



HICHROM

Chromatography Columns and Supplies

LC COLUMN SELECTION Polar Embedded and Other 'AQ' Type Phases

Catalogue 9

Hichrom Limited

**1 The Markham Centre, Station Road
Theale, Reading, Berks, RG7 4PE, UK**

Tel: +44 (0)118 930 3660 Fax: +44 (0)118 932 3484

Email: sales@hichrom.co.uk www.hichrom.co.uk

Introduction

When separating very polar, water-soluble compounds, eluents containing less than 5% organic modifier are commonly used to achieve sufficient retention. However, operation under such highly aqueous conditions can lead to poor chromatographic reproducibility and decreasing retention times. Conventional C8 and C18 phases undergo dewetting or 'phase collapse' under these conditions, resulting in a reduction of accessible bonded phase. This phenomenon may either occur very quickly or more gradually.

'High Aqueous' Phases

Approaches to address this problem include embedding a polar group in the alkyl chain or using hydrophilic (polar) endcapping reagents (see Figure 1). Both these approaches, or the use of a C30 phase, have the effect of maintaining the phase surface under fully wetted conditions, even when using 100% aqueous eluent. Polar embedded phases are also used to obtain different selectivity from conventional C18 phases.

Good Retention and Resolution for Polar Compounds

Compared to traditional alkyl phases these 'high aqueous' phases are resistant to retention loss when using highly aqueous eluents, even after several days or weeks. Reproducible retention times and improved peak shapes are achieved for acidic, basic and zwitterionic analytes.

Alternative Selectivity

Conventional C18 phases depend primarily on differing hydrophobic interactions between analytes and the stationary phase to provide separation. 'AQ' type phases may also show hydrophilic (polar) interactions via H-bonding and dipole-dipole forces. This can influence retention time and improve selectivity for polar analytes.

Eliminate Need for Ion-pair Additives

Many separations of very polar analytes are performed using ion-pair chromatography in order to provide adequate retention. The use of an 'AQ' phase generally enables reproducible results to be obtained using conventional aqueous/organic eluents.

Typical Applications

Typical applications of these 'AQ' type phases include carboxylic acids, water soluble vitamins, catecholamines, nucleic acid bases and various polar pharmaceuticals.

'AQ' Type Phases

Phase	Manufacturer	Particle Size (µm)	Pore Size (Å)	Comments	Page
Acclaim PolarAdvantage	Thermo Scientific	2.2, 3, 5	120	Embedded sulphonamide group	235, 238
Acclaim PolarAdvantage II		2.2, 3, 5	120	Embedded amide group	235, 238
Accucore AQ ¹		2.6	80	C18 with polar endcapping	223, 225, 227
Accucore Polar Premium ¹	Advanced Chromatography Technologies (ACT)	2.6	150	Amide embedded C18	223, 225, 227
ACE AQ		2 ² , 3, 5, 10	100	C18 with integral polar functionality	64, 67, 74, 75
ACE C18-AR		2 ² , 3, 5, 10	100	C18 with integral phenyl group	64, 65, 68, 74, 75, 77
AquaSep	ES Industries	3, 5	100	C8 with embedded ether group	101
Chromegabond ODS-PI	Shiseido	3, 5	120	Ureide embedded polar group	102
CAPCELL PAK C18 AQ		3, 5	80	C18	79, 80
COSMOSIL C18-PAQ	Nacalai Tesque	5	120	C18 phase with polymeric linkage	91, 94
Develosil RPAQUEOUS	Nomura	3, 5	140	C30, monofunctional	95, 96
Develosil RPAQUEOUS-AR		3, 5	140	C30, trifunctional	95, 96
Epic Polar	ES Industries	1.8, 3, 5, 10	120	Embedded ether group	100
HALO RP-Amide ¹	Advanced Materials Technology	2.7	90	Polar embedded amide	125, 126, 128
Hydrosphere C18	YMC	2, 3, 5	120	Hydrophilic C18 surface	268, 269
Hypersil GOLD AQ	Thermo Scientific	1.9, 3, 5, 8	175	Alkyl chain with polar endcapping	228, 230
Inertsil ODS-EP	GL Sciences	5	100	C18 phase with polar embedded group	108, 109, 113, 114
NUCLEODUR C18 Pyramid	Macherey-Nagel	1.8, 3, 5	110	C18 with hydrophilic endcapping	157, 158, 160
NUCLEODUR PolarTec		1.8, 3, 5	110	Polar embedded group	157, 158, 160
NUCLEOSIL Nautilus		3, 5	100	C18 with polar embedded group	167
NUCLEOSIL Protect 1		5	100	Protective polar group	167
ProntoSil C18 (or C8) ace-EPS	Bischoff	3, 5	120	C18 or C8 with embedded amide group	78
ProTec-RP	ES Industries	3, 5	100	C8, C18 or Phenyl with embedded amide group	-
Spursil C18 and C18-EP	Dikma Technologies	3, 5, 10	100	C18 with proprietary polar modification	97, 98
SymmetryShield	Waters	3.5, 5	100	C18 or C8 with polar embedded group	264
Synchronis aQ	Thermo Scientific	1.7, 3, 5	100	C18 with polar endcapping	234
YMC ODS-AQ	YMC	3, 5	120	C18 with hydrophilic endcapping	270-272
ZORBAX Bonus-RP	Agilent Technologies	1.8, 3.5, 5	80	C14 chain with embedded amide group	281, 282
ZORBAX SB-Aq		1.8, 3.5, 5	80	Proprietary	281

¹ Superficially porous phases

² As ACE Excel column

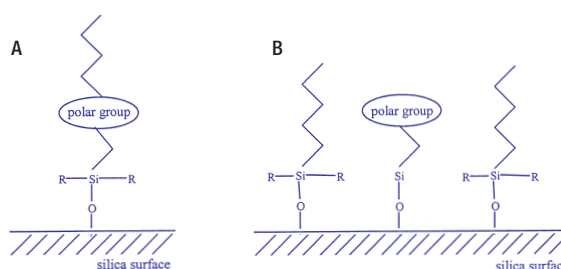


Figure 1. Polar embedded (A) and hydrophilic endcapped (B) phases