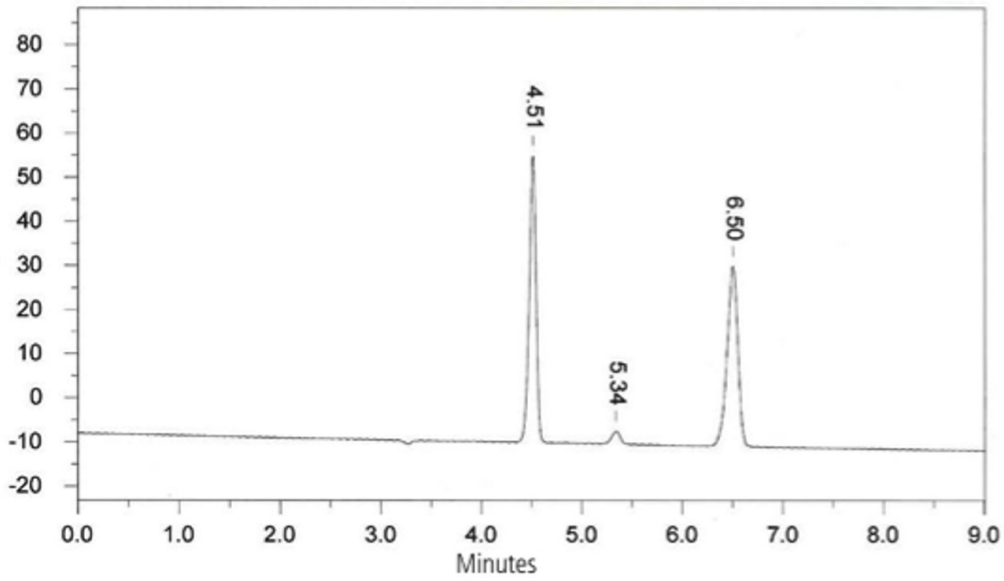


Figure 8

Conditions:

Column:	MMC2CIE22546
Description:	MAC-MOD Chiral Cel-2,Cl-E, 5 µm, 4.6 x 250 mm Coated SFC/HPLC Column
Mobile Phase:	Hexane
Temperature:	40 oC
Flow Rate:	3.0 mL/min
Injection Volume:	5 µL
Detection:	UV 254 nm
Analyte:	tso

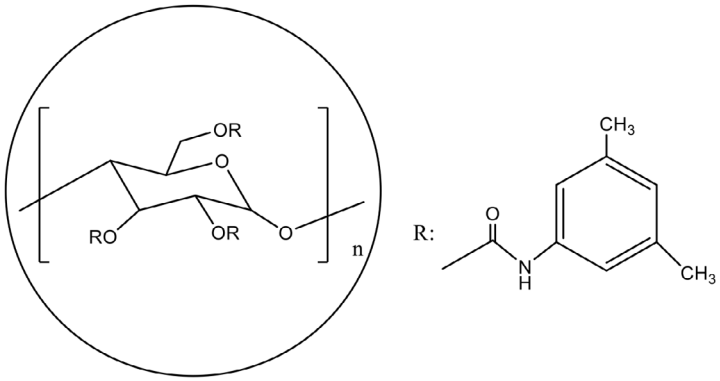
In this separation, trans-stilbene oxide (TSO) a common chiral marker is used to confirm chiral enantiomeric selectivity with the blended MAC-MOD Cel-2-Cl-E phase chemistry.

Established Amylose and Cellulose Coated Chiral Selectors

macmod chiral

MAC-MOD Amy-1:

CSP: *tris*-(3,5 – dimethylphenylcarbamate)



Physicals:

Coating	Immobilized (Yes/No)	Particle Sizes	Pore Size (Å)	pH Range	Pressure Limit (bar)
Amylose	No	3 5	Proprietary	2-8	400

Equivalence:

MAC-MOD Chiral	Daicel/Chiral Technologies	Phenomenex	Regis	Dr. Maisch	ES Industries
Amy-1	CHIRALPAK® AD	Lux Amylose-1	REFLECT C-Amylose A	ReproSil Chiral-AM	ChromegaChiral CCA

Important:
Normally packed in Normal-Phase Solvents for NPLC or SFC Applications
Available to be packed in Reversed-Phase Solvents

MAC-MOD Amy-1:

POM

Figure 9: pamalidomide

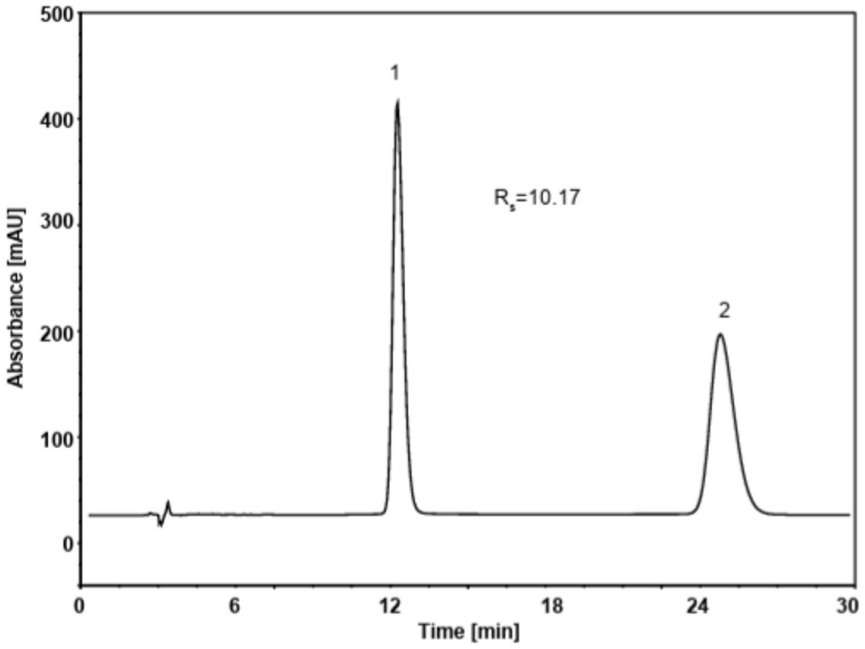


Figure 9

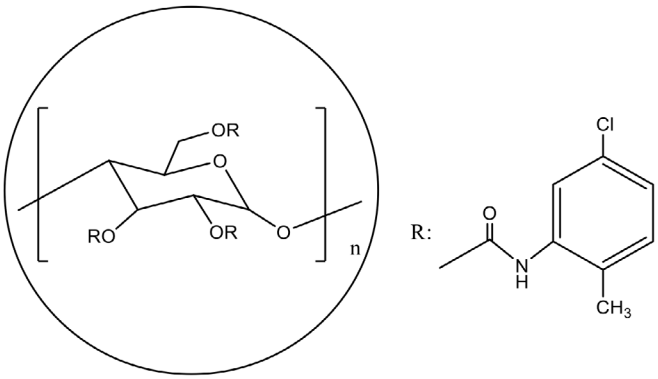
Conditions:

Column:	MMA122546
Description:	MAC-MOD Chiral Amy-1, 5 µm, 4.6 x 250 mm HPLC/SFC Column
Mobile Phase:	100/0.1 v/v MeOH/DEA
Flow Rate:	1.0 mL/min
Temperature:	Room Temperature
Injection Volume:	20 µL
Detection:	UV 254 nm
Analyte ID:	pamilidomide (0.8 mg/mL)

In this example, the MAC-MOD Amy-1 phase chemistry is used to separate the R and S enantiomers of pamalidomide using the MAC-MOD Amy-1 phase chemistry via polar organic mode (POM) HPLC conditions.

MAC-MOD Amy-2:

CSP: *tris*-(5-chloro-2-methylphenylcarbamate)



Physicals:

Coating	Immobilized (Yes/No)	Particle Sizes	Pore Size (Å)	pH Range	Pressure Limit (bar)
Amylose	No	3 5	Proprietary	2-8	400

Equivalence:

MAC-MOD Chiral	Daicel/Chiral Technologies	Phenomenex	Regis	Dr. Maisch	ES Industries
Amy-2	CHIRALPAK® AY	Lux Amylose-2	-	ReproSil Chiral-YM	ChromegaChiral CC3

Important:
Normally packed in Normal-Phase Solvents for NPLC or SFC Applications
Available to be packed in Reversed-Phase Solvents

MAC-MOD Amy-2:

POM

Figure 10: 1-diphenylmethyl-3-azetidinyl methanesulfonate

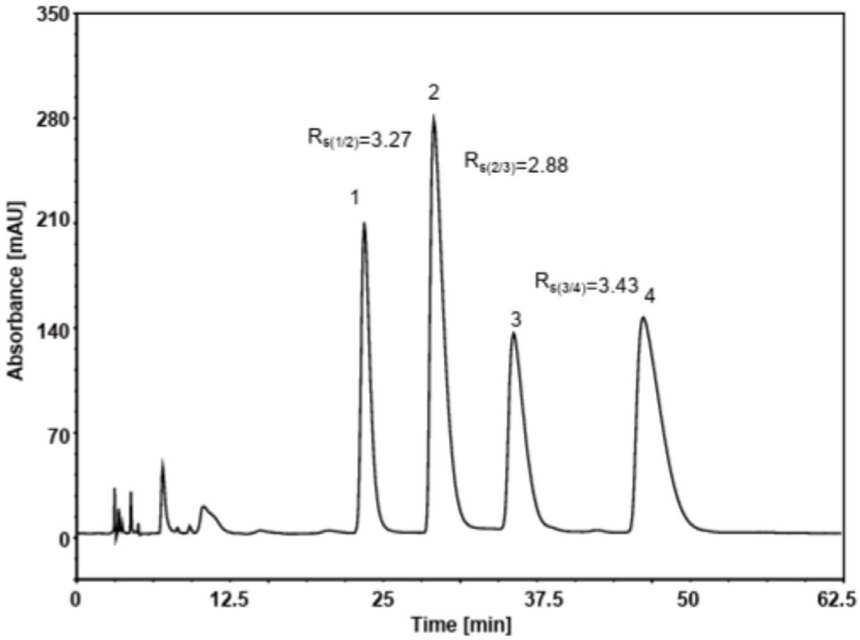


Figure 10

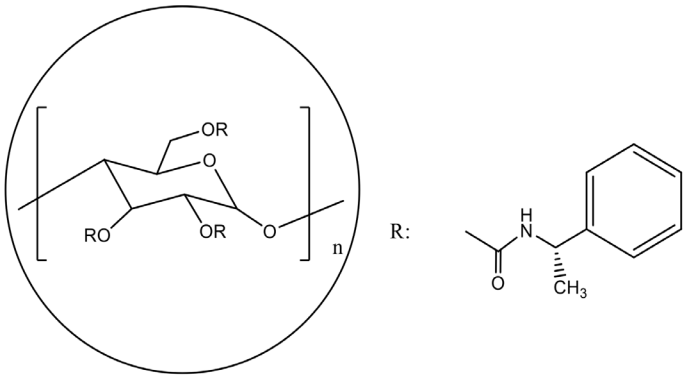
Conditions:

Column:	MMA222546
Description:	MAC-MOD Chiral Amy-2, 5 µm, 4.6 x 250 mm Coated HPLC/SFC Column
Mobile Phase:	100/0.1 v/v MeOH/DEA
Flow Rate:	1.0 mL/min
Temperature:	Room Temperature
Injection Volume:	5 µL
Detection:	UV 220 nm
Analyte ID:	Synthetic mixtures (5 mg/mL)

In this example, 1-diphenylmethyl-3-azetidinyl methanesulfonate has two chiral centers, thus 4 chiral enantiomers which present as well separated utilizing the MAC-MOD Amy-2 phase chemistry in polar organic mode (POM) HPLC mode.

MAC-MOD Amy-3:

CSP: *tris*-[(s)-α-methylbenzylcarbamate)]



Physicals:

Coating	Immobilized (Yes/No)	Particle Sizes	Pore Size (Å)	pH Range	Pressure Limit (bar)
Amylose	No	3 5	Proprietary	2-8	400

Equivalence:

MAC-MOD Chiral	Daicel/Chiral Technologies	Phenomenex	Regis	Dr. Maisch	ES Industries
Amy-3	CHIRALPAK® AS	-	-	ReproSil Chiral-AMS	ChromegaChiral CCS

Important:
Normally packed in Normal-Phase Solvents for NPLC or SFC Applications
Available to be packed in Reversed-Phase Solvents

MAC-MOD Amy-3:

NPLC

Figure 11: boc-pyro-glutamic acid

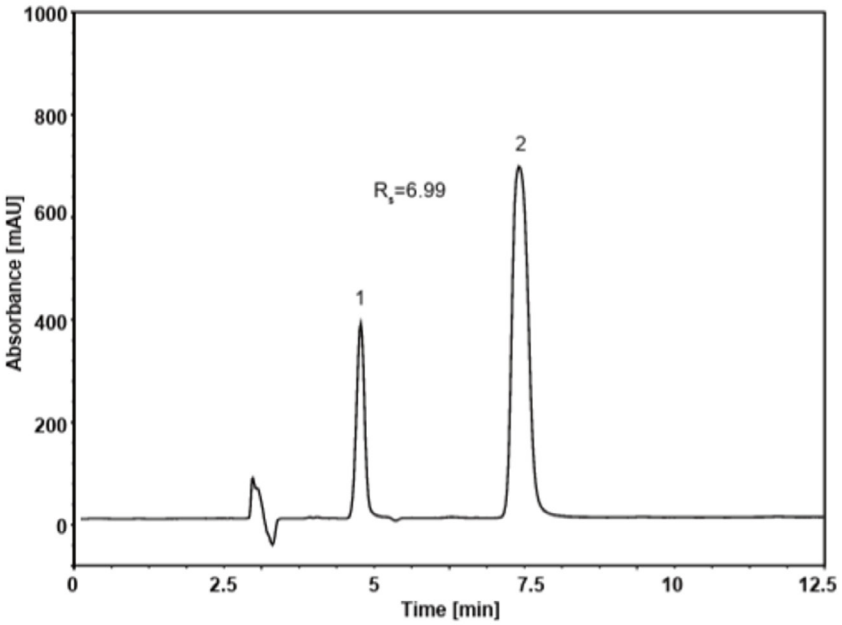


Figure 11

Conditions:

Column:	MMA322546
Description:	MAC-MOD Chiral Amy-3, 5 µm, 4.6 x 250 mm Coated HPLC/SFC Column
Mobile Phase:	80/20/0.1 v/v/v Hexane/EtOH/TFA
Flow Rate:	1.0 mL/min
Temperature:	Room Temperature
Injection Volume:	10 µL
Detection:	UV 200 nm
Analyte ID:	boc-pyro-glutamic acid
	1) boc-D-pyro-glutamic acid (0.17 mg/mL)
	2) boc-L-pyro-glutamic acid (0.17 mg/mL)

In this example, boc-pyro-glutamic acid is well separated utilizing the MAC-MOD Amy-3 established amylose coated chiral column utilizing normal phase HPLC mode.

MAC-MOD Amy-3:

NPLC

Figure 12: pharmaceutical intermediates

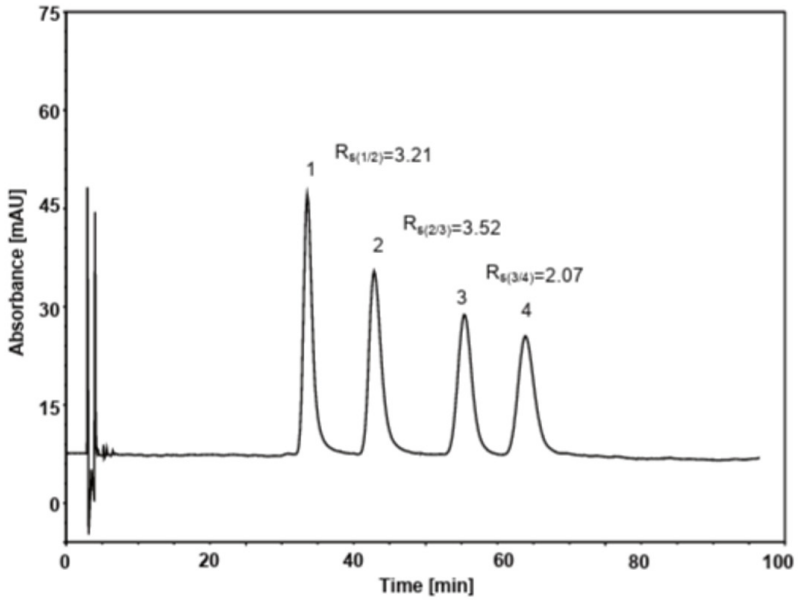


Figure 12

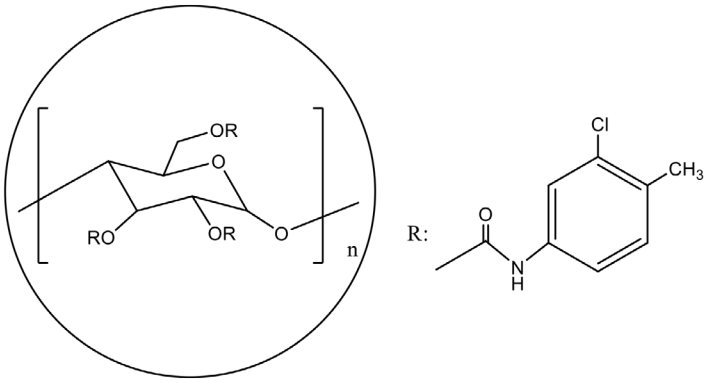
Conditions:

Column:	MMA322546
Description:	MAC-MOD Chiral Amy-3, 5 µm, 4.6 x 250 mm Coated HPLC/SFC Column
Mobile Phase:	87.5/7.5/0.1 v/v/v Hexane/IPA/MeOH/DEA
Flow Rate:	1.0 mL/min
Temperature:	Room Temperature
Injection Volume:	10 µL
Detection:	UV 254 nm
Analyte ID:	pharmaceutical intermediates (0.5 mg/mL each)

In this example, pharmaceutical intermediate enantiomers are well separated utilizing the MAC-MOD Amy-3 chiral phase chemistry in normal phase HPLC mode.

MAC-MOD Amy-5:

CSP: *tris*-(3-chloro-4-methylphenylcarbamate)



Physicals:

Coating	Immobilized (Yes/No)	Particle Sizes	Pore Size (Å)	pH Range	Pressure Limit (bar)
Amylose	No	3 5	Proprietary	2-8	400

Equivalence:

MAC-MOD Chiral	Daicel/Chiral Technologies	Phenomenex	Regis	Dr. Maisch	ES Industries
Amy-5	CHIRALPAK® AZ	-	-	ReproSil Chiral-ZA	-

Important:
Normally packed in Normal-Phase Solvents for NPLC or SFC Applications
Available to be packed in Reversed-Phase Solvents

MAC-MOD Amy-5:

NPLC

Figure 13: finerenone

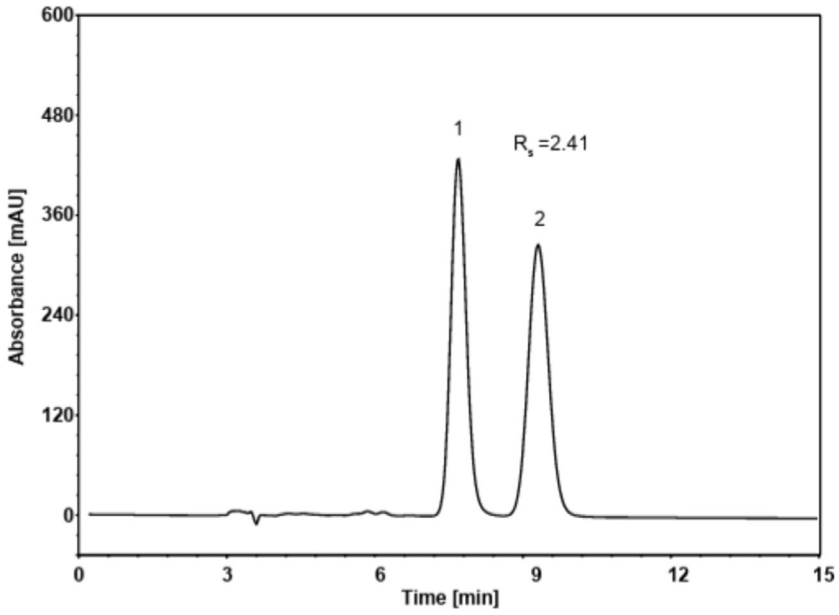


Figure 13

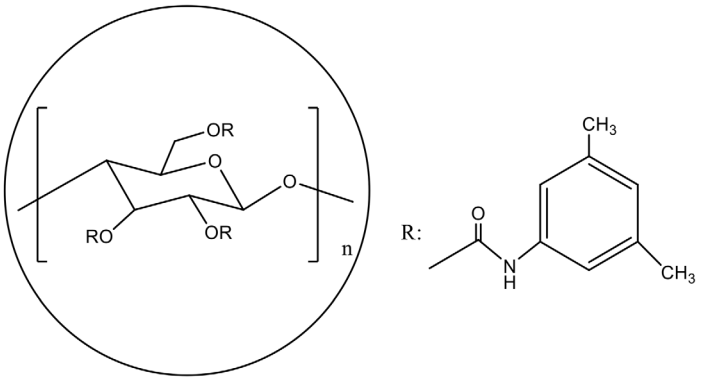
Conditions:

Column:	MMA522546
Description:	MAC-MOD Chiral Amy-5, 5 µm, 4.6 x 250 mm Coated HPLC/SFC Column
Mobile Phase:	87.5/7.5/0.1 v/v/v Hexane/IPA/MeOH/DEA
Flow Rate:	1.0 mL/min
Temperature:	30 oC
Injection Volume:	10 µL
Detection:	UV 254 nm
Analyte ID:	finerone (0.5 mg/mL, dissolved in MeOH)

In this example the R and S enantiomers of finerenone are well separated using the MAC-MOD Amy-5 phase chemistry with normal phase HPLC mode.

MAC-MOD Cel-1:

CSP: *tris*-(3,5 – dimethylphenylcarbamate)



Physicals:

Coating	Immobilized (Yes/No)	Particle Sizes	Pore Size (Å)	pH Range	Pressure Limit (bar)
Cellulose	No	3 5	Proprietary	2-8	400

Equivalence:

MAC-MOD Chiral	Daicel/Chiral Technologies	Phenomenex	Regis	Dr. Maisch	ES Industries
Cel-1	CHIRALCEL® OD	Lux-Cellulose-1	REFLECT C-Cellulose B	ReproSil Chiral-OM	ChromegaChiral CCO

Important:
Normally packed in Normal-Phase Solvents for NPLC or SFC Applications
Available to be packed in Reversed-Phase Solvents

MAC-MOD Cel-1:

NPLC

Figure 14: ketamine

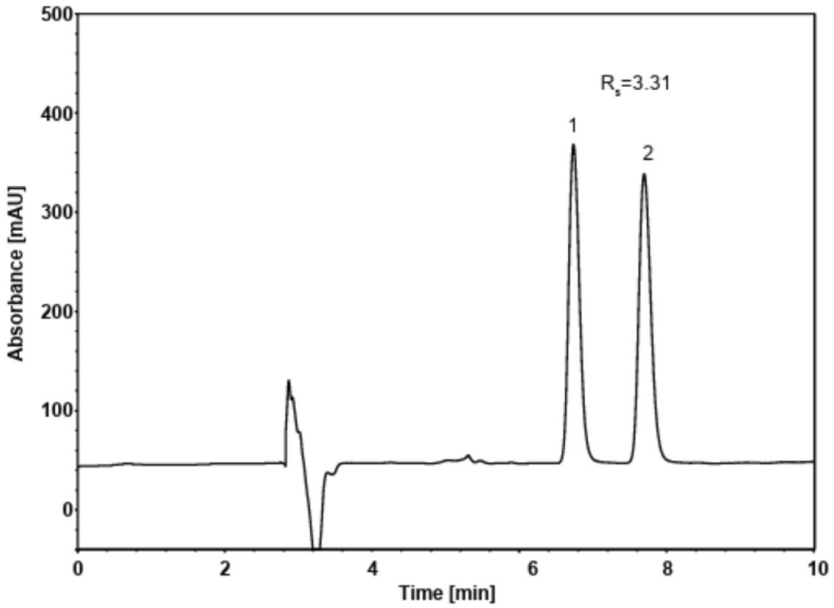


Figure 14

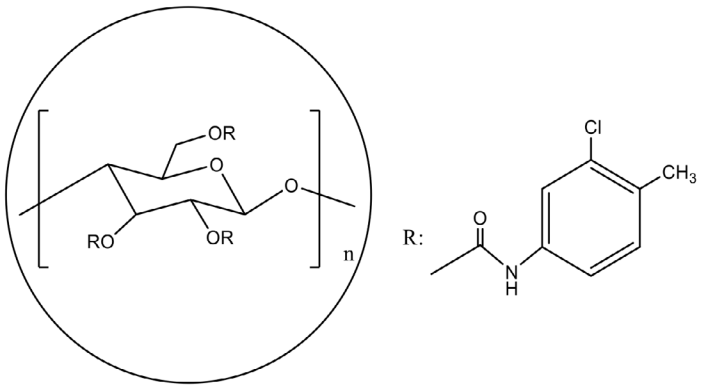
Conditions:

Column:	MMC122546
Description:	MAC-MOD Chiral Cel-1, 5 µm, 4.6 x 250 mm Coated HPLC/SFC Column
Mobile Phase:	95/5 v/v Hexane/IPA
Flow Rate:	1.0 mL/min
Temperature:	Room Temperature
Injection Volume:	10 µL
Detection:	UV 210 nm
Analyte ID:	ketamine (1.0 mg/mL, dissolved in IPA)

In this example, the R and S enantiomers of ketamine are well separated utilizing the MAC-MOD Cel-1 phase chemistry in normal phase HPLC mode.

MAC-MOD Cel-2:

CSP: *tris*-(3-chloro-4-methylphenylcarbamate)



Physicals:

Coating	Immobilized (Yes/No)	Particle Sizes	Pore Size (Å)	pH Range	Pressure Limit (bar)
Cellulose	No	3 5	Proprietary	2-8	400

Equivalence:

MAC-MOD Chiral	Daicel/Chiral Technologies	Phenomenex	Regis	Dr. Maisch	ES Industries
Cel-2	CHIRALCEL® OZ	Lux-Cellulose-2	-	ReproSil Chiral-ZM	ChromegaChiral CC2

Important:
Normally packed in Normal-Phase Solvents for NPLC or SFC Applications
Available to be packed in Reversed-Phase Solvents

MAC-MOD Cel-2:

POM

Figure 15: nilaparil benzenesulfonate

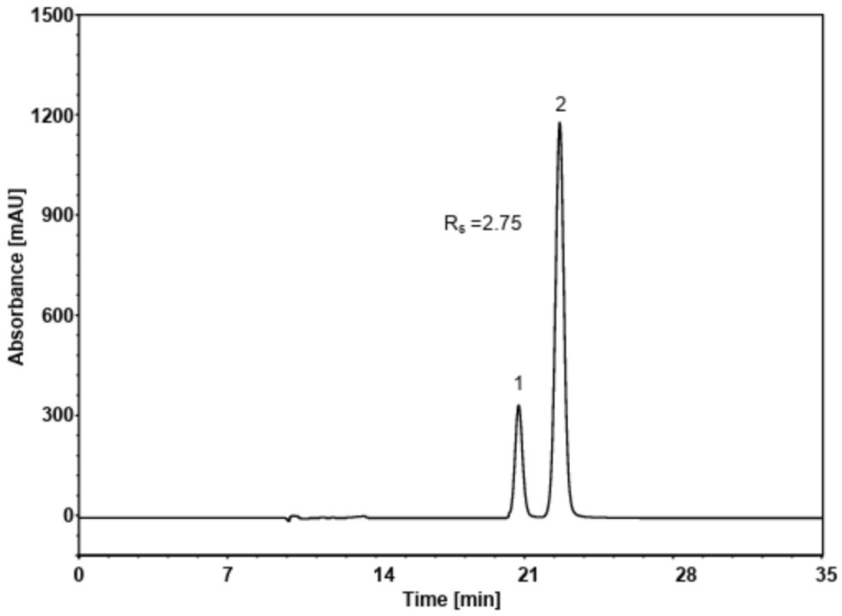


Figure 15

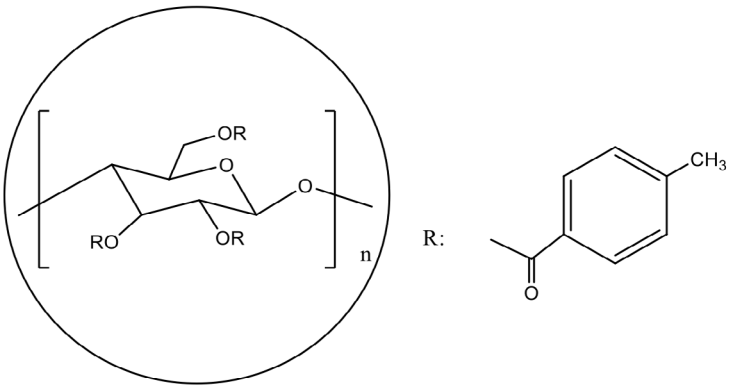
Conditions:

Column:	MMC222546
Description:	MAC-MOD Chiral Cel-2, 5 µm, 4.6 x 250 mm Coated HPLC/SFC Column
Mobile Phase:	80/20/0.1 v/v MeOH/IPA/DEA
Flow Rate:	0.3 mL/min
Temperature:	35 oC
Injection Volume:	10 µL
Detection:	UV 290 nm
Sample ID:	nilaparil benzenesulfonate
Peaks:	1) isomer of nilaparil (0.2 mg/mL)
	2) nilaparil (1 mg/mL)

In this example, the R and S enantiomers of nilaparil benzenesulfonate are well separated utilizing the MACMOD Cel-2 phase chemistry in polar organic HPLC mode.

MAC-MOD Cel-3:

CSP: *tris*-[4-methylbenzoate)]



Physicals:

Coating	Immobilized (Yes/No)	Particle Sizes	Pore Size (Å)	pH Range	Pressure Limit (bar)
Cellulose	No	3 5	Proprietary	2-8	400

Equivalence:

MAC-MOD Chiral	Daicel/Chiral Technologies	Phenomenex	Regis	Dr. Maisch	ES Industries
Cel-3	CHIRALCEL® OJ	Lux-Cellulose-3	-	ReproSil Chiral-JM	ChromegaChiral CCJ

Important:
Normally packed in Normal-Phase Solvents for NPLC or SFC Applications
Available to be packed in Reversed-Phase Solvents

MAC-MOD Cel-3:

NPLC

Figure 16: furano-coumarin ethers

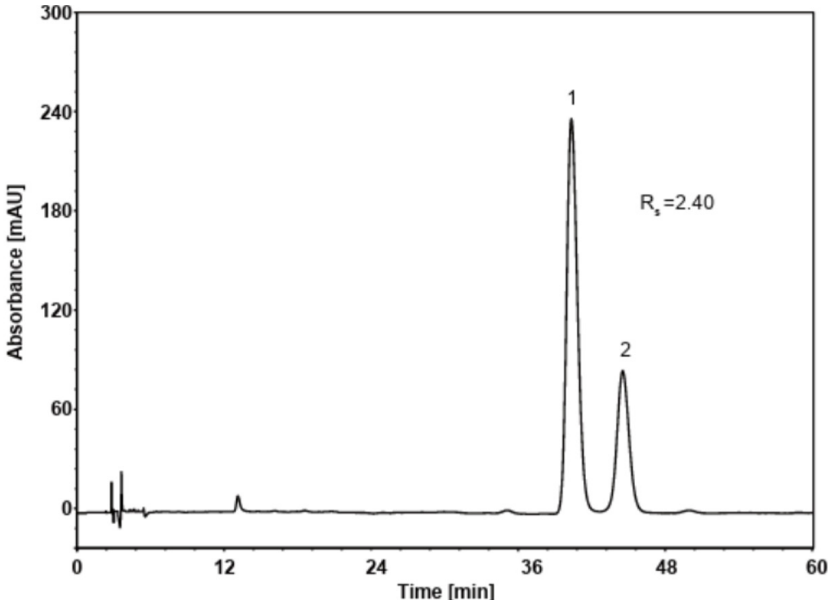


Figure 16

Conditions:

Column:	MMC322546
Description:	MAC-MOD Chiral Cel-3, 5 µm, 4.6 x 250 mm Coated HPLC/SFC Column
Mobile Phase:	90/10 v/v Hexane/EtOH
Flow Rate:	1.0 mL/min
Temperature:	Room Temperature
Injection Volume:	5 µL
Detection:	UV 254 nm
Analyte ID:	7-(3S,4S)-4-methyl-3,4-dihydroxybut-1-en-1-yloxy-2H-chromen-2-one

In this example, the R and S enantiomers of a furano-comarin ether is well separated utilizing the MAC-MOD Cel-3 phase chemistry in normal phase HPLC mode.

MAC-MOD Cel-3:

Figure 17: dapoxetine

POM

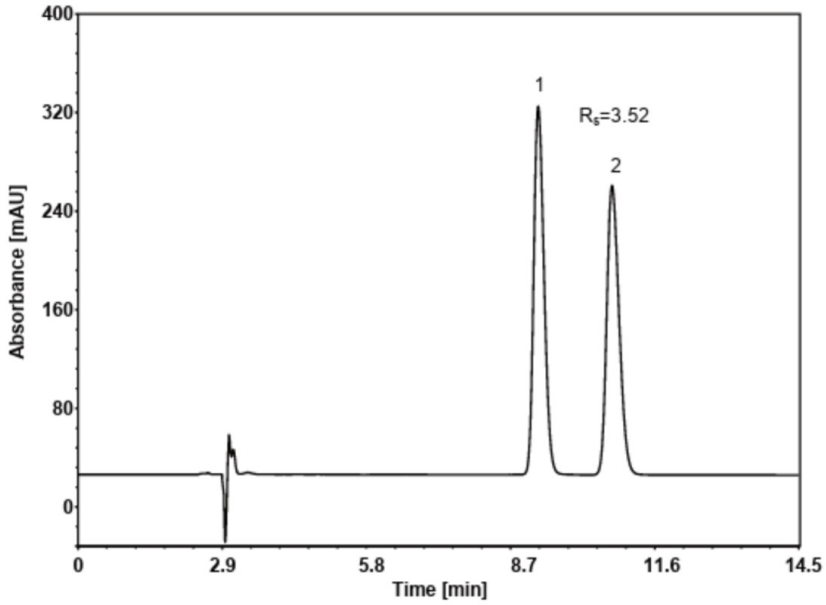


Figure 17

Conditions:

Column:	MMC322546
Description:	MAC-MOD Chiral Cel-3, 5 µm, 4.6 x 250 mm Coated HPLC/SFC Column
Mobile Phase:	90/10/0.1 v/v/v MeOH/EtOH/DEA
Flow Rate:	1.0 mL/min
Temperature:	Room Temperature
Injection Volume:	10 µL
Detection:	UV 290 nm
Analyte ID:	dapoxetine (0.5 mg/mL, dissolved in EtOH)

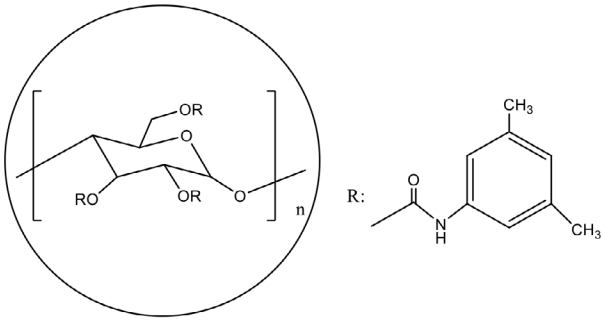
In this example, the R and S enantiomers of dapoxetine are well separated utilizing the MAC-MOD Cel-3 phase chemistry in polar organic HPLC mode.

Established Amylose and Cellulose Immobilized Chiral Selectors

macmod chiral

MAC-MOD Im-Amy-1:

CSP: *tris*-(3,5 – dimethylphenylcarbamate)



Covalently bonded to silica surface

Physicals:

Coating	Immobilized (Yes/No)	Particle Sizes	Pore Size (Å)	pH Range	Pressure Limit (bar)
Amylose	Yes	3 5	Proprietary	2-8	400

Equivalence:

MAC-MOD Chiral	Daicel/Chiral Technologies	Phenomenex	Regis	Dr. Maisch	ES Industries
Im-Amy-1	CHIRALPAK® IA	Lux-i-Amylose-1	REFLECT I-Amylose-A	ReproSil Chiral MIA	-

Important:
Always packed in Normal-Phase Solvents for NPLC or SFC Applications
Unlike Coated Variants, Immobilized columns are switchable between NPLC/SFC and RPLC modes

MAC-MOD Im-Amy-1:

Figure 18: menthol benzoate

POM

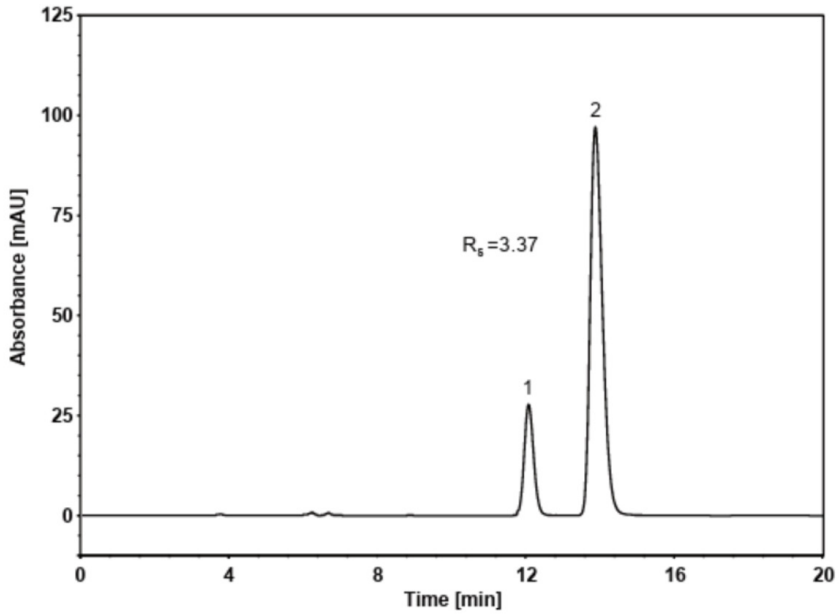


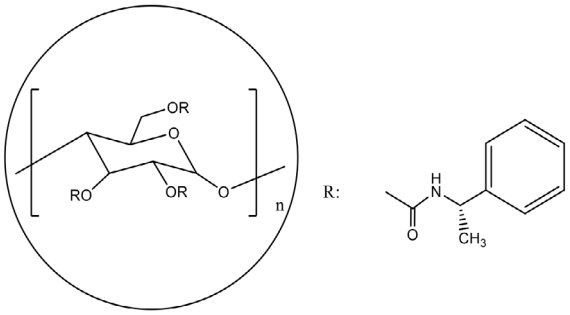
Figure18

Conditions:

Column:	MMIA122546
Description:	MAC-MOD Chiral Im-Amy-1, 5 µm, 4.6 x 250 mm Immobilized SFC/HPLC Column
Mobile Phase:	80/20 v/v EtOH/H2O
Flow Rate:	0.5 mL/min
Temperature:	25 oC
Injection Volume:	10 µL
Detection:	UV 254 nm
Analyte ID:	menthol benzoate (0.5 mg/mL, dissolved in EtOH)

In this example, the R and S enantiomers of methol benzoate are well separated utilizing the MAC-MOD Im-Amy-1 phase chemistry in polar organic HPLC mode

MAC-MOD Im-Amy-3:
CSP: *tris*-[(s)-α-methylbenzylcarbamate)]



Covalently bonded to silica surface

Physicals:

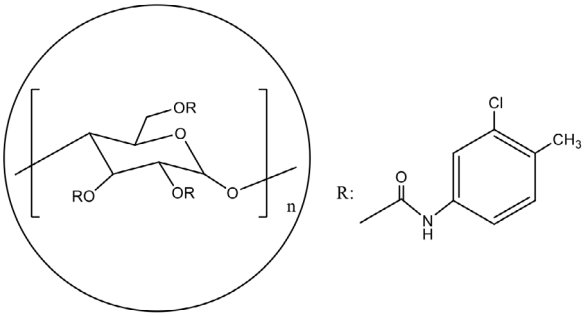
Coating	Immobilized (Yes/No)	Particle Sizes	Pore Size (Å)	pH Range	Pressure Limit (bar)
Amylose	Yes	3 5	Proprietary	2-8	400

Equivalence:

MAC-MOD Chiral	Daicel/Chiral Technologies	Phenomenex	Regis	Dr. Maisch	ES Industries
Im-Amy-3	CHIRALPAK® IH	-	-	-	-

Important:
Always packed in Normal-Phase Solvents for NPLC or SFC Applications
Unlike Coated Variants, Immobilized columns are switchable between NPLC/SFC and RPLC modes

MAC-MOD Im-Amy-5:
CSP: *tris*-(4-chloro-3-methylphenylcarbamate)



Covalently bonded to silica surface

Physicals:

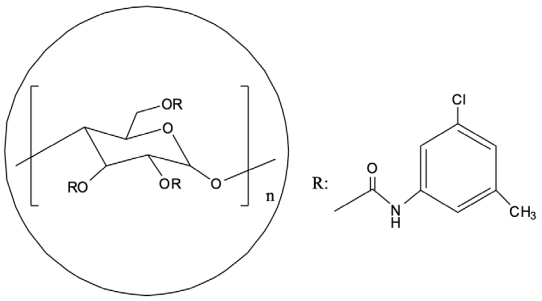
Coating	Immobilized (Yes/No)	Particle Sizes	Pore Size (Å)	pH Range	Pressure Limit (bar)
Amylose	Yes	3 5	Proprietary	2-8	400

Equivalence:

MAC-MOD Chiral	Daicel/Chiral Technologies	Phenomenex	Regis	Dr. Maisch	ES Industries
Im-Amy-5	CHIRALPAK® IF	-	-	ReproSil Chiral MIF	-

Important:
Always packed in Normal-Phase Solvents for NPLC or SFC Applications
Unlike Coated Variants, Immobilized columns are switchable between NPLC/SFC and RPLC modes

MAC-MOD Im-Amy-6:
CSP: *tris*-(3-chloro-5-methylphenylcarbamate)



Covalently bonded to silica surface

Physicals:

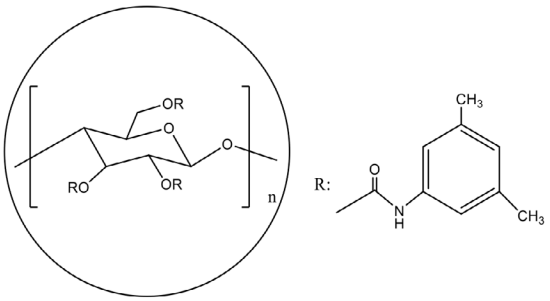
Coating	Immobilized (Yes/No)	Particle Sizes	Pore Size (Å)	pH Range	Pressure Limit (bar)
Amylose	No	3 5	Proprietary	2-8	400

Equivalence:

MAC-MOD Chiral	Daicel/Chiral Technologies	Phenomenex	Regis	Dr. Maisch	ES Industries
Im-Amy-6	CHIRALPAK® IG	LUX-i-Amylose-3	-	ReproSil Chiral MIG	-

Important:
Normally packed in Normal-Phase Solvents for NPLC or SFC Applications
Available to be packed in Reversed-Phase Solvents
Coated equivalent TO Daicel CHIRALPAK® IG Immobilized Chemistry

MAC-MOD Im-Cel-1:
CSP: *tris*-(3,5-dimethylphenylcarbamate)



Covalently bonded to silica surface

Physicals:

Coating	Immobilized (Yes/No)	Particle Sizes	Pore Size (Å)	pH Range	Pressure Limit (bar)
Cellulose	Yes	3 5	Proprietary	2-8	400

Equivalence:

MAC-MOD Chiral	Daicel/Chiral Technologies	Phenomenex	Regis	Dr. Maisch	ES Industries
Im-Cel-1	CHIRALPAK® IB	-	REFLECT I-Cellulose-B	ReproSil Chiral MIB	-

Important:
Always packed in Normal-Phase Solvents for NPLC or SFC Applications
Unlike Coated Variants, Immobilized columns are switchable between NPLC/SFC and RPLC modes

MAC-MOD Im-Cel-1:

RPLC

Figure 19: tripeptide

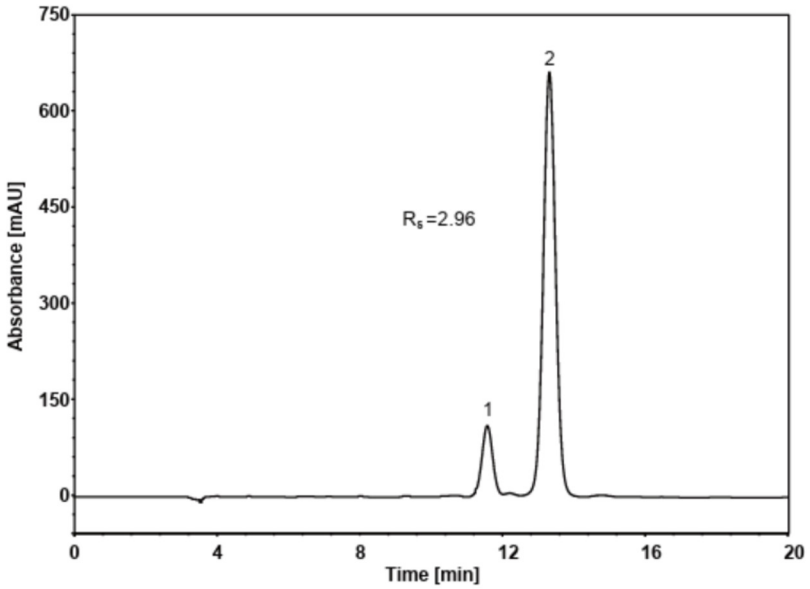


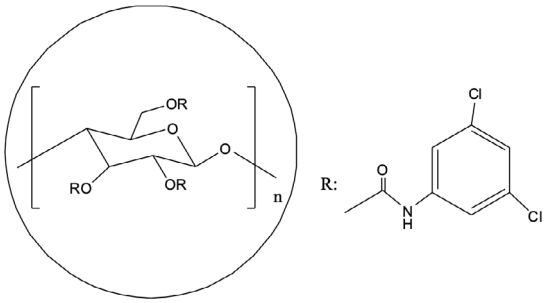
Figure 19

Conditions:

Column:	MMIC122546
Description:	MAC-MOD Chiral Im-Cel-1, 5 µm, 4.6 x 250 mm Immobilized SFC/HPLC Column
Mobile Phase:	60/40/0.1 v/v/v MeCN/H2O/TFA
Flow Rate:	0.8 mL/min
Temperature:	35 oC
Injection:	10 µL
Detection:	UV 220 nm
Analyte ID:	tripeptide (0.5 mg/mL)

In this example, the R and S enantiomers of this tripeptide are well separated utilizing the MAC-MOD Im-Cel-1 phase chemistry in reversed phase HPLC mode with TFA as an ion-pair additive to improve retention.

MAC-MOD Im-Cel-C:
CSP: *tris*-(3,5-dichlorophenylcarbamate)



Covalently bonded to silica surface

Physicals:

Coating	Immobilized (Yes/No)	Particle Sizes	Pore Size (Å)	pH Range	Pressure Limit (bar)
Cellulose	Yes	3 5	Proprietary	2-8	400

Equivalence:

MAC-MOD Chiral	Daicel/Chiral Technologies	Phenomenex	Regis	Dr. Maisch	ES Industries
Im-Cel-C	CHIRALPAK® IC	Lux-i-Cellulose-5	REFLECT I-Cellulose-C	ReproSil Chiral MIC	-

Important:
Always packed in Normal-Phase Solvents for NPLC or SFC Applications
Unlike Coated Variants, Immobilized columns are switchable between NPLC/SFC and RPLC modes

MAC-MOD Im-Cel-C:

Figure 20: empagliflozin

NPLC

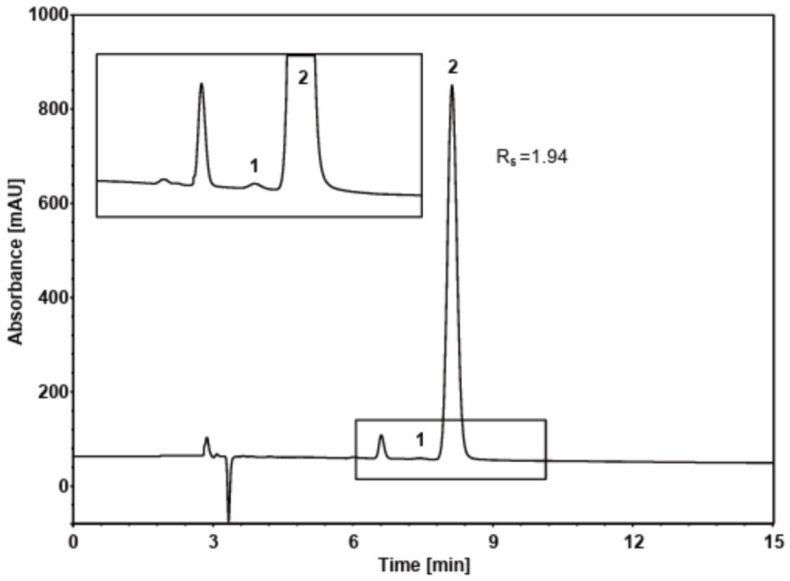


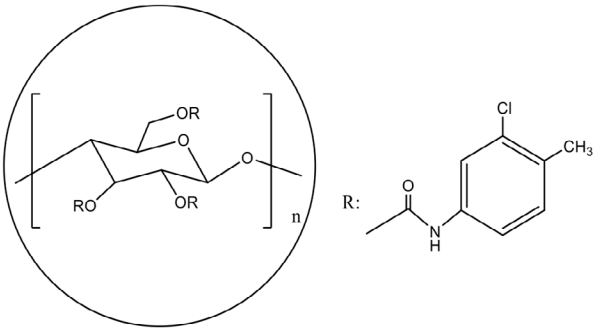
Figure 20

Conditions:

Column:	MMICC22546
Description:	MAC-MOD Chiral Im-Cel-C, 5 µm, 4.6 x 250 mm Immobilized SFC/HPLC Column
Mobile Phase:	60/40/0.2 v/v Hexane/EtOH/CH3COOH
Flow Rate:	1.0 mL/min
Temperature:	Room Temperature
Injection:	10 µL
Detection:	UV 225 nm
Analyte ID:	empagliflozin (0.5 mg/mL)

In this example, the chiral enantiomers of empagliflozin is well separated utilizing the MAC-MOD Im-Cel-C phase chemistry in normal phase mode.

MAC-MOD Im-Cel-2:
CSP: *tris*-(3-chloro-4-methylphenylcarbamate)



Covalently bonded to silica surface

Physicals:

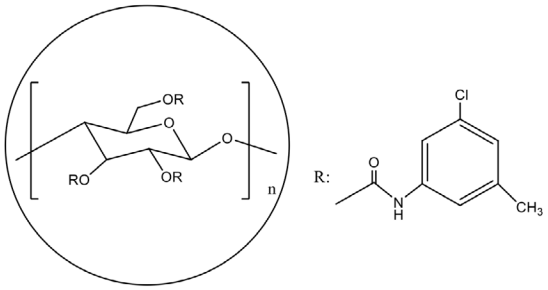
Coating	Immobilized (Yes/No)	Particle Sizes	Pore Size (Å)	pH Range	Pressure Limit (bar)
Cellulose	Yes	3 5	Proprietary	2-8	400

Equivalence:

MAC-MOD Chiral	Daicel/Chiral Technologies	Phenomenex	Regis	Dr. Maisch	ES Industries
Im-Cel-2	CHIRALPAK® IM	-	REFLECT I-Cellulose-Z	-	-

Important:
Always packed in Normal-Phase Solvents for NPLC or SFC Applications
Unlike Coated Variants, Immobilized columns are switchable between NPLC/SFC and RPLC modes

MAC-MOD Im-Cel-9:
CSP: *tris*-(3-chloro-5-methylphenylcarbamate)



Covalently bonded to silica surface

Physicals:

Coating	Immobilized (Yes/No)	Particle Sizes	Pore Size (Å)	pH Range	Pressure Limit (bar)
Cellulose	Yes	3 5	Proprietary	2-8	400

Equivalence:

MAC-MOD Chiral	Daicel/Chiral Technologies	Phenomenex	Regis	Dr. Maisch	ES Industries
Im-Cel-9	CHIRALPAK® IK	-	-	-	-

Important:
Always packed in Normal-Phase Solvents for NPLC or SFC Applications
Unlike Coated Variants, Immobilized columns are switchable between NPLC/SFC and RPLC modes

COMPREHENSIVE CONVERSION TABLES TO EXISTING CHIRAL MANUFACTURERS

MAC-MOD Chiral	Daicel/Chiral Technologies	Phenomenex	Regis	Dr. Maisch	ES Industries
Amy-1	CHIRALPAK® AD	Lux Amylose-1	REFLECT C-Amylose A	ReproSil Chiral-AM	ChromegaChiral CCA
Amy-2	CHIRALPAK® AY	Lux Amylose-2	-	ReproSil Chiral-YM	ChromegaChiral CC3
Amy-3	CHIRALPAK® AS	-	-	ReproSil Chiral-AMS	ChromegaChiral CCS
Amy-4	-	-	-	-	-
Amy-5	CHIRALPAK® AZ	-	-	ReproSil Chiral-ZA	-
Amy-6	-	-	-	-	-
Amy-8	-	-	-	-	-
Cel-1	CHIRALCEL® OD	Lux-Cellulose-1	REFLECT C-Cellulose B	ReproSil Chiral-OM	ChromegaChiral CCO
Cel-2	CHIRALCEL® OZ	Lux-Cellulose-2	-	ReproSil Chiral-ZM	ChromegaChiral CC2
Cel-3	CHIRALCEL® OJ	Lux-Cellulose-3	-	ReproSil Chiral-JM	ChromegaChiral CCJ
Cel-4	CHIRALCEL® OX	Lux-Cellulose-4	-	ReproSil Chiral-XM	ChromegaChiral CC4
Cel-9	-	-	-	-	-
Amy-4F	-	-	-	-	ChromegaChiral CCA F4
Cel-2F	-	-	-	-	ChromegaChiral CCO F2
Cel-4F	-	-	-	-	ChromegaChiral CCO F4
Cel-FT	-	-	-	-	ChromegaChiral CCO F4 T3
Amy -1-3B	-	-	-	-	ChromegaChiral CCX
Amy – 3-5B	-	-	-	-	ChromegaChiral CCU
Cel – 2,Cl-E	-	-	-	-	ChromegaChiral CCC
Im-Amy-1	CHIRALPAK® IA	Lux-i-Amylose-1	REFLECT I-Amylose-A	ReproSil Chiral -MIA	-
Im-Amy-3	CHIRALPAK® IH	-	-	-	-
Im-Amy-5	CHIRALPAK® IF			ReproSil Chiral -MIF	
Im-Amy-6	CHIRALPAK® IG	Lux-i-Amylose-3	-	ReproSil Chiral-MIG	-
Im-Cel-1	CHIRALPAK® IB	-	REFLECT I-Cellulose-B	ReproSil Chiral -MIB	-
Im-Cel-C	CHIRALPAK® IC	Lux-i-Cellulose-5	REFLECT I-Cellulose-C	ReproSil Chiral -MIC	-
Im-Cel-2	CHIRALPAK® IM	-	REFLECT I-Cellulose-Z		-
Im-Cel-9	CHIRALPAK® IK	-	-	-	-

PART NUMBER TABLE:

Innovative Coated Chiral Selectors

	Bonded Phases				
Column Size	Amy-4	Amy-6	Amy-8	Cel-4	Cel-9
3 µm, 2.1 x 50 mm	MMA410502	MMA610502	MMA810502	MMC410502	MMC910502
3 µm, 2.1 x 100 mm	MMA411002	MMA611002	MMA811002	MMC411002	MMC911002
3 µm, 2.1 x 150 mm	MMA411502	MMA611502	MMA811502	MMC411502	MMC911502
3 µm, 2.1 x 250 mm	MMA412502	MMA612502	MMA812502	MMC412502	MMC912502
3 µm, 3.0 x 50 mm	MMA410503	MMA610503	MMA810503	MMC410503	MMC910503
3 µm, 3.0 x 100 mm	MMA411003	MMA611003	MMA811003	MMC411003	MMC911003
3 µm, 3.0 x 150 mm	MMA411503	MMA611503	MMA811503	MMC411503	MMC911503
3 µm, 3.0 x 250 mm	MMA412503	MMA612503	MMA812503	MMC412503	MMC912503
3 µm, 4.6 x 50 mm	MMA410546	MMA610546	MMA810546	MMC410546	MMC910546
3 µm, 4.6 x 100 mm	MMA411046	MMA611046	MMA811046	MMC411046	MMC911046
3 µm, 4.6 x 150 mm	MMA411546	MMA611546	MMA811546	MMC411546	MMC911546
3 µm, 4.6 x 250 mm	MMA412546	MMA612546	MMA812546	MMC412546	MMC912546

	Bonded Phases				
Column Size	Amy-4	Amy-6	Amy-8	Cel-4	Cel-9
5 µm, 2.1 x 50 mm	MMA420502	MMA620502	MMA820502	MMC420502	MMC920502
5 µm, 2.1 x 100 mm	MMA421002	MMA621002	MMA821002	MMC421002	MMC921002
5 µm, 2.1 x 150 mm	MMA421502	MMA621502	MMA821502	MMC421502	MMC921502
5 µm, 2.1 x 250 mm	MMA422502	MMA622502	MMA822502	MMC422502	MMC922502
5 µm, 3.0 x 50 mm	MMA420503	MMA620503	MMA820503	MMC420503	MMC920503
5 µm, 3.0 x 100 mm	MMA421003	MMA621003	MMA821003	MMC421003	MMC921003
5 µm, 3.0 x 150 mm	MMA421503	MMA621503	MMA821503	MMC421503	MMC921503
5 µm, 3.0 x 250 mm	MMA422503	MMA622503	MMA822503	MMC422503	MMC922503
5 µm, 4.6 x 50 mm	MMA420546	MMA620546	MMA820546	MMC420546	MMC920546
5 µm, 4.6 x 100 mm	MMA421046	MMA621046	MMA821046	MMC421046	MMC921046
5 µm, 4.6 x 150 mm	MMA421546	MMA621546	MMA821546	MMC421546	MMC921546
5 µm, 4.6 x 250 mm	MMA422546	MMA622546	MMA822546	MMC422546	MMC922546
5 µm, 10.0 x 150 mm	MMA421510	MMA621510	MMA821510	MMC421510	MMC921510
5 µm, 10.0 x 250 mm	MMA422510	MMA622510	MMA822510	MMC422510	MMC922510
5 µm, 21.2 x 150 mm	MMA421520	MMA621520	MMA821520	MMC421520	MMC921520
5 µm, 21.2 x 250 mm	MMA422520	MMA622520	MMA822520	MMC422520	MMC922520
5 µm, 30.0 x 150 mm	MMA421530	MMA621530	MMA821530	MMC421530	MMC921530
5 µm, 30.0 x 250 mm	MMA422530	MMA622530	MMA822530	MMC422530	MMC922530
5 µm, 50.0 x 150 mm	MMA421550	MMA621550	MMA821550	MMC421550	MMC921550
5 µm, 50.0 x 250 mm	MMA422550	MMA622550	MMA822550	MMC422550	MMC922550

Note: If you intend to use these coated columns for RPLC analysis please add the letter R **before** the part number. The cost is the same, but this indicates to our manufacturing team what to pack the columns in. Coated columns are not easily converted between modes of chromatography.

PART NUMBER TABLE:

Innovative Fluorinated Coated Chiral Selectors

	Bonded Phases			
Column Size	Amy-4F	Cel-2F	Cel-4F	Cel-FT
3 µm, 2.1 x 50 mm	MMA4F10502	MMC2F10502	MMC4F10502	MMCFT10502
3 µm, 2.1 x 100 mm	MMA4F11002	MMC2F11002	MMC4F11002	MMCFT11002
3 µm, 2.1 x 150 mm	MMA4F11502	MMC2F11502	MMC4F11502	MMCFT11502
3 µm, 2.1 x 250 mm	MMA4F12502	MMC2F12502	MMC4F12502	MMCFT12502
3 µm, 3.0 x 50 mm	MMA4F10503	MMC2F10503	MMC4F10503	MMCFT10503
3 µm, 3.0 x 100 mm	MMA4F11003	MMC2F11003	MMC4F11003	MMCFT11003
3 µm, 3.0 x 150 mm	MMA4F11503	MMC2F11503	MMC4F11503	MMCFT11503
3 µm, 3.0 x 250 mm	MMA4F12503	MMC2F12503	MMC4F12503	MMCFT12503
3 µm, 4.6 x 50 mm	MMA4F10546	MMC2F10546	MMC4F10546	MMCFT10546
3 µm, 4.6 x 100 mm	MMA4F11046	MMC2F11046	MMC4F11046	MMCFT11046
3 µm, 4.6 x 150 mm	MMA4F11546	MMC2F11546	MMC4F11546	MMCFT11546
3 µm, 4.6 x 250 mm	MMA4F12546	MMC2F12546	MMC4F12546	MMCFT12546

	Bonded Phases			
Column Size	Amy-4F	Cel-2F	Cel-4F	Cel-FT
5 µm, 2.1 x 50 mm	MMA4F20502	MMC2F20502	MMC4F20502	MMCFT20502
5 µm, 2.1 x 100 mm	MMA4F21002	MMC2F21002	MMC4F21002	MMCFT21002
5 µm, 2.1 x 150 mm	MMA4F21502	MMC2F21502	MMC4F21502	MMCFT21502
5 µm, 2.1 x 250 mm	MMA4F22502	MMC2F22502	MMC4F22502	MMCFT22502
5 µm, 3.0 x 50 mm	MMA4F20503	MMC2F20503	MMC4F20503	MMCFT20503
5 µm, 3.0 x 100 mm	MMA4F21003	MMC2F21003	MMC4F21003	MMCFT21003
5 µm, 3.0 x 150 mm	MMA4F21503	MMC2F21503	MMC4F21503	MMCFT21503
5 µm, 3.0 x 250 mm	MMA4F22503	MMC2F22503	MMC4F22503	MMCFT22503
5 µm, 4.6 x 50 mm	MMA4F20546	MMC2F20546	MMC4F20546	MMCFT20546
5 µm, 4.6 x 100 mm	MMA4F21046	MMC2F21046	MMC4F21046	MMCFT21046
5 µm, 4.6 x 150 mm	MMA4F21546	MMC2F21546	MMC4F21546	MMCFT21546
5 µm, 4.6 x 250 mm	MMA4F22546	MMC2F22546	MMC4F22546	MMCFT22546
5 µm, 10.0 x 150 mm	MMA4F21510	MMC2F21510	MMC4F21510	MMCFT21510
5 µm, 10.0 x 250 mm	MMA4F22510	MMC2F22510	MMC4F22510	MMCFT22510
5 µm, 21.2 x 150 mm	MMA4F21520	MMC2F21520	MMC4F21520	MMCFT21520
5 µm, 21.2 x 250 mm	MMA4F22520	MMC2F22520	MMC4F22520	MMCFT22520
5 µm, 30.0 x 150 mm	MMA4F21530	MMC2F21530	MMC4F21530	MMCFT21530
5 µm, 30.0 x 250 mm	MMA4F22530	MMC2F22530	MMC4F22530	MMCFT22530
5 µm, 50.0 x 150 mm	MMA4F21550	MMC2F21550	MMC4F21550	MMCFT21550
5 µm, 50.0 x 250 mm	MMA4F22550	MMC2F22550	MMC4F22550	MMCFT22550

Note: If you intend to use these coated columns for RPLC analysis please add the letter R **before** the part number. The cost is the same, but this indicates to our manufacturing team what to pack the columns in. Coated columns are not easily converted between modes of chromatography.

PART NUMBER TABLE:

Innovative Blended Coated Chiral Selectors

	Bonded Phases		
Column Size	Amy-1-3B	Amy-3-5B	Cel-2,Cl-E
3 µm, 2.1 x 50 mm	MMA13B10502	MMA35B10502	MMC2CIE10502
3 µm, 2.1 x 100 mm	MMA13B11002	MMA35B11002	MMC2CIE11002
3 µm, 2.1 x 150 mm	MMA13B11502	MMA35B11502	MMC2CIE11502
3 µm, 2.1 x 250 mm	MMA13B12502	MMA35B12502	MMC2CIE12502
3 µm, 3.0 x 50 mm	MMA13B10503	MMA35B10503	MMC2CIE10503
3 µm, 3.0 x 100 mm	MMA13B11003	MMA35B11003	MMC2CIE11003
3 µm, 3.0 x 150 mm	MMA13B11503	MMA35B11503	MMC2CIE11503
3 µm, 3.0 x 250 mm	MMA13B12503	MMA35B12503	MMC2CIE12503
3 µm, 4.6 x 50 mm	MMA13B10546	MMA35B10546	MMC2CIE10546
3 µm, 4.6 x 100 mm	MMA13B11046	MMA35B11046	MMC2CIE11046
3 µm, 4.6 x 150 mm	MMA13B11546	MMA35B11546	MMC2CIE11546
3 µm, 4.6 x 250 mm	MMA13B12546	MMA35B12546	MMC2CIE12546

	Bonded Phases		
Column Size	Amy-1-3-B	Amy-3-5B	Cel-2,Cl-E
5 µm, 2.1 x 50 mm	MMA13B20502	MMA35B20502	MMC2CIE20502
5 µm, 2.1 x 100 mm	MMA13B21002	MMA35B21002	MMC2CIE21002
5 µm, 2.1 x 150 mm	MMA13B21502	MMA35B21502	MMC2CIE21502
5 µm, 2.1 x 250 mm	MMA13B22502	MMA35B22502	MMC2CIE22502
5 µm, 3.0 x 50 mm	MMA13B20503	MMA35B20503	MMC2CIE20503
5 µm, 3.0 x 100 mm	MMA13B21003	MMA35B21003	MMC2CIE21003
5 µm, 3.0 x 150 mm	MMA13B21503	MMA35B21503	MMC2CIE21503
5 µm, 3.0 x 250 mm	MMA13B22503	MMA35B22503	MMC2CIE22503
5 µm, 4.6 x 50 mm	MMA13B20546	MMA35B20546	MMC2CIE20546
5 µm, 4.6 x 100 mm	MMA13B21046	MMA35B21046	MMC2CIE21046
5 µm, 4.6 x 150 mm	MMA13B21546	MMA35B21546	MMC2CIE21546
5 µm, 4.6 x 250 mm	MMA13B22546	MMA35B22546	MMC2CIE22546
5 µm, 10.0 x 150 mm	MMA13B21510	MMA35B21510	MMC2CIE21510
5 µm, 10.0 x 250 mm	MMA13B22510	MMA35B22510	MMC2CIE22510
5 µm, 21.2 x 150 mm	MMA13B21520	MMA35B21520	MMC2CIE21520
5 µm, 21.2 x 250 mm	MMA13B22520	MMA35B22520	MMC2CIE22520
5 µm, 30.0 x 150 mm	MMA13B21530	MMA35B21530	MMC2CIE21530
5 µm, 30.0 x 250 mm	MMA13B22530	MMA35B22530	MMC2CIE22530
5 µm, 50.0 x 150 mm	MMA13B21550	MMA35B21550	MMC2CIE21550
5 µm, 50.0 x 250 mm	MMA13B22550	MMA35B22550	MMC2CIE22550

Note: If you intend to use these coated columns for RPLC analysis please add the letter R **before** the part number. The cost is the same, but this indicates to our manufacturing team what to pack the columns in. Coated columns are not easily converted between modes of chromatography.

PART NUMBER TABLE:

Established Coated Chiral Selectors

	Bonded Phases			
Column Size	Amy-1	Amy-2	Amy-3	Amy-5
3 µm, 2.1 x 50 mm	MMA110502	MMA210502	MMA310502	MMA510502
3 µm, 2.1 x 100 mm	MMA111002	MMA211002	MMA311002	MMA511002
3 µm, 2.1 x 150 mm	MMA111502	MMA211502	MMA311502	MMA511502
3 µm, 2.1 x 250 mm	MMA112502	MMA212502	MMA312502	MMA512502
3 µm, 3.0 x 50 mm	MMA110503	MMA210503	MMA310503	MMA510503
3 µm, 3.0 x 100 mm	MMA111003	MMA211003	MMA311003	MMA511003
3 µm, 3.0 x 150 mm	MMA111503	MMA211503	MMA311503	MMA511503
3 µm, 3.0 x 250 mm	MMA112503	MMA212503	MMA312503	MMA512503
3 µm, 4.6 x 50 mm	MMA110546	MMA210546	MMA310546	MMA510546
3 µm, 4.6 x 100 mm	MMA111046	MMA211046	MMA311046	MMA511046
3 µm, 4.6 x 150 mm	MMA111546	MMA211546	MMA311546	MMA511546
3 µm, 4.6 x 250 mm	MMA112546	MMA212546	MMA312546	MMA512546

	Bonded Phases			
Column Size	Amy-1	Amy-2	Amy-3	Amy-5
5 µm, 2.1 x 50 mm	MMA120502	MMA220502	MMA320502	MMA520502
5 µm, 2.1 x 100 mm	MMA121002	MMA221002	MMA321002	MMA521002
5 µm, 2.1 x 150 mm	MMA121502	MMA221502	MMA321502	MMA521502
5 µm, 2.1 x 250 mm	MMA122502	MMA222502	MMA322502	MMA522502
5 µm, 3.0 x 50 mm	MMA120503	MMA220503	MMA320503	MMA520503
5 µm, 3.0 x 100 mm	MMA121003	MMA221003	MMA321003	MMA521003
5 µm, 3.0 x 150 mm	MMA121503	MMA221503	MMA321503	MMA521503
5 µm, 3.0 x 250 mm	MMA122503	MMA222503	MMA322503	MMA522503
5 µm, 4.6 x 50 mm	MMA120546	MMA220546	MMA320546	MMA520546
5 µm, 4.6 x 100 mm	MMA121046	MMA221046	MMA321046	MMA521046
5 µm, 4.6 x 150 mm	MMA121546	MMA221546	MMA321546	MMA521546
5 µm, 4.6 x 250 mm	MMA122546	MMA222546	MMA322546	MMA522546
5 µm, 10.0 x 150 mm	MMA121510	MMA221510	MMA321510	MMA521510
5 µm, 10.0 x 250 mm	MMA122510	MMA222510	MMA322510	MMA522510
5 µm, 21.2 x 150 mm	MMA121520	MMA221520	MMA321520	MMA521520
5 µm, 21.2 x 250 mm	MMA122520	MMA222520	MMA322520	MMA522520
5 µm, 30.0 x 150 mm	MMA121530	MMA221530	MMA321530	MMA521530
5 µm, 30.0 x 250 mm	MMA122530	MMA222530	MMA322530	MMA522530
5 µm, 50.0 x 150 mm	MMA121550	MMA221550	MMA321550	MMA521550
5 µm, 50.0 x 250 mm	MMA122550	MMA222550	MMA322550	MMA522550

Note: If you intend to use these coated columns for RPLC analysis please add the letter R **before** the part number. The cost is the same, but this indicates to our manufacturing team what to pack the columns in. Coated columns are not easily converted between modes of chromatography.

PART NUMBER TABLE:

Established Coated Chiral Selectors

	Bonded Phases		
Column Size	Cel-1	Cel-2	Cel-3
3 µm, 2.1 x 50 mm	MMC110502	MMC210502	MMC310502
3 µm, 2.1 x 100 mm	MMC111002	MMC211002	MMC311002
3 µm, 2.1 x 150 mm	MMC111502	MMC211502	MMC311502
3 µm, 2.1 x 250 mm	MMC112502	MMC212502	MMC312502
3 µm, 3.0 x 50 mm	MMC110503	MMC210503	MMC310503
3 µm, 3.0 x 100 mm	MMC111003	MMC211003	MMC311003
3 µm, 3.0 x 150 mm	MMC111503	MMC211503	MMC311503
3 µm, 3.0 x 250 mm	MMC112503	MMC212503	MMC312503
3 µm, 4.6 x 50 mm	MMC110546	MMC210546	MMC310546
3 µm, 4.6 x 100 mm	MMC111046	MMC211046	MMC311046
3 µm, 4.6 x 150 mm	MMC111546	MMC211546	MMC311546
3 µm, 4.6 x 250 mm	MMC112546	MMC212546	MMC312546

	Bonded Phases		
Column Size	Cel-1	Cel-2	Cel-3
5 µm, 2.1 x 50 mm	MMC120502	MMC220502	MMC320502
5 µm, 2.1 x 100 mm	MMC121002	MMC221002	MMC321002
5 µm, 2.1 x 150 mm	MMC121502	MMC221502	MMC321502
5 µm, 2.1 x 250 mm	MMC122502	MMC222502	MMC322502
5 µm, 3.0 x 50 mm	MMC120503	MMC220503	MMC320503
5 µm, 3.0 x 100 mm	MMC121003	MMC221003	MMC321003
5 µm, 3.0 x 150 mm	MMC121503	MMC221503	MMC321503
5 µm, 3.0 x 250 mm	MMC122503	MMC222503	MMC322503
5 µm, 4.6 x 50 mm	MMC120546	MMC220546	MMC320546
5 µm, 4.6 x 100 mm	MMC121046	MMC221046	MMC321046
5 µm, 4.6 x 150 mm	MMC121546	MMC221546	MMC321546
5 µm, 4.6 x 250 mm	MMC122546	MMC222546	MMC322546
5 µm, 10.0 x 150 mm	MMC121510	MMC221510	MMC321510
5 µm, 10.0 x 250 mm	MMC122510	MMC222510	MMC322510
5 µm, 21.2 x 150 mm	MMC121520	MMC221520	MMC321520
5 µm, 21.2 x 250 mm	MMC122520	MMC222520	MMC322520
5 µm, 30.0 x 150 mm	MMC121530	MMC221530	MMC321530
5 µm, 30.0 x 250 mm	MMC122530	MMC222530	MMC322530
5 µm, 50.0 x 150 mm	MMC121550	MMC221550	MMC321550
5 µm, 50.0 x 250 mm	MMC122550	MMC222550	MMC322550

Note: If you intend to use these coated columns for RPLC analysis please add the letter R **before** the part number. The cost is the same, but this indicates to our manufacturing team what to pack the columns in. Coated columns are not easily converted between modes of chromatography.

PART NUMBER TABLE:

Established Immobilized Chiral Selectors

	Bonded Phases			
Column Size	Im-Amy-1	Im-Amy-3	Im-Amy-5	Im-Amy-6
3 µm, 2.1 x 50 mm	MMIA110502	MMIA310502	MMIA510502	MMIA610502
3 µm, 2.1 x 100 mm	MMIA111002	MMIA311002	MMIA511002	MMIA611002
3 µm, 2.1 x 150 mm	MMIA111502	MMIA311502	MMIA511502	MMIA611502
3 µm, 2.1 x 250 mm	MMIA112502	MMIA312502	MMIA512502	MMIA612502
3 µm, 3.0 x 50 mm	MMIA110503	MMIA310503	MMIA510503	MMIA610503
3 µm, 3.0 x 100 mm	MMIA111003	MMIA311003	MMIA511003	MMIA611003
3 µm, 3.0 x 150 mm	MMIA111503	MMIA311503	MMIA511503	MMIA611503
3 µm, 3.0 x 250 mm	MMIA112503	MMIA312503	MMIA512503	MMIA612503
3 µm, 4.6 x 50 mm	MMIA110546	MMIA310546	MMIA510546	MMIA610546
3 µm, 4.6 x 100 mm	MMIA111046	MMIA311046	MMIA511046	MMIA611046
3 µm, 4.6 x 150 mm	MMIA111546	MMIA311546	MMIA511546	MMIA611546
3 µm, 4.6 x 250 mm	MMIA112546	MMIA312546	MMIA512546	MMIA612546

	Bonded Phases			
Column Size	Im-Amy-1	Im-Amy-3	Im-Amy-5	Im-Amy-6
5 µm, 2.1 x 50 mm	MMIA120502	MMIA320502	MMIA520502	MMIA620502
5 µm, 2.1 x 100 mm	MMIA121002	MMIA321002	MMIA521002	MMIA621002
5 µm, 2.1 x 150 mm	MMIA121502	MMIA321502	MMIA521502	MMIA621502
5 µm, 2.1 x 250 mm	MMIA122502	MMIA322502	MMIA522502	MMIA622502
5 µm, 3.0 x 50 mm	MMIA120503	MMIA320503	MMIA520503	MMIA620503
5 µm, 3.0 x 100 mm	MMIA121003	MMIA321003	MMIA521003	MMIA621003
5 µm, 3.0 x 150 mm	MMIA121503	MMIA321503	MMIA521503	MMIA621503
5 µm, 3.0 x 250 mm	MMIA122503	MMIA322503	MMIA522503	MMIA622503
5 µm, 4.6 x 50 mm	MMIA120546	MMIA320546	MMIA520546	MMIA620546
5 µm, 4.6 x 100 mm	MMIA121046	MMIA321046	MMIA521046	MMIA621046
5 µm, 4.6 x 150 mm	MMIA121546	MMIA321546	MMIA521546	MMIA621546
5 µm, 4.6 x 250 mm	MMIA122546	MMIA322546	MMIA522546	MMIA622546
5 µm, 10.0 x 150 mm	MMIA121510	MMIA321510	MMIA521510	MMIA621510
5 µm, 10.0 x 250 mm	MMIA122510	MMIA322510	MMIA522510	MMIA622510
5 µm, 21.2 x 150 mm	MMIA121520	MMIA321520	MMIA521520	MMIA621520
5 µm, 21.2 x 250 mm	MMIA122520	MMIA322520	MMIA522520	MMIA622520
5 µm, 30.0 x 150 mm	MMIA121530	MMIA321530	MMIA521530	MMIA621530
5 µm, 30.0 x 250 mm	MMIA122530	MMIA322530	MMIA522530	MMIA622530
5 µm, 50.0 x 150 mm	MMIA121550	MMIA321550	MMIA521550	MMIA621550
5 µm, 50.0 x 250 mm	MMIA122550	MMIA322550	MMIA522550	MMIA622550

PART NUMBER TABLE:

Established Immobilized Chiral Selectors

	Bonded Phases			
Column Size	Im-Cel-1	Im-Cel-C	Im-Cel-2	Im-Cel-9
3 µm, 2.1 x 50 mm	MMIC110502	MMICC10502	MMIC210502	MMIC910502
3 µm, 2.1 x 100 mm	MMIC111002	MMICC11002	MMIC211002	MMIC911002
3 µm, 2.1 x 150 mm	MMIC111502	MMICC11502	MMIC211502	MMIC911502
3 µm, 2.1 x 250 mm	MMIC112502	MMICC12502	MMIC212502	MMIC912502
3 µm, 3.0 x 50 mm	MMIC110503	MMICC10503	MMIC210503	MMIC910503
3 µm, 3.0 x 100 mm	MMIC111003	MMICC11003	MMIC211003	MMIC911003
3 µm, 3.0 x 150 mm	MMIC111503	MMICC11503	MMIC211503	MMIC911503
3 µm, 3.0 x 250 mm	MMIC112503	MMICC12503	MMIC212503	MMIC912503
3 µm, 4.6 x 50 mm	MMIC110546	MMICC10546	MMIC210546	MMIC910546
3 µm, 4.6 x 100 mm	MMIC111046	MMICC11046	MMIC211046	MMIC911046
3 µm, 4.6 x 150 mm	MMIC111546	MMICC11546	MMIC211546	MMIC911546
3 µm, 4.6 x 250 mm	MMIC112546	MMICC12546	MMIC212546	MMIC912546

	Bonded Phases			
Column Size	Im-Cel-1	Im-Cel-C	Im-Cel-2	Im-Cel-9
5 µm, 2.1 x 50 mm	MMIC120502	MMICC20502	MMIC220502	MMIC920502
5 µm, 2.1 x 100 mm	MMIC121002	MMICC21002	MMIC221002	MMIC921002
5 µm, 2.1 x 150 mm	MMIC121502	MMICC21502	MMIC221502	MMIC921502
5 µm, 2.1 x 250 mm	MMIC122502	MMICC22502	MMIC222502	MMIC922502
5 µm, 3.0 x 50 mm	MMIC120503	MMICC20503	MMIC220503	MMIC920503
5 µm, 3.0 x 100 mm	MMIC121003	MMICC21003	MMIC221003	MMIC921003
5 µm, 3.0 x 150 mm	MMIC121503	MMICC21503	MMIC221503	MMIC921503
5 µm, 3.0 x 250 mm	MMIC122503	MMICC22503	MMIC222503	MMIC922503
5 µm, 4.6 x 50 mm	MMIC120546	MMICC20546	MMIC220546	MMIC920546
5 µm, 4.6 x 100 mm	MMIC121046	MMICC21046	MMIC221046	MMIC921046
5 µm, 4.6 x 150 mm	MMIC121546	MMICC21546	MMIC221546	MMIC921546
5 µm, 4.6 x 250 mm	MMIC122546	MMICC22546	MMIC222546	MMIC922546
5 µm, 10.0 x 150 mm	MMIC121510	MMICC21510	MMIC221510	MMIC921510
5 µm, 10.0 x 250 mm	MMIC122510	MMICC22510	MMIC222510	MMIC922510
5 µm, 21.2 x 150 mm	MMIC121520	MMICC21520	MMIC221520	MMIC921520
5 µm, 21.2 x 250 mm	MMIC122520	MMICC22520	MMIC222520	MMIC922520
5 µm, 30.0 x 150 mm	MMIC121530	MMICC21530	MMIC221530	MMIC921530
5 µm, 30.0 x 250 mm	MMIC122530	MMICC22530	MMIC222530	MMIC922530
5 µm, 50.0 x 150 mm	MMIC121550	MMICC21550	MMIC221550	MMIC921550
5 µm, 50.0 x 250 mm	MMIC122550	MMICC22550	MMIC222550	MMIC922550

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