HPLC Columns

NEW

Analtech is proud to offer, for the first time, High Pressure Liquid Chromatography Columns. Analtech is partnering with Separation Methods Technologies - another company committed to excellence in chromatography.

Separation Methods Technologies (SMT) utilizes proprietary bonding technologies that result in bonded phase coverages that approach 100%. SMT's methods of bonding allow the density of the functional ligands to be controlled with appropriate spacer molecules, a novel procedure that ensures TOTAL COVERAGE and highly cross-linked polysiloxane under layer structure. The results are bonded phases that are well protected and that show unprecedented resistance to both acid and base hydrolysis. Self-Assemled Monolayers (SAM) technology provides you with the widest range of column retention selectivities and performance benefits.

HPLC Method Development - Choosing a column

The column of choice for analytical methods development is very easy; the best column for an application is the column that gives the highest performance under the most favorable condition desired by the end-user. Most analytes are acidic, basic or neutral. The best initial approach is to use a mid-range pH, such as pH 7. The standard SMT SAM-C18 and C8 columns are the best choice for use at this pH because they provide superior column lifetime, extremely high selectivity and resolution. Acetonitrile or methanol and water are normally the first choice for mobile phase.

Another option is combination of organic solvent with phosphate buffer (with buffer range pH 6.2-8.2) or acetate buffer (with buffer range pH 3.8-5.8). Method development optimization can continue from here by changing several factors, including mobile phase, pH, column temperature (up to 95 degrees C). SMT SAM-C18 is uniquely stable to high temperatures, a characteristic that can be used as an additional tool to improve resolution.

Using a low pH mobile phase results in the best peak shapes for basic compounds because these analytes are fully protonated and exhibit low retention and tailing. SMT SAM C18 or C8 columns are the best choice providing longest available lifetime and performance at low pH.

Separations at high pH region may also be the most appropriate for certain compounds. For example, it may be possible to separate bases in their free form – where they are not charged. Here the retention increases as the chance of obtaining the desired selectivity improves. SMT SAMC18 column has highest ligand density available and offers the best protection (up to pH 12) of the silica substrate from being dissolved by the strongly basic mobile phase.

Self-Assembled Monolayers (SAM) in Separation Science

Self-Assembled Monolayers (SAM) are supramolecular organizates resembling, in some respects, the well-known Langmuir-Blodgett (LB) built-up films while displaying other distinct and rather unique features. Much of the interest in SAM stems from their potential in a wide range of scientific and technological applications. The first application of SAM in chromatographic separation science was developed at the University of Delaware by Fatunmbi and Wirth.

The bonding technique allows ordered monolayers of functional molecules to be chemically immobilized on solid substrates, such as silica and alumina. The technique of bonding was termed "horizontal polymerization" due to the fact that there is significant Si-O-Si bridging parallel to the silica substrate. This is achieved by reaction of trifunctional silanizing agent with the silica substrate under anhydrous condition, except for a monolayer of water on silica. This contrasts with conventional polymerization of trifunctional silanes, referred to as "vertical polymerization," where water is deliberately added to polymerize the reagents before attachment to the surface. The key structural difference is that horizontal polymerization provides much higher ligand density at the silica surface boundary.

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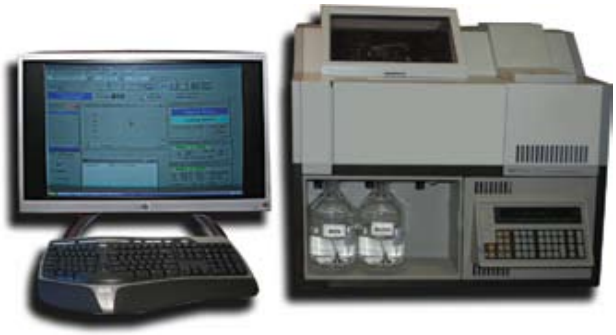
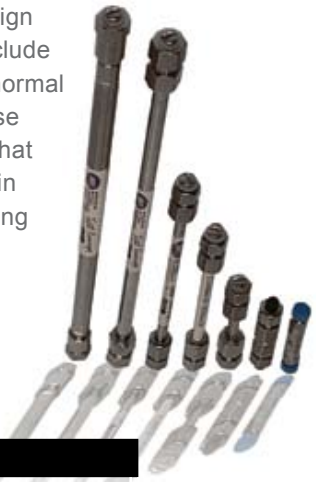


Specialty Columns and Applications

SMT has a special interest in surface modification and materials engineering. When separation is difficult with conventional bonded phases, SMT assists in method development and special column design for new applications. SMT specialty columns include special columns designed for reversed phase, normal phase, and ion exchange chromatography. These columns are specially designed for companies that are interested in having competitive advantage in separation and surface modification. The following specialty columns are currently available:



COLUMN	FUNCTION
PAH	Analysis of polyaromatic hydrocarbons
TNT	Separation of Explosives
OD-IQ and OIQ	Polar/nonpolar/basic compounds
C12	Nonpolar/Polar compounds
C30	Nonpolar compounds
Urea	Polar compounds
QuickSep	Quick screening/analysis
ChiralSep	Enantiomers
MetalSep	Metal Removal
C6F5	Separation of Taxols
USP	Regulated Analytical Methods
Micro/Narrow Bore	LC/MS, LC/GC, Drug Screening
Guard	Column Guard

Introduction to SMT SAM-C18 Columns and Packings

SMT SAM-C18 or [OD] column is usually the first column of choice for reversed-phase chromatographic separation or method development. When compared to other columns such as a C8, C4, CN, phenyl, or an amino bonded phase, C18 is the most hydrophobic.

SMT SAM-C18 column is very stable at a wide pH range and high temperatures. Separation of most basic solutes is often possible without trifluoroacetic acid (TFA) or other mobile phase additives. SMT packings enable you to achieve a broader pH range than what is accessible with other commercially available packings. SMT utilizes a novel self-assembled monolayers technology in all its bonding chemistries to achieve maximum coverage. The technique involves pre-treatment of the silica substrate including rigorous control of water molecules. A mixture of trifunctional ligands is then allowed to come in contact with the substrate. The result is an unprecedented high-density assembly of molecules on the substrate. The unique aspect of SAM is that only a monolayer of coverage is achieved when the bonding is performed accordingly. At least one of the ligands (e.g. C18) is functional for the separation while the other (e.g. C1) is used as a spacer molecule, although, it too can impact certain selectivity needed for some separation. A typical coverage achievable with SAM is 7-8 ^{o}mole/m^{2}. This coverage value is equivalent to the maximum achievable coverage on any substrate and it is about 50% higher than that achievable using the most exhaustive conventional bonding and end-capping methods available in the market today.

SMT Column Series

SMT COLUMN SERIES	DESCRIPTION
SMT-SAM-C18 [OD-Series]	**SMT-C18 phase with the highest functional ligand coverage confirmed with carbon analysis results of 24% carbon load.**
SMT-SAM-C18 [ODL-Series]	SAM-C18 phase with the lowest functional ligand coverage confirmed with carbon analysis results of 12% carbon load
SMT SAM-C18 [Elite C18 series]	SMT Elite-C18 phases is designed to have intermediate functional ligand coverage confirmed with carbon analysis results of 16% carbon load
SMT SAM-C8 [O series]	SMT SAM-C8 phase with the highest functional ligand coverage confirmed with carbon analysis results of 12% carbon load.
SMT SAM-C8 [OL series]	SMT SAM-C8 phase with the lowest functional ligand coverage confirmed with carbon analysis results of 6% carbon load
SMT SAM-C8 [Elite-C8 series]	density of the functional ligand, octyl molecule or C8, is moderated with the proprietary spacer molecule to ensure max. coverage
SMT MEB1 series	The functional ligand is methyl, C1 with carbon analysis results of about 1% carbon load
SMT MEB2 series	The functional ligand is ethyl, C2 with carbon analysis results of 2% carbon load
SMT MEB4 series	The functional ligand is butyl, C4 with carbon analysis results of about 4% carbon load
SMT-Phen1 series	contains one phenyl per ligand - provides unique selectivity for aromatic compounds
SMT-Phen2 series	contains two phenyls per ligand - ideal for the separation of proteins, peptides and other biomolecules
SMT Diol1 series	acid-catalyzed cleavage of 3-(2,3-epoxypropoxy) propyl as the functional ligand
SMT-Diol2 series	acid-catalyzed cleavage of 5,6-epoxyhexyl as the functional ligand
SMT-Aminopropyl [NH2]	recommended for the separation of polar compounds and can be used in 3 separation modes: Normal, Weak anion exchange, and RP
SMT-Cyanopropyl [CN]	When used in reversed-phase mode, with relatively polar solvents, CN-stationary phase offers complimentary selectivity that may be unattainable with traditional reversed-phase packings such as C18 and C8
SMT-SAX series	silica-based Strong Anion eXchange packing developed for separation of anionic compounds
SMT-WAX series	silica-based Weak Anion eXchange packing materials developed for separation of anionic compounds
SMT-DEAE series	[Di-Ethyl-Amino-Ethyl] columns provide a unique chemically attached hydrophilic, weak anion exchange type, functional surface desirable for the separation of many biomolecules such as proteins, nucleotides, oligonucleotides, polynucleotides, high molecular weight RNA's and plasmid DNA's
SMT-SCX series	silica-based Strong Cation eXchange packing materials developed for separation of cationic compounds. SMT-SCX consists of chemically attached hydrophilic surface derivatized to form sulfonic acid functionality
SMT-WCX series	silica-based Weak Cation eXchange packing materials developed for separation of cationic compounds. SMT-WCX consists of chemically attached hydrophilic surface derivatized to form carboxylic acid functionality
SMT PAH series	SMT PAH1 columns consist of octadecyl functional ligands and are made with silica with proprietary pore size
SMT-TNT series	specially designed C18 column for use in the reversed-phase separation of nitroaromatic and nitroamine derivatives
SMT OD-IQ series	unique reversed phase packing material designed to have both hydrophobic and truly hydrophilic spacer ligands. The mixed-phase consists of a meticulously controlled mixture of hydrophobic, C18 molecules, and proprietary hydrophilic molecules
SMT-C30 series	columns consist of Triacontyl as the functional ligand
SMT-Urea series	columns consist of Ureidopropyl as the functional ligand
SMT QuickSep series	specially designed for rapid resolution - these columns are ideal for fast analysis, drug screening, and purification
SMT ChiralSep series	chiral column may contain one form of an enantiomeric compound immobilized on the surface of a packing material
SMT MetalSep series	proprietary strong cation exchange functional ligands that are chemically attached on silica substrate using SAM technique
SMT -C6F5 series	columns consist of Pentafluorophenyl as the functional ligand
SMT Micro/Narrow Bore series	columns are nonstandard columns designed for special HPLC applications (such as LC/MS and LC/GC)

UNIQUE FEATURE
Highly versatile; strongly recommended for basic compounds
Fast mass transfer and very high efficiency for the separation of highly hydrophobic molecules
Moderately hydrophobic; Offers comparable carbon load as most other commercially available C18 columns and faster mass transfer than SAM OD-series
SMT SAM-C8 columns are designed to withstand a pH range of 1-10
The spacer molecules protect the substrate from aggressive pH conditions and impact unique selectivity compared with other C8 phases
These phases are moderately hydrophobic; nevertheless, designed to tolerate usage in very aggressive pH conditions and high temperatures
These phases are the least hydrophobic of all the MEB columns
These phases offer medium hydrophobicity when compared with all the other MEB phases
These phases offer the highest hydrophobicity when compared with all the other MEB phases
Offers preferential retention of aromatic compounds
ideal for the separation of proteins, peptides and other biomolecules
High loading capability and improved sample recovery
High reproducibility of bonded ligand resulting in consistent separation
Improved separation of polar solutes; excellent sample recovery; high loading capability
Homogeneous CN-functional surface that permits faster equilibration than unmodified hydroxyl silica surface
Superior selectivity and efficiency in the separation of proteins and biomolecules
Superior selectivity and efficiency in the separation of proteins and biomolecules
Fast reequilibration and very negligible non-specific protein interaction, High density tertiary amine functional groups that provide better selectivity and recovery compared to conventional DEAE
superior selectivity and efficiency in the separation of proteins and biomolecules with medium to high [isoelectric point] or pH values,
Superior selectivity and efficiency in the separation of proteins and biomolecules
Superior monitoring of polyaromatic hydrocarbons (PAH) - large organic compounds produced during combustion
Highly reproducible mixed bonded phase; consistent separation of analytes
Stronger retention of polar molecules in aqueous eluent, Reduced backpressure; the hydrophilic hybrid enhances the solvation of the bonded phase in an aqueous environment. Eliminates the need for ion pairing reagents
columns offer selectivities that are much different from C18 reversed-phase columns when applied to separation of carotenoid and related compounds
columns are specially designed for the separation of extremely basic analytes that are not retained in traditional reversed-phase columns
Quick screening for method development; QuickSep columns can be used to assess columns suitability for a particular analysis
At least three points of simultaneous interaction between the chiral phase and one analyte enantiomer, with at least one point of stereo-chemical dependence
strong selectivities toward heavy metal ions such as Copper, gold, nickel, silver, iron, etc. Applications include precious metal recovery and waste water purification
columns are specially designed for the separation of Taxols
greatly enhanced sensitivity, ideal for applications in genomics and proteomics

HPLC Column Selection Guide

SMT SUPERIOR COLUMN SERIES	EQUIVALENT COLUMNS	USP DESIGNATION
SMT-SAM-C18 [OD-Series]	Luna C18; Symmetry C18; YMC ODS-AM; Xterra C18; Kromasil C18; Inersil C18	L1
SMT-SAM-C18 [ODL-Series]	Luna C18; Symmetry C18; YMC ODS-AM; Xterra C18; Kromasil C18; Inersil C18; Zorbax SB C18	L1
SMT-SAM-C18 [Elite C18 series]	Luna C18; Symmetry C18; YMC ODS-AM; Xterra C18; Kromasil C18; Inersil C18	L1
SMT-SAM-C8 [O series]	Luna C8; Symmetry C8; YMC-Pack C8; Xterra C8; Kromasil C8; Inertsil C8	L7
SMT-SAM-C8 [OL series]	Luna C8; Symmetry C8; YMC-Pack C8; Xterra C8; Kromasil C8; Inertsil C8; Zorbax SB C8	L7
SMT-SAM-C8 [Elite-C8 series]	Luna C8; Symmetry C8; YMC-Basic, Pack C8; Xterra C8; Kromasil C8; Inertsil C8	L7
SMT-MEB1 series	Luna C5, Kromasil C1	L13
SMT-MEB2 series	Zorbax SB C3	
SMT-MEB4 series	Kromasil C4; Zorbax C4	L26
SMT-Phen1 series	Luna Phenyl; BetaSil Phenyl	L11
SMT-Phen2 series	YMC-Pack Phenyl; Zorbax Phenyl	L11
SMT-Diol1 series	Lichrosorb Diol; Spherex Diol	L20
SMT-Diol2 series	YMC-Pack Diol; NucleoSil Diol	L20
SMT-Aminopropyl [NH2]	Luna NH2; Kromasil NH2; YMC-Pack-NH2	L8
SMT-Cyanopropyl [CN]	Luna CN; Zorbax SB CN; YMC-Pack CN	L10
SMT-SAX series	Hypersil SAX; Vydac SAX; PureGel SAX	L12; L14
SMT-WAX series	Vydac WAX; BioSep DEAE	
SMT-DEAE series	BioSep DEAE; TSK DEAE	
SMT-SCX series	Vydac SCX; PureGel SCX; Capcell Pak SCX	L9
SMT-WCX series	PartiSphere WCX; Gammabond WCX	
SMT PAH series	Luna C18; EnviroSep PAH; Vydac PAH	
SMT QuickSep series	Luna C18; C8, C4, etc.; Symmetry C18, C8, etc.; Inertsil C18, C8, etc.	
SMT -C6F5 series	Phenomenex-Curosil; SupelcoSil LC-F	
SMT-Silica series		L3

SMT Manufactures Ion Exchange and Specialty Columns Such As:

Aminopropyl (NH2) columns, Cyanopropyl (CN) columns, DIOLS (OH) columns, Phenyl columns, DEAE columns, SAX columns, WAX columns, SCX columns, WCX columns, TSX colums

SMT manufactures columns for USP methods including:

UPSL7 and USPL1

Also available as L3, L8, L9, L10, L11, L13, L14, L20, L26, L27, and other unclassified phases, such as C12 and C30.

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