SUPELCOGEL TPR-100 Modular Column

Product Specification

High Efficiency Resin for Reversed Phase HPLC

Silica, the most commonly used support for HPLC phases, has several drawbacks, including a narrow working pH range (pH 2-7), and the existence of free silanols and metal ion impurities. At readings below pH 2, hydrolysis of the bonded phase can occur, and above pH 8 the silica itself can dissolve. The presence of residual silanols can cause unpredictable retention, irreversible adsorption, poor peak shape and efficiency, and unsatisfactory reproducibility for silanophilic compounds.

HPLC resins often are characterized by low efficiency and short lifetime. These problems usually are attributed to the suspension polymerization technique by which most HPLC resins are made. In suspension polymerization, the particle grows out from widely distributed monomer droplets. Porogens are added to make the particle porous, but ultimately cause contamination. The growth rate is not uniform and a wide distribution of particle sizes results, creating the need for extensive sizing to obtain the desired particle size. A wide distribution often is accepted, causing low efficiency of conventional resins. Other sources of low column efficiency are the presence of micropores — "dead-end" channels that inhibit mass transfer.

The SUPELCOGEL™ TPR-100 column overcomes these limitations. This column is prepared by a patented templated polymerization▲ (Figure A), rather than by the conventional suspension polymerization process. First, a high efficiency silica particle (the same used to make HPLC phases) is imbibed with a monomer solution. Then the monomer solution is polymerized and crosslinked for stability. Finally, the starting silica bead is dissolved by a caustic solution. The result is an exact template of the silica particle, in resin. This template has the physical attributes of silica (narrow particle and pore size distributions), and the chemical attributes of a polymer (inertness and pH stability). Table 1 describes the characteristics of the SUPELCOGEL TPR-100 packing.

Figure A. Templated Polymerization

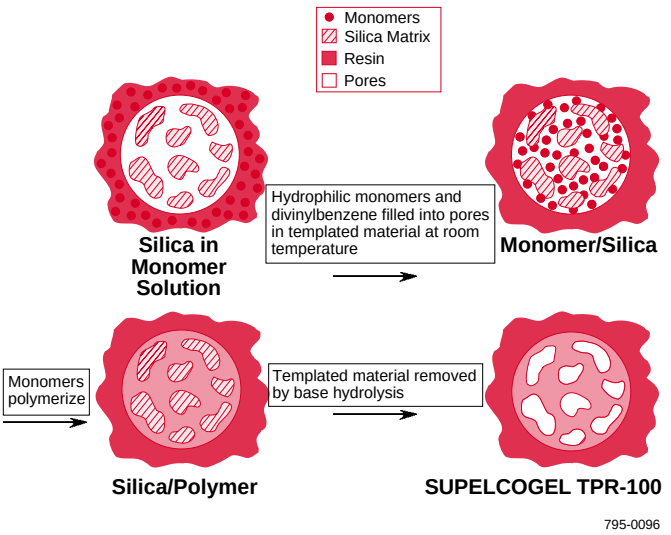


Table 1. Packing Characteristics

Composition:	poly(divinylbenzene/methacrylate), spherical
Particle Size:	5µm
Pore Size:	100Å
Surface Area:	340m^2/g
pH:	2-13

Table 2. Chromatography of Polar Compounds on Resin-Based HPLC Columns

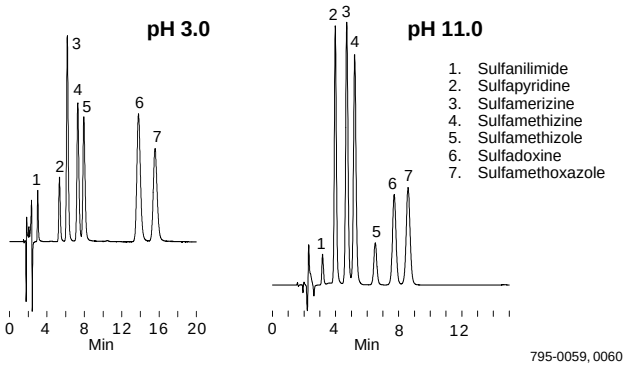
	SUPELCOGEL TPR-100	PLRP-S	TSK OD-2PW	PRP-1	ODP-50	DE-613
Retention (k´)						
4-Hydroxybenzoic acid	0.59	0.71	1.38	0.84	1.31	3.26
Acetylsalicylic acid	1.47	2.20	1.55	2.64	1.81	4.73*
p-Acetophenetidide	1.85	3.06	1.69	3.61	2.11	4.73*
Salicylic acid	2.74	4.67	4.94	5.53	6.73	12.13
Efficiency						
4-Hydroxybenzoic acid	6126	1323	3678	401	1766	4229
Acetylsalicylic acid	5930	932	3860	826	3161	*
p-Acetophenetidide	5741	1115	2814	1470	4103	*
Salicylic acid	5335	749	3409	1584	2139	4432
Symmetry						
4-Hydroxybenzoic acid	1.03	1.74	1.07	1.19	1.92	1.26
Acetylsalicylic acid	0.98	1.43	1.17	0.64	1.39	*
p-Acetophenetidide	0.98	1.33	1.54	0.95	1.55	*
Salicylic acid	1.01	1.31	1.36	0.90	2.00	1.52

Columns: 15cm x 4.6mm ID (except PRP-1, 15cm x 4.1mm ID, and DE-613, 15cm x 6.0mm ID)
Mobile Phase: acetonitrile:0.1% TFA (30:70)
Flow Rate: 1mL/min

The SUPELCOGEL TPR-100 resin has advantages over other HPLC resins (Table 2). Because a mixture of hydrophobic and hydrophilic monomers is used, the TPR-100 particle is intermediate in polarity between the hydrophobic styrene-divinylbenzene polymers and the hydrophilic methacrylate polymers. The TPR-100 resin yields a different elution pattern, demonstrating its unique selectivity as well as its improved efficiency and symmetry compared with other resin columns. Another benefit of the monomer chemistry of the TPR-100 resin is stability. Repeated gradients do not change the bed structure, allowing this resin to be used with 100% aqueous or 100% organic mobile phases without shrinking or swelling. Pressures up to 3000psi are accommodated.

Figure B. Sulfa Drugs

Column: **SUPELCOGEL TPR-100, 15cm x 4.6mm ID, 5µm particles**
Cat. No.: **59154**
Mobile Phase: acetonitrile:25mM KH_2PO_4, 20:80 (pH 3.0) or 9:91 (pH 11.0)
Flow Rate: 1mL/min
Temp.: ambient (pH 3.0) or 30°C (pH 11.0)
Det.: UV, 254nm
Inj.: 10µL



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The sulfa drug separation in Figure B illustrates the importance of using an unlimited mobile phase pH range to obtain selectivity and decrease solvent consumption. At pH 3, the drugs are more hydrophobic and require 20% acetonitrile for elution. However, by using a mobile phase of pH 11, less organic solvent is needed, and the selectivity is different.

Ordering Information:

SUPELCOGEL TPR-100 Modular Columns

Description	Cat. No.
15cm x 4.6mm Column with cartridge endfittings	**59154**
15cm x 4.6mm Replacement cartridge**	**59154C46**
Modular endfittings, pk. of 2 Supelguard™ TPR-100	**55200-U**
Guard Column Kit (2cm guard column, holder, connecting hardware)	**59570-U**
Supelguard TPR-100 Guard Columns, pk. of 2***	**59571**
Modular Guard Column Holder	**55205**

*Coelution.

**Modular endfittings (Cat. No. 55200) are required to install a replacement cartridge in your system. Modular endfittings can be reused.

***Use a modular guard column holder (Cat. No. 55205) to directly connect a guard column to a modular column.

▲US Patent No. 4,933,372, Sigma-Aldrich Co.

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