Separation techniques (Proteins)

Monolithic support Chromatography

Monolithic support

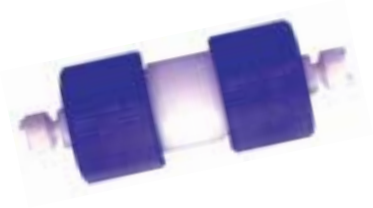
Biochromatography on Convective Interaction Media

Convective Interaction Media (CIM®) are evolutionary chromatographic and bioconversion supports based on a highly cross-linked porous monolithic polymer, offering exceptional chemical stability and flow characteristics. They are available in different forms and chemistries, making them suitable for ion-exchange, hydrophobic interaction, reversed phase, affinity chromatography and bioconversions on an analytical and preparative scale.

- Faster separations
- High volumetric throughput
- High capacity for very large biomolecules
- Low back pressure

Characteristics :

CIM® Matrix : poly(glycidyl methacrylate-co-ethylene glycol dimethacrylate) or poly(styrene-co-divinyl benzene)
Number of Disks per housing : up to 4
Operating Pressure : up to 50 bar (5Mpa)
Operating temperature : up to 50°C (122°F)
pH : 1-14
Disk dimensions : diameter 16 mm ; thickness 3 mm ; active bed volume 0.34 ml
Solvents : 0-100% of common polar solvents
Ionic strength : 0-8 M, all common buffers and salt



CIM® Disk monolithic column

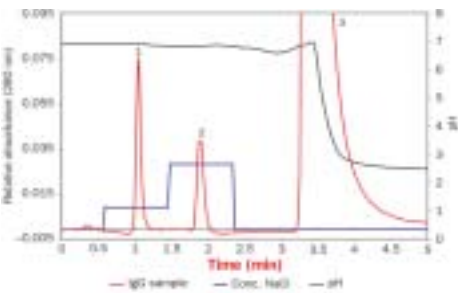
The CIM® Disk Monolithic Column consists of a CIM® Disk in a specially designed housing. The CIM® housing provides low dead volume, excellent sample distribution, simple handling, and can be easily connected to any LC/HPLC or FIA system. The CIM® Disk consist of a CIM® matrix and a non-porous, self-seaking fitting ring which ensures only axial flow through the disk and prevents any sample and mobile phase leakage or by-pass. The CIM® matrix has a well defined bimodal pore size distribution providing excellent separations at low back pressures.

- Very fast analyzes
- Flow-unaffected high dynamic binding capacity
- Chemically and mechanically stable
- Up to 1000 analyzes

Operating flow rates : up to 10 mL/min (Recommended flow rate : 5 mL/min)

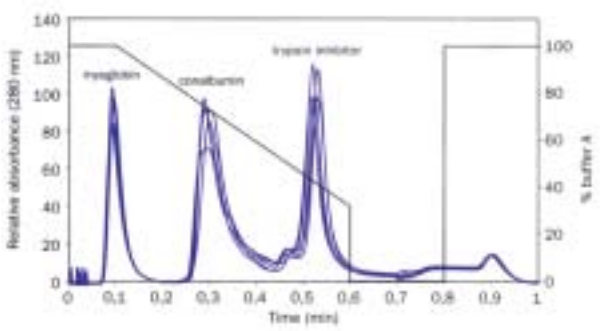
Separation of immunoglobulin (IgG) sample on CIM® QA disks

Binding buffer : 20 mM Tris-HCl pH 7.0
Elution buffer 1 : 20 mM Tris-HCl, 1M NaCl, pH 7.0
Elution buffer 2 :0.1 M Glycine-HCl pH 2.0
Flow rate : 4 ml/min
Sample concentration :16 mg IgG/ml of binding buffer
Injection volume : 250 µl
Peak 1 : Transferrin, peak 2 : Albumin, Peak 3 : IgGs



Courtesy of Dr. Andrea Buchacher and Dr Karmen Branovic, Octapharma, Austria

Separation of a test protein mixture (180 to more than a 1000 injections)



Key features :

- Easily exchangeable : a disk is easily replaced with an other one in a minute
- Adjustable column length : working on a laboratory scale has never been so easy ! simply place several disks in a single housing and the capacity will increase accordingly
- Conjoint Liquid Chromatography (CLC) : the more important advantage : you can combine several kind of separation in one single column (Affinity with ion exchange for instance).

CIM® Tube monolithic column

CIM® Tube Monoltihic Columns are designed for laboratory and industrial scale purification and bioconversion. It consist of a CIM® Tube modified with the appropriate active group(s) seated in a specially constructed tubular housing. The housing is made of stainless steel and provides low dead volume, excellent sample distribution, simple handling and it can be easily connected to any LC/HPLC or FIA system. The design of the housing forces liquid to flow in a radial direction from the outer surface of the CIM® Tube, through the porous tube wall where it is then collected in the hollow center of the tube.

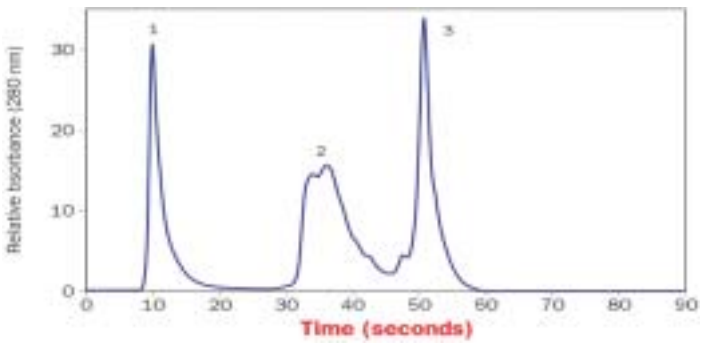
Operating flow rates : up to 40 mL/min for 8 mL tubes, up to250 mL/min for 80 mL tubes, up to 2 L/min for 800 mL tubes

Key features :

- Fast large scale separations of biomolecules
- High flow unaffected dynamic binding capacity :
  - Up to 200 mg H SA on 8 ml CIM® Tubes
  - Up to 2 g on 80 ml CIM® Tubes
  - Up to 20 g on 800 ml CIM® Tubes CIM® Tubes
- Ideal for preparative purifications : tubes are made on the same material as the analytical CIM® Disks. Thus, the prurification can be performed on the same type of support by applying similar separation conditions
- Conjoint Liquid Chromatography : due to its unique tube in a tube design, it is possible to construct CLC Tube Monolithic Columns for your large scale multidimensional chromatographic purifications

Fast linear gradient separation of a mixture of three test proteins on an 80 ml CIM™ DEAE tube Monotlithic column

Conditions
Buffer A : 20 mM Tris-HCl buffer, pH 7.4
Buffer B : 20 mM Tris-HCl buffer + 1 M NaCl, pH 7.4
Flow rate : 160 ml/min
Gradient : 0-70 % buffer B in 37 s
Detection : UV at 280 nm
Sample
1. Myoglobin
2. Conalbumin
3. Soybean Trypsin Inhibitor
Injection volume : 1000 µl

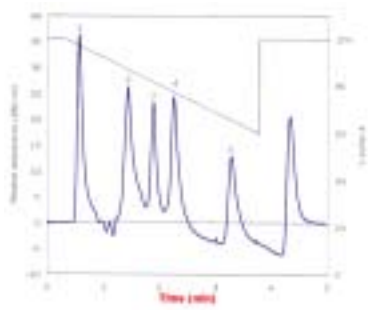


Separation techniques (Proteins)

Monolithic support Chromatography

Conjoint liquid Chromatography

(combination of a weak anion and strong cation CIMGEL™ support in the same column) separation of a mixture of 5 proteins



Mobile Phase :
Buffer A : 20 mM Tris-HCl buffer, pH 8.0
Buffer B : 20 mM Tris -HCl buffer + 2 M NaCl
Column Amersham Pharmacia XK™ 16 column
Column packed with : 2 CIMGEL™ DEAE-16 and 2 CIMGEL™ SO3-16
Flow rate : 3 ml/min
Gradient : 0-40 % buffer B in 3.5 min
Detection : UV at 280 nm
Injection volume : 20 ml
Sample : 1.Myoglobin (0.6 mg/ml)
2. Conalbumin (1.5 mg/ml)
3. Cytochrome C (1.0 mg/ml)
4. Soybean Trypsin inhibitor (2.0 mg/ml)
5. Lysozyme (1.0 mg/ml)

CIMGEL® monolithic column

CIMGEL® Monolithic support were developed to improve the performance and simplify the packing and repacking of standard liquid chromatography columns. You no longer need to be concerned with air bubbles during column and sample preparation. It consists of a CIM® matrix and a non-porous, self-sealing fitting ring which ensures only axial flow through the disk and prevents any sample and mobile phase leakage or by-pass. The CIMGEL® matrix has a well defined bimodal pore size distribution providing excellent separations and low back pressure. It comes in a 16 mm and a 26 mm size.

Characteristics :

CIM® Matrix : poly(glycidyl methacrylate-co-ethylene glycol dimethacrylate)
Maximum number of supports : 5 per column
pH : 1-14
Dimensions : 16 mm : diameter 16 mm ; thickness 3.1 mm ; active bed volume 0.34 ml
26 mm : diameter 26 mm ; thickness 6.2 mm ; active bed volume 2.0 ml
Solvents : 0-100% of common polar solvents
Ionic strength : 0-8 M, all common buffers and salt

Key features :

- Designed for 16 mm and 26 mm ID columns
- Extremely easy column packing and repacking
- No more air bubbles
- Conjoint Liquid Chromatography
- No Shrinking/swelling while working with different mobile phases

CIM® Disk monolithic Column

Description	Cat.#
Quaternary amine (CIM® QA)	210.5113
Diethylamine (CIM® DEAE)	210.5114
Ethylenediamine (CIM® EDA)	210.5116
Ethyl (CIM® C2)	210.8130
Butyl (CIM® C4)	210.8135
Sulfonyl (CIM® SO3)	211.6157
Carboxymethyl (CIM® CM)	211.6170
Reversed Phase (CIM® RP-SDVB)	220.2000
Epoxy (CIM® Epoxy)	213.7175
Protein A, low ligand density (CIM® Protein A LLD)	217.1001
Protein A, high ligand density (CIM® Protein A HLD)	217.1002
Protein G (CIM® Protein G)	217.1011
Special affinities	217.1201
Immobilized enzymes	217.1256

CIM® Disk "Scale Up"

4 CIM® QA Disks (210.5113)	245.5113
4 CIM® DEAE Disks (210.5114)	245.5114
4 CIM® EDA Disks (210.5116)	245.5116
4 CIM® C2 Disks (210.8130)	245.8130
4 CIM® C4 Disks (210.8135)	245.8135
4 CIM® SO3 Disks (211.6157)	245.6157
4 CIM® CM Disks (211.6170)	245.6170
4 CIM® RP-SDVB Disks (220.2000)	245.2000
4 CIM® Epoxy Disks (213.7175)	245.7175
4 CIM® Protein A LLD Disks (210.1001)	245.1001
4 CIM® Protein A HLD Disks (210.1002)	245.1002

Housing and Accessories for CIM® Disks

Complete housing for CIM® disks*	**222.0830**
Retaining fitting with distributor	**222.0831**
Housing cylinder	**222.0832**
Screw cap	**222.0834**

*To be used at moderate temperatures up to 50°C and with aqueous mobile phases (buffers).

Complete housing for CIM® disks, **PEEK Type	**222.0850**
Retaining fitting with distributor, **PEEK Type	**222.0851**
Housing cylinder, **PEEK Type	**222.0852**
Screw cap, **PEEK Type	**222.0854**

**PEEK type, is autoclavable and compatible with most organic solvents!

Blind fitting	**222.0837**
CIM® disk extractor	**222.0901**
Biocompatible, extra-low dead volume mixing tee (strongly recommended for fast gradient mixing)	**231.0850**
PEEK In-line high-pressure filter	**231.0851**
Replacement frits for In-line filter	**231.0852**
Replacement O-rings for retaining fitting	**231.0853**

CIM® 8 ml Tube Monolithic Columns

Quaternary amine 8 ml tube monolithic column (CIM® QA-8)	**410.5113**
Diethylamine 8 ml tube monolithic column (CIM® DEAE-8)	**410.5114**
Ethylenediamine 8 ml tube monolithic column (CIM® EDA-8)	**410.5116**
Ethyl 8 ml tube monolithic column (CIM® C2-8)	**410.8130**
Butyl 8 ml tube monolithic column (CIM® C4-8)	**410.8135**
Sulfonyl 8 ml tube monolithic column (CIM® SO3-8)	**411.6157**
Carboxymethyl 8 ml tube monolithic column (CIM® CM-8)	**411.6170**
Reversed Phase 8 ml tube monolithic column (CIM® RP-SDVB-8)-PEEK Housing	**420.2000**
Epoxy 8 ml tube monolithic column (CIM® Epoxy-8)	**413.7175**
Protein A, low ligand density 8 ml tube monolithic column (CIM® Protein A-8 LLD)	**417.1001**
Protein A, high ligand density 8 ml tube monolithic column (CIM® Protein A-8 HLD)	**417.1002**
Protein G, 8 ml tube monolithic column (CIM® Protein G-8)	**417.1011**
Special affinities 8 ml tube monolithic column	**417.1201**
Immobilized enzymes 8 ml tube monolithic column	**417.1256**

CIM® 80 ml Tube Monolithic Columns

Quaternary amine 80 ml tube monolithic column (CIM® QA-80)	**610.5113**
Diethylamine 80 ml tube monolithic column (CIM® DEAE-80)	**610.5114**
Sulfonyl 80 ml tube monolithic column (CIM® SO3-80)	**611.6157**
Epoxy 80 ml tube monolithic column (CIM® Epoxy-80)	**613.7175**

*80 ml tube are packed in a stainless steel housing of the medical grade quality and specialy designed for good sample distribution

CIM® 800 ml Tube Monolithic Columns

Diethylamine 800 ml tube monolithic column (CIM® DEAE-800)	**810.5114**
Epoxy 800 ml tube monolithic column (CIM® Epoxy-800)	**813.7175**

*800 ml tube are packed in a stainless steel housing of the medical grade quality and specialy designed for good sample distribution

CIMGEL™ Monolithic Units ("bulk monoliths")

Diethylamine CIMGEL™ (CIMGEL™ DEAE-16) ; 0.34 ml	**210.5114-16**
Diethylamine CIMGEL™ (CIMGEL™ DEAE-26) ; 2 ml	**210.5114-26**
Sulfonyl CIMGEL™ (CIMGEL™ SO3-16) ; 0,34 ml	**211.6157-16**
Sulfonyl CIMGEL™ (CIMGEL™ SO3-26) ; 2 ml	**211.6157-26**
Epoxy CIMGEL™ (CIMGEL™ Epoxy -16) ; 0.34 ml	**213.7175-16**
Epoxy CIMGEL™ (CIMGEL™ Epoxy -26) ; 2 ml	**213.7175-26**

CIMGEL™ "Scale-Up"

Diethylamine CIMGEL™ (CIMGEL™ DEAE-16) ; 1 ml	**210.5114-16.3**
Diethylamine CIMGEL™ (CIMGEL™ DEAE-26) ; 10 ml	**210.5114-26.5**
Sulfonyl CIMGEL™ (CIMGEL™ SO3-16) ; 1 ml	**211.6157-16.3**
Sulfonyl CIMGEL™ (CIMGEL™ SO3-26) ; 10 ml	**211.6157-26.5**
Epoxy CIMGEL™ (CIMGEL™ Epoxy -16) ; 1 ml	**213.7175-16.3**
Epoxy CIMGEL™ (CIMGEL™ Epoxy -26) ; 10 ml	**213.7175-26.5**
Column packing kit for 16 mm ID columns (consisting of two 13x2.00 O-rings and one disk extractor tool)	**200.1001**
Column packing kit for 26 mm ID columns (consisting of two 24x2.00 O-rings and one disk extractor tool)	**200.1010**