

CHP material series

Analytical and preparative chromatography columns and materials for pharmaceutical applications

MCI GEL™ CHP material series are chromatography materials of porous type polymers.

Because polymeric materials are chemically stable, wide pH range, from acidic to alkaline eluents are able to be applied to MCI GEL™ CHP material series.

MCI GEL™ CHP50 series and CHP20 series are both ST/DVB polymers, but they differences in porosity. Pore size of CHP20 series is fairly larger than that of CHP50 series. Appropriate packing material can be selected in accordance with molecular size of injection samples.

●CHP material series

Base polymer	Functional group	Product name	Particle size [μm]	Pore diameter [nm]	Main application	Equivalent HPLC column
Styrene Divinylbenzene	None	CHP20/P20	20	45	drug compounds Peptides Proteins	CHP20/C04 CHP20/C10
		CHP20/P30	30			
		CHP20/P50	50			
		CHP20/P70	70			
		CHP20/P120	120			
	CHP50/P20	20	25	—		
	CHP50/P30	30				
CSP50/P10	10	25	CHP20/C10			
	Br	CHP07/P120	120	25	CHP07/C04 CHP07/C10	
		Polymethacrylate	None	CMG20/P10	10	25
CMG20/P30	30					
CMG20/P150	150					

Application data of CHP 50

Fig. 5-34 Phthalic acid esters

Conditions
 Column : MCI GEL™ CHP50/P20, 10mm I.D.×250mmL
 Eluent : H₂O/CH₃CN=20/80
 Flow rate : 0.75 ml/min
 Column temp. : 25°C
 Detection : 254nm,
 Sample : 1. Dimethyl phthalate 0.5%
 2. Dipropyl phthalate 0.5%
 3. Dibutyl phthalate 0.5%
 Injection : 100μl

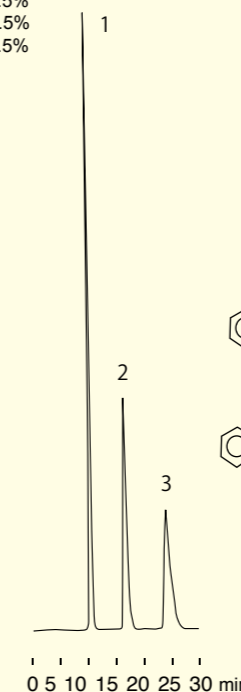
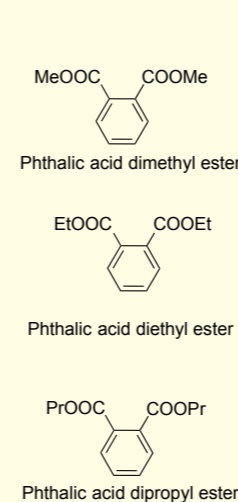


Fig. 5-35 Penicillin antibiotics

Conditions
 Column : MCI GEL™ CHP series, 10mm I.D.×250mmL
 Eluent : CH₃OH/0.05M Phosphate buffer (pH8.0)=60/40
 Flow rate : 2.18 ml/min
 Column temp. : 25°C
 Detection : 254nm,
 Sample : 1. 6-Aminopenicillanic acid 1000ppm
 2. Penicillin G 1000ppm
 3. Penicillin V 1000ppm
 Injection : 100μl

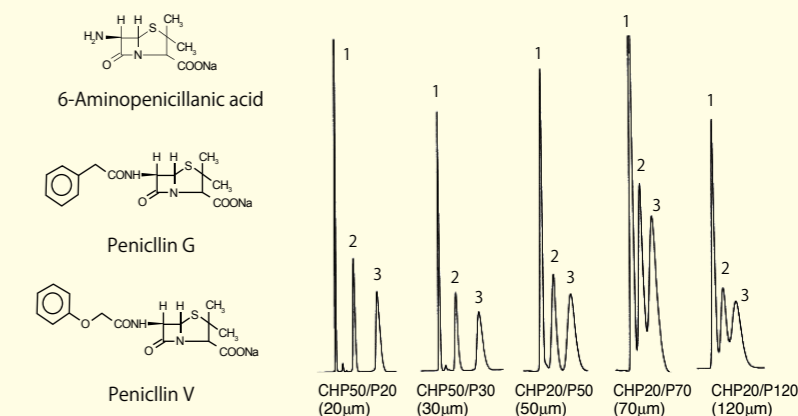
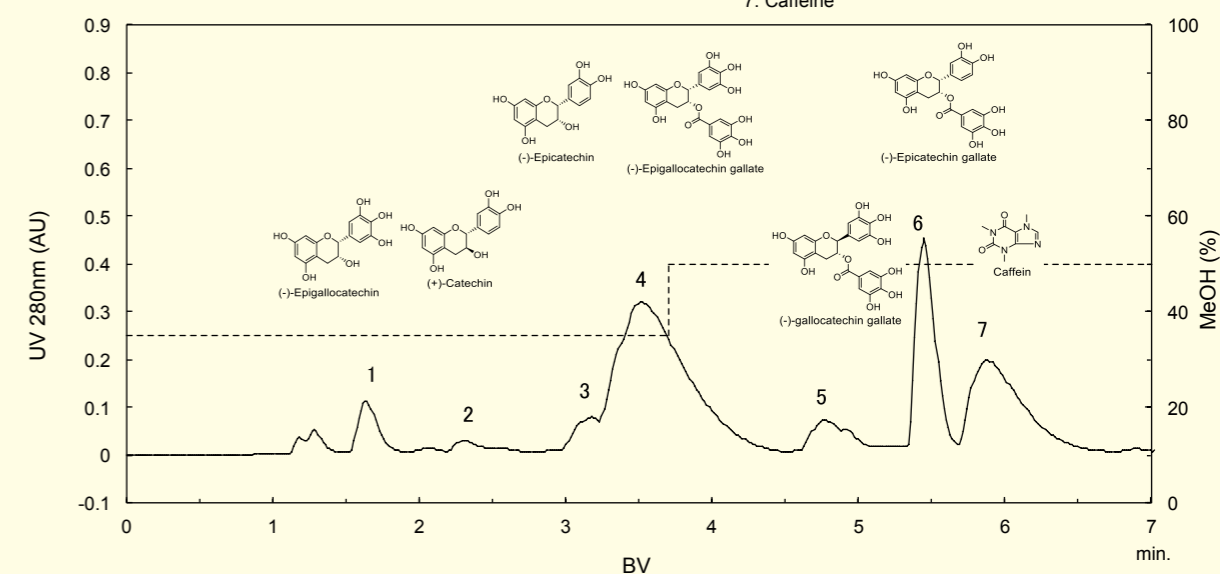


Fig. 5-36 Extract of green tea leaves

Conditions
 Column : MCI GEL™ CHP50/P20, 32mm I.D.×465mm
 Eluent : 0–185min, CH₃OH:0.01M Acetic acid(35:65)
 185–350min, CH₃OH:0.01M Acetic acid(50:50)
 Flow rate : 7.48 ml/min
 Detection : 280nm
 Sample : extract of green tea leaves, injection volume 18.7 ml

1. Epigallocatechin
 2. Catechin
 3. Epicatechin
 4. Epigallocatechin gallate
 5. Gallo catechin
 6. Epicatechin gallate
 7. Caffeine



Application data of CHP 20

Fig.5-37 Senna pulv. extract

Conditions

Chromatogram A	Chromatogram B	Chromatogram C
Column : MCI GEL™ CHP20/C10 4.6mm I.D.×250mm	Column : MCI GEL™ CHP20/P20 10.0mm I.D.×250mm	Column : MCI GEL™ CHP20/P30 10.0mm I.D.×250mm
Eluent : CH ₃ OH/1% Acetic acid = 60/40 (vol.)	Eluent : CH ₃ OH/1% Acetic acid = 60/40 (vol.)	Eluent : CH ₃ OH/1% Acetic acid = 60/40 (vol.)
Flow rate : 0.5 ml/min	Flow rate : 2.4 ml/min	Flow rate : 2.4 ml/min
Detection : 270nm	Detection : 270nm	Detection : 270 nm
Sample : Extract of senna pulv. 10μL	Sample : Extract of senna pulv. 80μL	Sample : Extract of senna pulv. 80μL

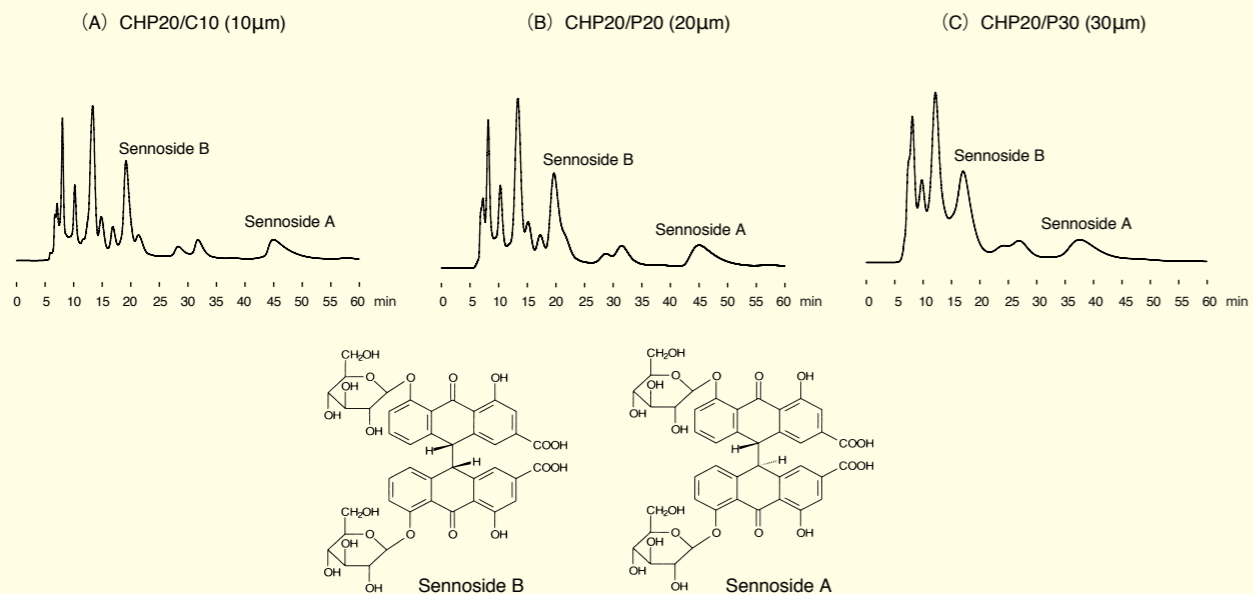
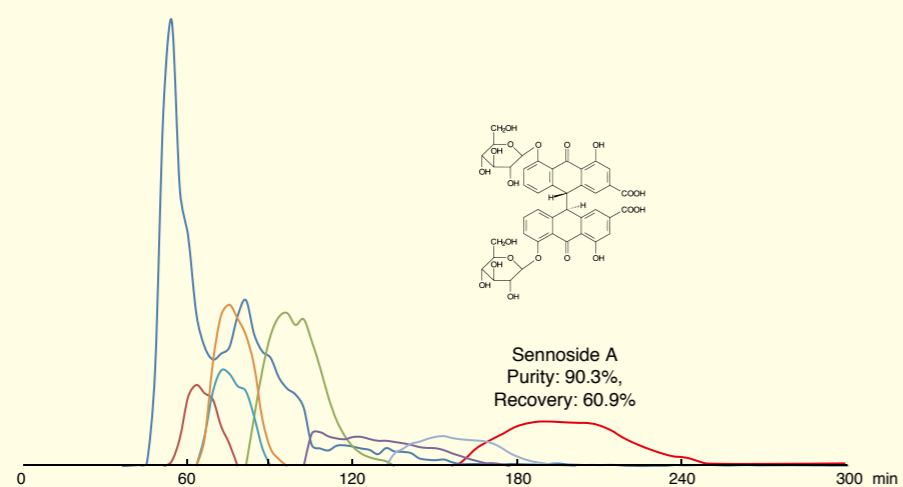


Fig. 5-38 Elution profile of senna pulv. extract separated on MCI GEL™ CHP20/P30

Conditions

Column	: MCI GEL™ CHP20/P30 32mm I.D.×490mm
Eluent	: CH ₃ OH + 1% Acetic acid = 60 + 40 (vol.)
Flow rate	: 7.88 ml/min
Detection	: 270 nm
Sample	: Extract of senna pulv., partially purified by Diaion HP20 injected amount : 39.4 ml



Application data of CHP series

Fig. 5-39 Elution profile of gardenia fructus extract separated on MCI GEL™ CHP20/P30

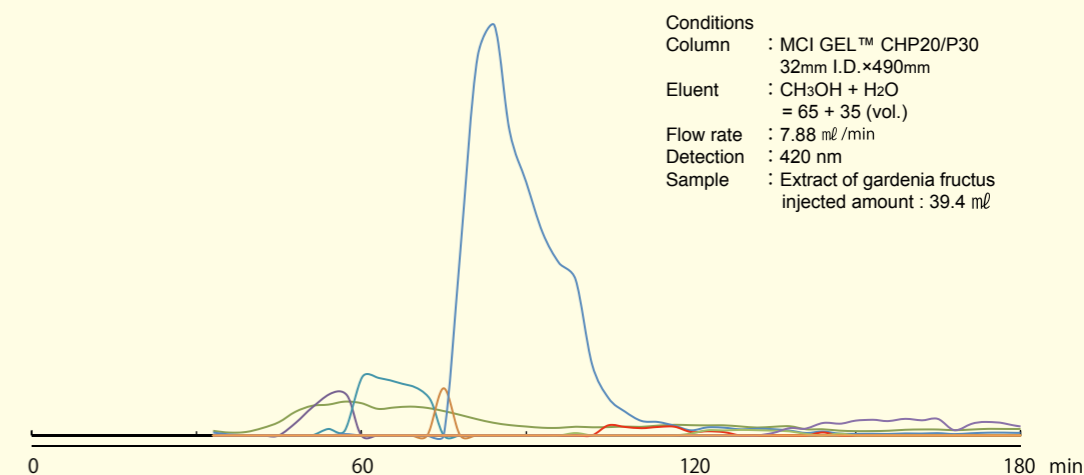
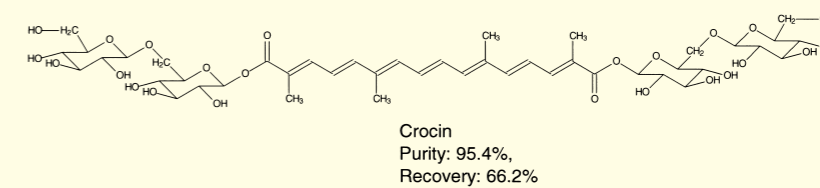
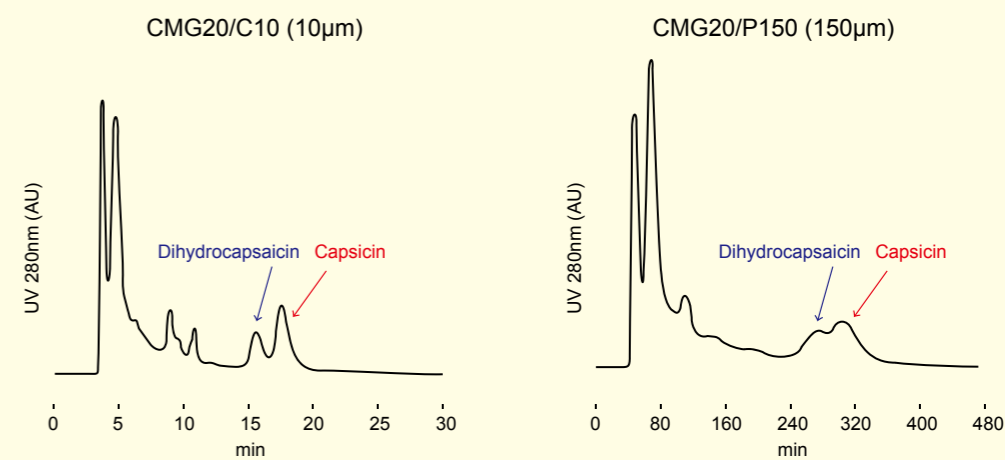


Fig. 5-40 Capsaicin

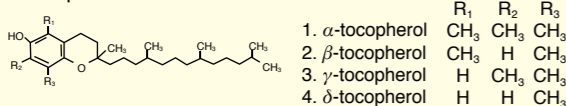


Conditions

Column	: MCI GEL™ CMG20/C10, 4.6mm I.D.×250mm MCI GEL™ CMG20/P150, 20mm I.D.×500mm
Eluent	: Hexane/EtOH=87.5/12.5;
Flow rate	: 1.00 ml/min for CMG20/C10, 2.36 ml/min for CMG20/P150;
Column temp.	: 25°C
Detection	: UV 280nm
Sample	: Capsici Fructus extract;
Injection	: 20ml for CMG20/C10, 1.5ml for CMG20/P150.

Application data of CHP series

Tocopherol



Tocotrienol

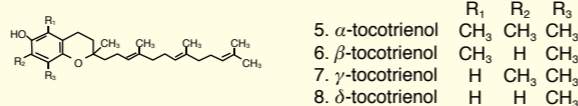


Fig. 5-41 Vitamin E in Rice Bran Oil

Conditions
 Column : MCI GEL™ CMG20/C10
 4.6mm I.D.×150mm
 Eluent : Hexane-EtOH = 98/2 (vol.)
 Flow rate : 0.5 ml/min
 Detection : 295nm
 Sample : Rice Bran Oil, 50 mg/ml
 Injection : 10 μ L

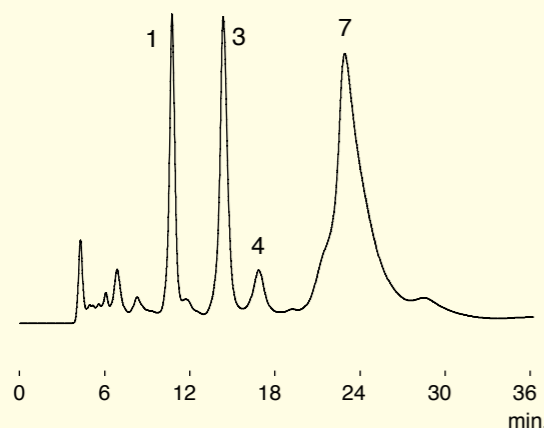


Fig. 5-42 Elution profile of Rice Bran Oil in preparative scale

Conditions
 Column : MCI GEL™ CMG20/P30
 20mm I.D.×500mm
 Eluent : Hexane/C₂H₅OH = 98/2 (vol.)
 Flow rate : 4.7 ml/min
 Detection : 295 nm
 Sample : Rice Bran Oil, 50 mg/ml
 Injection : 1260 μ L

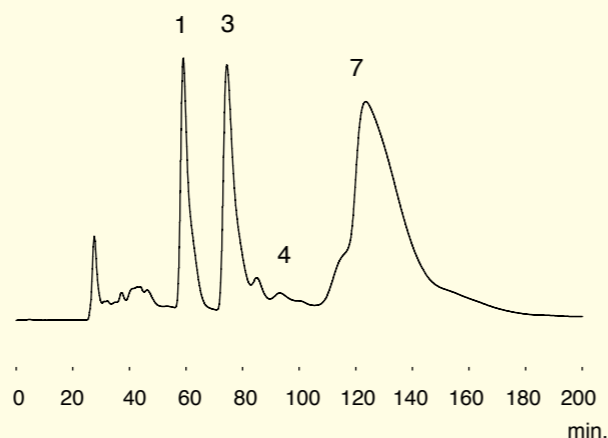


Fig. 5-43 Mixture of tocopherol and tocotrienol : Comparison with silica gel column

Conditions
 Column : 1. Silica gel 5SIL, 4.6mm I.D.×250mm
 2. MCI GEL™ CMG20/C04, 4.6mm I.D.×150mm
 Eluent : 1. Hexane/EtOH = 99/1
 2. Hexane/EtOH = 98/2
 Flow rate : 1.0 ml/min
 Column temp. : 25°C
 Detection : UV 292nm
 Sample : Mixture of tocopherol and tocotrienol
 Injection : 10 μ L (1 mg/mL)

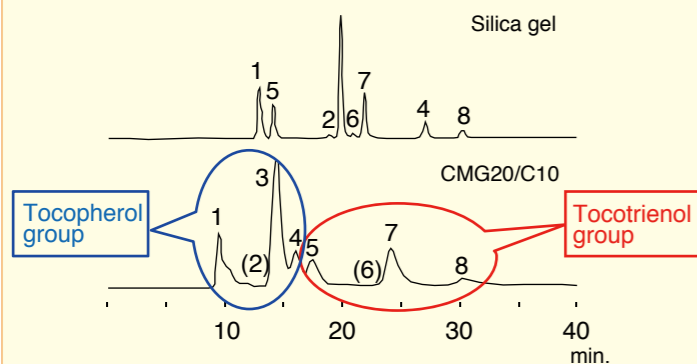
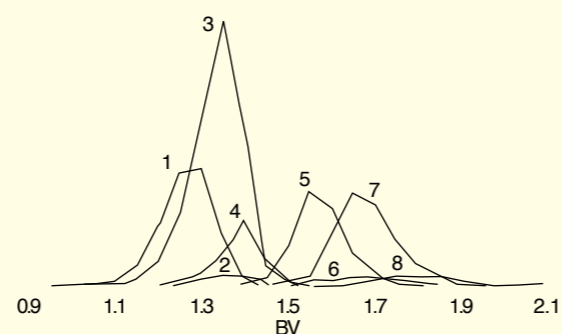


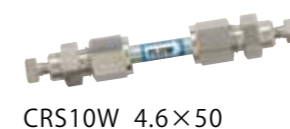
Fig. 5-44 Elution profile of tocopherol and tocotrienol in preparative scale

Conditions
 Column : MCI GEL™ CMG20/P150, 41.2mm I.D.×550mm, ×4
 Eluent : Hexane/EtOH = 90/10
 Flow rate : 49.0 ml/min (SV=1.0)
 Column temp. : 25°C
 Detection : UV 292n
 Sample : Mixture of tocopherol and tocotrienol
 Injection : 150 mL (50g/L)



6 MCI GEL™ Chiral separation columns

Chiral separation columns MCI GEL™ CRS10W (DLAA) MCI GEL™ CRS15W (LDAA)



CRS10W 4.6×50

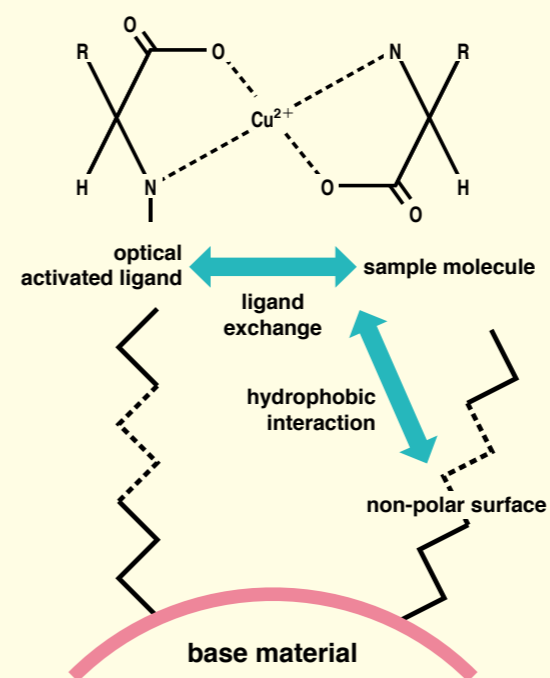


CRS15W 4.6×50

MCI GEL™ column	Column dimensions	Particle size (μ m)	USP
MCI GEL™ CRS10W	4.6×50mm	3	L32
MCI GEL™ CRS15W	4.6×50mm	3	L32

Separation mechanism and performance of MCI GEL™ CRS series

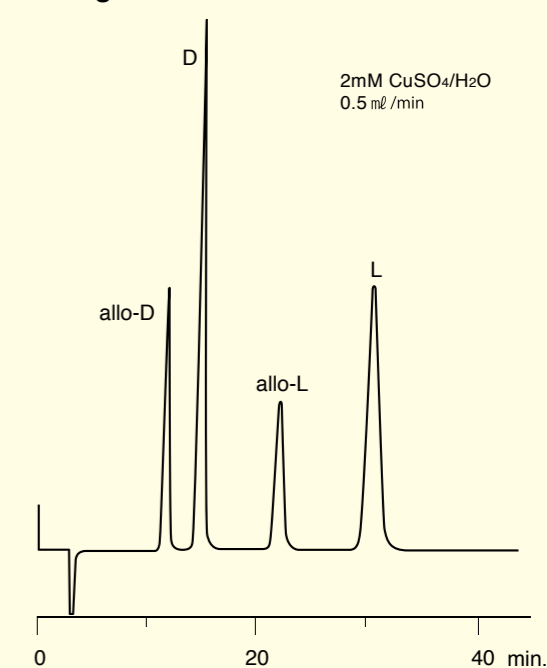
Separation mechanism



Separation mechanism

MCI GEL™ CRS10W and its companion product MCI GEL™ CRS15W (an optical isomer of CRS10W) are based on a 3 μ m with 10nm mean pore diameter of silica gel coated with N,N-Dioctyl-L(or D)-alanine which is a novel optical activated ligand. The chiral resolution mechanism is a combination of ligand exchange and hydrophobic interaction. A copper sulfate aqueous solution is used as an eluent. Elution samples are directly detected at wave length of 254 nm because complex compound, composed of sample molecule and copper in the eluent, are object of detection. With the CRS10W, D-isomers generally elute in front of L-isomers while L-isomers elute ahead of D-isomers on the CRS15W. The hydrophobic interaction mechanism allows hydrophilic samples to elute faster than hydrophobic molecules. Long alkyl chain or aromatic compounds will elute late or require an organic solvent (CH₃CN or CH₃OH, max. of 15v/v%) to prevent adsorption onto the stationary phase.

Application of CRS10W Fig. 6-1 DL-Isoleucine



Separation performance

- The CRS series columns separate over 20 D,L- α -Amino acids by only single column. The columns separate not only α -Amino acids but also α -Hydroxy carboxylic acids and derivative amino acids such as Acetylated amino acids.
- The columns provide excellent resolution operated at room temperature.
- The columns show high durability.

USP L32 column