

Cation Exchange Chromatography Columns

Features

- SP-825**
CM-825
 - Suitable for analyzing relatively high molecular weight compounds: proteins, peptides, DNA, and RNA
 - Usable in a wide pH range from pH 2 to 12
- SP-420N**
 - Non-porous base material
 - For rapid analysis
- New SP-FT 4A**
 - Non-porous base material
 - Provides ultra-rapid analysis using conventional devices
- SP-2B**
 - Non-porous base material
 - Can be used with UHPLC (available under hyperbaric conditions for up to 30 MPa)
- ES-502C 7C**
 - Compared to IEC series columns, polyvinyl alcohol is used as base material offering different separation pattern
 - Low hydrophobic interaction with proteins allows analysis under mild conditions
- P-421S**
 - Column for amino acids analysis by cation exchange mode
 - Provides simultaneous analysis of different amino acids
 - Fulfills USP L22 and L58 requirements

Standard columns

[Strong cation exchange resin] Functional Group: Sulfopropyl

Product Code	Product Name	Ion Exchange Capacity (meq/g)	Base Material	Particle Size (µm)	Pore Size (Å)	Column Size (mm) I.D. x Length	Shipping Solvent
F6118250	IEC SP-825	0.4	Polyhydroxymethacrylate	8	5,000	8.0 x 75	50mM Na ₂ SO ₄ aq.
F6113000	IEC SP-420N	0.3	Polyhydroxymethacrylate	2.5	–	4.6 x 35	20mM Sodium acetate buffer + 0.5M Na ₂ SO ₄ (pH5.0)
F6113100	New IEC SP-FT 4A	0.2	Polyhydroxymethacrylate	2.7	–	4.6 x 10	20mM *MES buffer (pH5.6)

Housing Material of SP-FT 4A: PEEK
*MES: 2-(N-Morpholino)ethanesulfonic acid

[Strong cation exchange resin] Functional Group: Sulfopropyl (UHPLC column)

Product Code	Product Name	Ion Exchange Capacity (meq/g)	Base Material	Particle Size (µm)	Pore Size (Å)	Column Size (mm) I.D. x Length	Shipping Solvent
F6113110	PIKESS SP-2B	0.3	Polyhydroxymethacrylate	2.5	–	2.0 x 50	20mM Sodium acetate buffer + 0.5M Na ₂ SO ₄ (pH5.0)

[Weak cation exchange resin] Functional Group: Carboxymethyl

Product Code	Product Name	Ion Exchange Capacity (meq/g)	Base Material	Particle Size (µm)	Pore Size (Å)	Column Size (mm) I.D. x Length	Shipping Solvent
F6110002	IEC CM-825	0.4	Polyhydroxymethacrylate	8	5,000	8.0 x 75	50mM Na ₂ SO ₄ aq.
F7640001	Asahipak ES-502C 7C	0.55	Polyvinyl alcohol	9	2,000	7.5 x 100	0.1M Sodium phosphate buffer (pH4.4)

[For amino acid analysis] Functional Group: Sulfo (Na⁺)

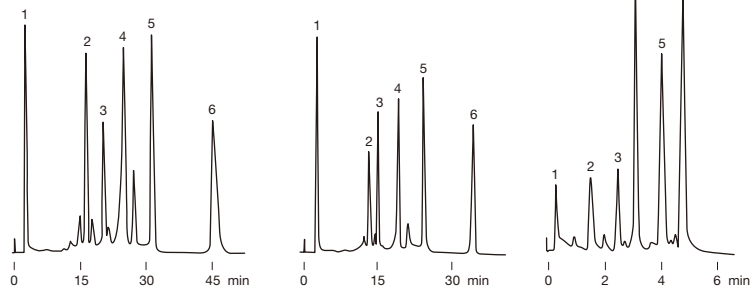
Product Code	Product Name	Plate Number (TP/column)	Base Material	Particle Size (µm)	Column Size (mm) I.D. x Length	Shipping Solvent
F6354211	CXpak P-421S	≥ 3,500	Styrene divinylbenzene copolymer	6	4.6 x 150	H ₂ O
F6700210	CXpak P-G	(guard column)	Styrene divinylbenzene copolymer	6	4.6 x 10	H ₂ O

Preparative columns *Preparative columns are made to order.

Product Code	Product Name	Particle Size (µm)	Column Size (mm) I.D. x Length	Standard column
F6548002	IEC SP-2025	20	20.0 x 150	SP-825
F6709604	IEC SP-G 8B (IEC SP-LG)	20	8.0 x 50	(guard column)
F6548003	IEC CM-2025	20	20.0 x 150	CM-825
F6709605	IEC CM-G 8B (IEC CM-LG)	20	8.0 x 50	(guard column)
F6840003	Asahipak ES-502C 20C	13	20.0 x 100	ES-502C 7C
F6710021	Asahipak GS-20G 7B	20	7.5 x 50	(guard column)

Protein separation using cation exchange columns

(I) CM-825 (Weak cation exchange) 90 μ L injection
 (II) SP-825 (Strong cation exchange) 30 μ L injection
 (III) SP-420N (Strong cation exchange) non-porous type gel

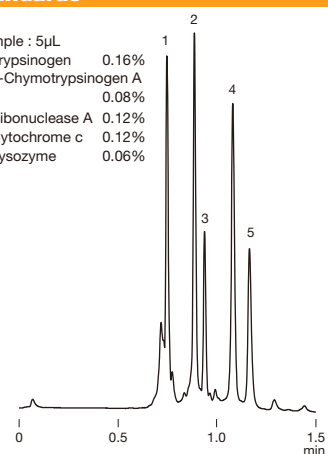


Column : (I) Shodex IEC CM-825, (II) Shodex IEC SP-825, (III) Shodex IEC SP-420N
Eluent : (A); 20mM Sodium phosphate buffer (pH7.0) (B); (A) + 0.5M NaCl (I,II) Linear gradient; (A) to (B), 60min (III) Linear gradient; (A) to (B), 10min
Flow rate : (I,II) 1.0mL/min (III) 1.5mL/min
Detector : UV (280nm)
Column temp. : Room temp.

Sample :
 1. Myoglobin
 2. Trypsinogen
 3. Ribonuclease A
 4. α -Chymotrypsinogen A
 5. Cytochrome c
 6. Lysozyme

Ultra-rapid analysis of protein standards

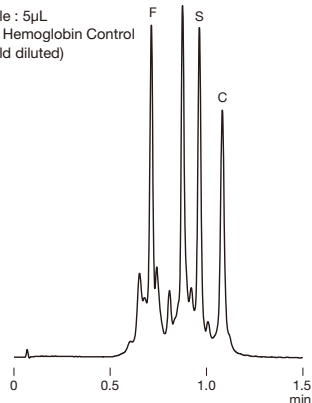
Sample : 5 μ L
 1. Trypsinogen 0.16%
 2. α -Chymotrypsinogen A 0.08%
 3. Ribonuclease A 0.12%
 4. Cytochrome c 0.12%
 5. Lysozyme 0.06%



Column : Shodex IEC SP-FT 4A
Eluent : (A); 20mM MES buffer (pH5.6) (B); (A) + 0.5M Na₂SO₄ Linear gradient; (A) to (B), 2min
Flow rate : 1.7mL/min
Detector : UV (280nm)
Column temp. : 30°C

Ultra-rapid analysis of hemoglobins

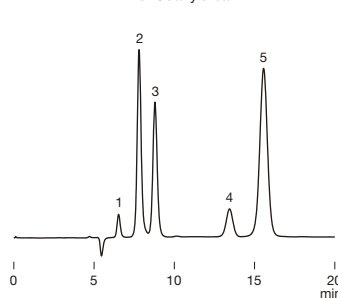
Sample : 5 μ L
 AFSC Hemoglobin Control (51-fold diluted)



Column : Shodex IEC SP-FT 4A
Eluent : (A); 20mM MES buffer (pH5.6) (B); (A) + 0.5M Na₂SO₄ Linear gradient; 5% (B) to 100% (B), 2min
Flow rate : 1.7mL/min
Detector : VIS (415nm)
Column temp. : 30°C

Analysis of nitrogen compounds following the testing methods for fertilizers

Sample : 10 μ g/mL each, 10 μ L
 1. Urea
 2. Biuret
 3. Dicyandiamide
 4. Guanidine
 5. Guanylurea

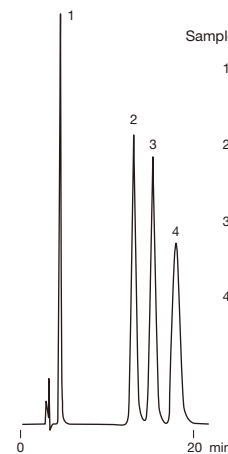


Column : Shodex Asahipak ES-502C 7C
Eluent : 3.92g KH₂PO₄ + 0.12g H₃PO₄ in 1000mL of H₂O
Flow rate : 0.6mL/min
Detector : UV (190nm)
Column temp. : 40°C

Catecholamines

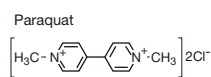
Sample : 300 μ g/mL each, 10 μ L

1. DOPA
Oc1ccc(O)cc1CC(N)C(=O)O
 2. Adrenaline
Oc1ccc(O)cc1CC(N)C(C)O
 3. Noradrenaline
Oc1ccc(O)cc1CC(N)O
 4. Dopamine
Oc1ccc(O)cc1CCN

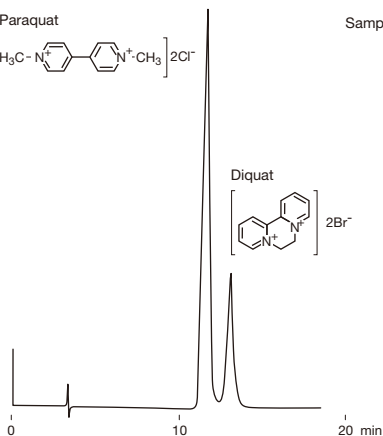
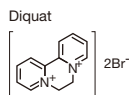


Column : Shodex Asahipak ES-502C 7C
Eluent : 20mM Sodium malonate buffer (pH6.0) + 0.5M NaCl
Flow rate : 1.0mL/min
Detector : UV (280nm)
Column temp. : 30°C

Paraquat and diquat



Sample : 20 μ L

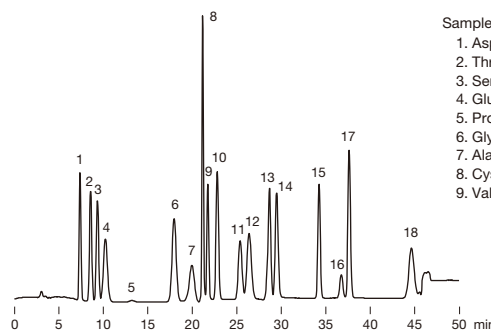


Column : Shodex Asahipak ES-502C 7C
Eluent : 50mM Sodium phosphate buffer (pH7.0) + 150mM NaCl
Flow rate : 1.0mL/min
Detector : UV (288nm)
Column temp. : 30°C

Standard amino acids

Sample : 0.1 μ M each, 100 μ L

1. Asp 10. Met
 2. Thr 11. Ile
 3. Ser 12. Leu
 4. Glu 13. Tyr
 5. Pro 14. Phe
 6. Gly 15. Lys
 7. Ala 16. NH₃
 8. Cys 17. His
 9. Val 18. Arg



Column : Shodex CXpak P-421S
Eluent : MCI Buffer L-8500-PH Kit (Mitsubishi Chemical Corporation) Low pressure gradient: 0min; PH-1, 0.2min; PH-2, 12.5min; PH-3, 22.7min; PH-4 40.0-53.0min; PH-RG
Reagent : Ninhydrin Coloring Solution Kit for HITACHI (Wako Pure Chemical Industries, Ltd.) 0-52min; R1:R2=50:50
Flow rate : (Eluent) 0.5mL/min (Reagent) 0.35mL/min
Detector : VIS (570nm)
Column Temp. : 63°C
Reaction Temp. : 120°C