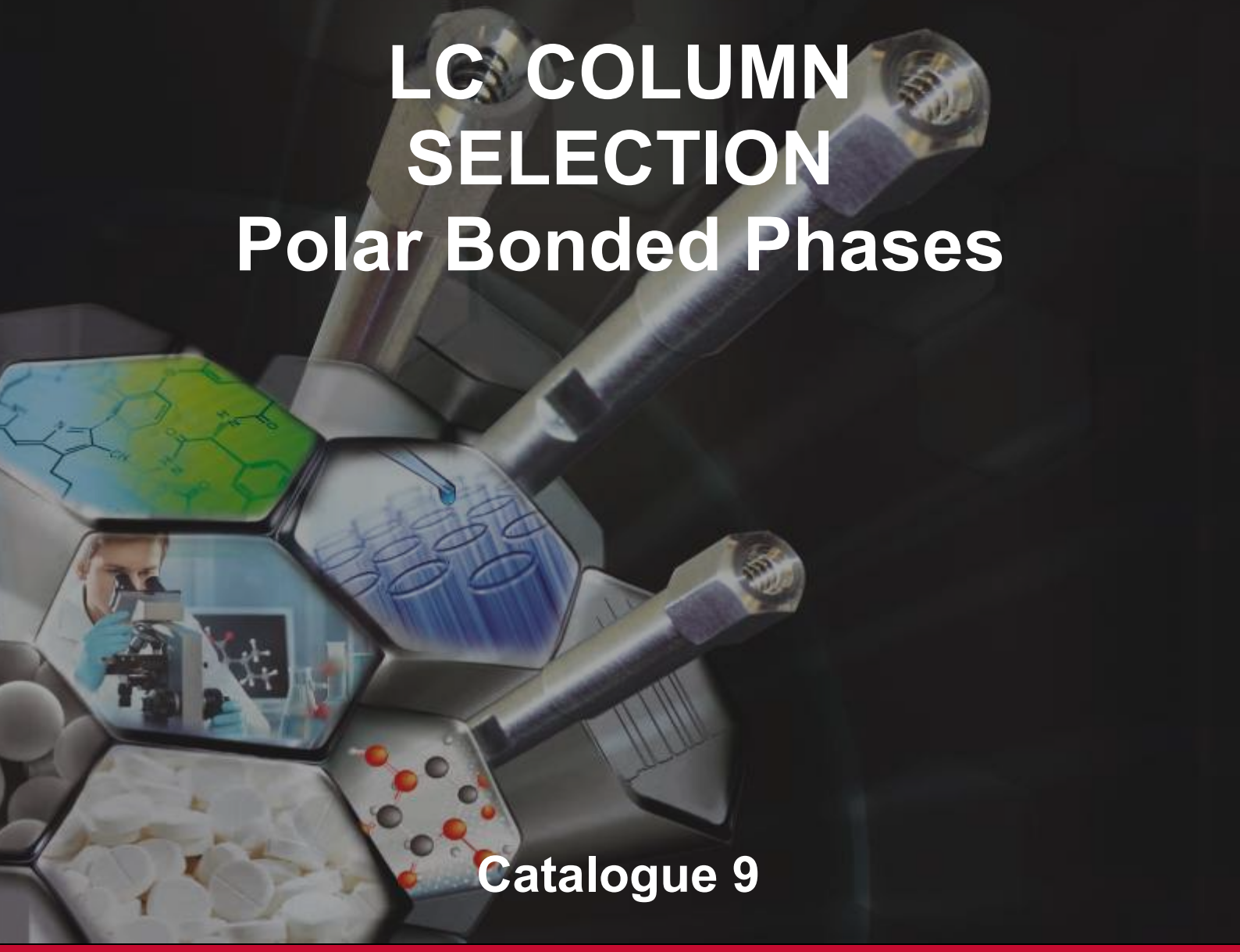
HICHROM

Chromatography Columns and Supplies

LC COLUMN SELECTION
Polar Bonded Phases



Catalogue 9

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POLAR BONDED PHASES

Introduction

Polar bonded silica phases offer an alternative selectivity to alkyl bonded materials (see p.35-40). In general they have a lower hydrophobicity but higher polarity. Cyano, amino and diol bonded phases can be used in both normal- and reversed-phase modes. In normal-phase they equilibrate more rapidly with the eluent than silica itself and are not deactivated by traces of water.

Availability

Cyano bonded phases show unique selectivity for polar compounds and are more suitable than bare silica for normal-phase gradient separations. The cyano functional group is a strong dipole that can interact with other dipoles or induce dipoles on solutes. These phases also exhibit moderate hydrophobicity due to the alkyl linker.

Amino bonded phases show alternative normal-phase selectivity to unbonded silica, especially for aromatics. Amino columns are also used in the HILIC mode for carbohydrate analysis and for other polar compounds. Their weak anion-exchange properties can be used in the analysis of anions and organic acids.

Diol bonded phases are a versatile alternative to unbonded silica for normal-phase separations. The hydroxyl groups provide good selectivity without excessive retention, since H-bonding with the diol layer is weaker than with silanols. Some diol bonded phases have been developed specifically for HILIC applications. Differing pore size materials are used in size-exclusion separations.

Cyano Bonded Phases

Phase	Manufacturer	Particle Size (µm)	Pore Size (Å)	Surface Area (m^2/g)	Page
ACE CN	ACT	2[1], 3, 5, 10	100	300	64, 70, 74-76
CAPCELL PAK CN UG	Shiseido	5	120	300	79, 80
Chromegabond BAS-CN	ES Industries	3, 5, 10	120	180	102
Chromegabond CN-BD		3, 5, 10	100	475	102
Chromegabond CN-HS		3, 5, 10	60	550	102
COSMOSIL CN-MS	Nacalai Tesque	5	120	300	91
Develosil CN-UG	Nomura	5	140	300	95, 96
Develosil XG-CN		3, 5	140	300	95
Exsil CN	Grace	3, 5	100	200	104
Genesis CN		4	120	300	124
HALO ES-CN[2]	Advanced Materials Technology	2.7	90	150	125, 126, 129
HALO-5 ES-CN[2]		5	90	90	125, 128, 129
Hypersil GOLD CN	Thermo Scientific	1.9, 3, 5	175	220	228, 230
Hypersil CPS		3, 5	120	170	232
Hypersil CPS-2		5	120	170	232
Hypersil BDS CPS		3, 5	130	170	233
Inertsil CN-3	GL Sciences	3, 5	100	450	108, 112-114
Kromasil CN	Akzo Nobel	5, 10, 16	60	540	141, 143-146
LiChrosorb CN	Merck	5	100	300	181
LiChrospher CN		5	100	350	182-184
NUCLEODUR CN and CN-RP	Macherey-Nagel	3, 5	110	340	157, 160
NUCLEOSIL CN		5, 10	100	350	163, 164, 165
		7	120	200	163, 165
ProntoSIL CN	Bischoff	3, 5	120	300	78
TSKgel CN-80Ts	Tosoh Bioscience	5	80	-	247, 248
Ultrasphere CN	Hichrom	3, 5	80	-	258, 259
Waters µBondapak CN	Waters	10	125	-	265
Waters Nova-Pak CN HP		4	60	-	265
Waters Spherisorb CN		3, 5	80	220	262, 263
YMC CN	YMC	3, 5	120	330	270, 272
ZORBAX CN	Agilent Technologies	5	70	330	279, 280

[1] As ACE Excel column [2] Superficially porous phase

POLAR BONDED PHASES (continued)

Amino Bonded Phases

Phase	Manufacturer	Particle Size (µm)	Pore Size (Å)	Surface Area (m^2/g)	Page
CAPCELL PAK NH_2 UG	Shiseido	5	80	-	79, 80
Chromegabond A/RP	ES Industries	3, 5, 10	60, 100	475, 330	102
Chromolith NH_2	Merck	-	-	300	178
COSMOSIL NH2-MS	Nacalai Tesque	5	120	300	91
Exsil NH_2	Grace	3, 5	100	200	104
Genesis NH_2		3	120	300	124
Hypersil GOLD Amino	Thermo Scientific	1.9, 3, 5	175	220	228-230
Hypersil APS-2		3, 5	120	170	232
Inertsil NH_2	GL Sciences	3, 5	100	450	108, 112-114
InertSustain NH_2		3, 5	100	350	5
Kromasil NH_2	Akzo Nobel	3.5, 5, 7, 10	100	320	141, 143-147
LiChrosorb NH_2	Merck	5, 10	100	300	181
LiChrospher NH_2		5	100	350	182-184
NUCLEODUR NH_2 and NH_2-RP	Macherey-Nagel	3, 5, 7	110	340	157, 160
NUCLEOSIL NH_2		5	100	350	163, 164
		7	120	200	163, 165
Purospher STAR NH_2	Merck	5	120	330	180
Syncronis NH_2	Thermo Scientific	1.7, 3, 5	100	320	234
TSKgel NH2-100	Tosoh Bioscience	3	100	450	250
Waters µBondapak NH_2	Waters	10	125	330	265
Waters Spherisorb NH_2		3, 5, 10	80	220	262, 263
YMC NH_2	YMC	3, 5	120	330	270, 272
ZORBAX NH_2	Agilent Technologies	5	70	330	279, 280

Diol Bonded Phases

Phase	Manufacturer	Particle Size (µm)	Pore Size (Å)	Surface Area (m^2/g)	Page
Chromegabond D/RP	ES Industries	3, 5	60, 100	475, 330	102
COSMOSIL Diol	Nacalai Tesque	5	120	300	91
Inertsil Diol	GL Sciences	3, 5	100	450	108, 111-114
Inertsil WP Diol		5	300	150	115
Kromasil Diol	Akzo Nobel	5, 10, 16	60	540	141, 143-146
Kromasil HILIC-D		5	60	540	147
LiChrosorb Diol	Merck	5, 10	100	300	181
LiChrospher Diol		5	100	350	182-184
NUCLEOSIL Diol	Macherey-Nagel	5, 7	100	350	163, 164
ProntoSIL Diol	Bischoff	3, 5	120	300	78
YMC Diol	YMC	5	120	330	270, 272
YMC-Triart Diol-HILIC		1.9, 3, 5	120	-	266, 267

Figures 1 and 2 show typical applications on amino and diol bonded columns respectively.

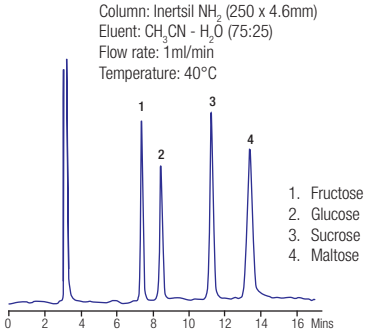

Figure 1. Separation of sugars on amino column

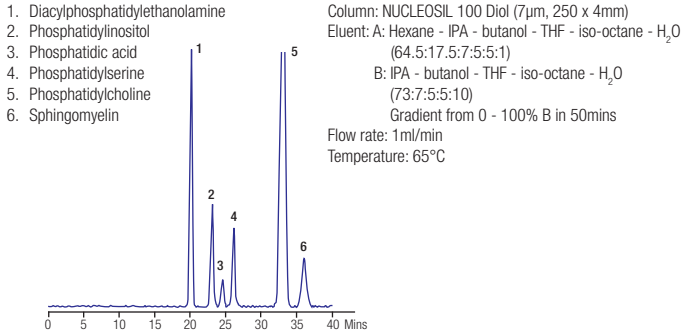

Figure 2. Separation of phospholipids on diol column