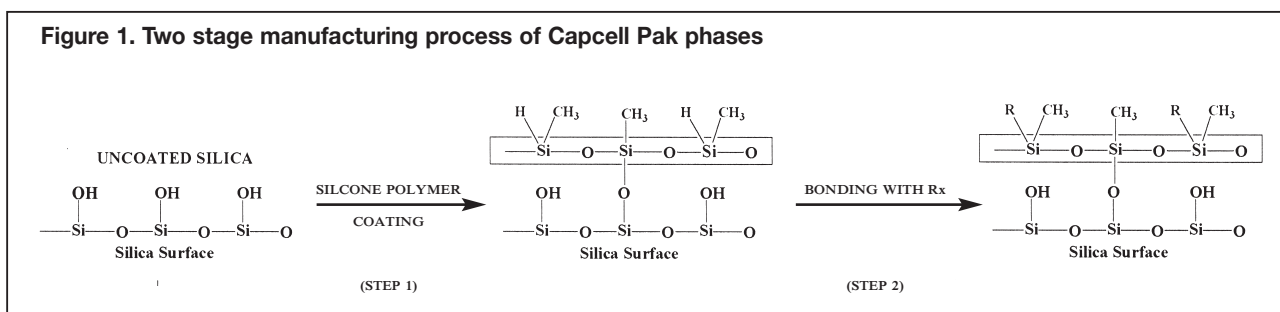


- Polymer coated 'capsule type' silica
- Extended pH range of 2 - 10
- Durable and reproducible
- Low column pressure

Capcell Pak columns are manufactured by Shiseido in Japan. The base silica gel is first homogeneously coated with a silicone polymer monolayer by vapour deposition. A range of phases is then produced by bonding to the silicone polymer coated surface. As a result, the appropriate functional groups are chemically bonded via a Si-C (Figure 1) rather than Si-O-Si linkage, providing enhanced pH stability and excellent reproducibility.

Type	Base Silica	Polymer Coating	pH Range	Separation Efficiency	Retention of Polar Compounds
AG	Conventional Grade	Mono-layer	2 - 10	Good	Fair
SG	High Purity	Mono-layer	2 - 9	Good	Fair
UG	High Purity	Homogeneous mono-layer	2 - 10	Excellent	Fair
MG	High Purity	Controlled homogeneous mono-layer	2 - 10	Excellent	Strong
ACR	High Purity	Reinforced homogeneous mono-layer	1 - 10	Excellent	Fair
AQ	High Purity	Controlled homogeneous mono-layer	2 - 9	Excellent	Excellent
DD	High Purity	Controlled homogeneous mono-layer	1.5 - 10	Excellent	Excellent

Figure 1. Two stage manufacturing process of Capcell Pak phases



Capcell Pak Phases

Capcell Pak Phase	Particle Size (µm)	Pore Size (Å)	Surface Area (m ² /g)	Carbon Load (%)
C18 MG	3, 5	100	260	15
C18 ACR	3, 5	80	340	18
C18 AQ	3, 5	120	300	11
C8 DD	5	80	300	11
C18 UG	3, 5	120	300	15
C8 UG	5	120	300	10
C1 UG	5	120	300	7
Phenyl UG	5	120	300	5
CN UG	5	120	300	5
NH2 UG	5	80	400	15
SCX UG	5	80	400	9
C18 SG	5	120	300	14
C8 SG	5	120	300	10
C18 AG	5	120	300	15
C8 AG	5	120	300	10

CAPCELL PAK® (continued)

Capcell Pak AG and SG Types

The Capcell Pak AG type was the first material produced using Shiseido's 'capsule type' bonding. Since then the product line has evolved in terms of quality of the base silica gel as well as the polymer coating technology. The SG type was developed utilising a higher purity silica base.

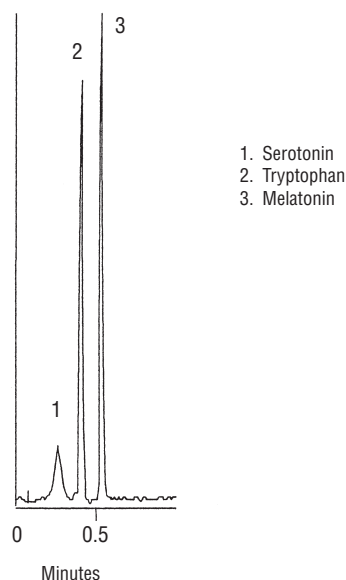
Capcell Pak UG Series

The Capcell Pak UG type has similar retention characteristics to the SG series, but separates basic and polar compounds faster and with more symmetrical peaks than the SG type columns. A wide variety of chemistries is available (see page 73).

Capcell Pak MG Series

Capcell Pak C18 MG is recommended as the column of choice for developing new methods. It is suitable for separating both hydrophobic and polar compounds and is a robust and reproducible phase with a high alkaline and acid resistance. The 3 micron phase is ideal for high throughput analysis. Capcell Pak C18 MG S5 Mini is a short column for rapid, inert LC-MS applications. Capillary columns for peptide mapping and proteomics are now available. Figure 2 demonstrates the short LC-MS analysis times that can be obtained with this phase.

Figure 2. LC-MS analysis on Capcell Pak C18 MG Mini



Column: Capcell Pak C18 MG S5 (20 x 2.0mm)
Eluent: A: 0.1% HCOOH in H₂O
B: 0.1% HCOOH in CH₃CN
0% - 100% B in 0.7min
Flow rate: 0.6ml/min
Temperature: 40°C
Detection: MS

Capcell Pak ACR Series

Capcell Pak C18 ACR has unprecedented acid resistance and enables the analysis of compounds requiring highly acidic mobile phases (as low as pH 1). It is ideal for LC-MS analysis under conditions of low organic solvent. Although the phase shows similar retention properties to those of UG, it also shows a high steric selectivity, analogous to polymeric phases.

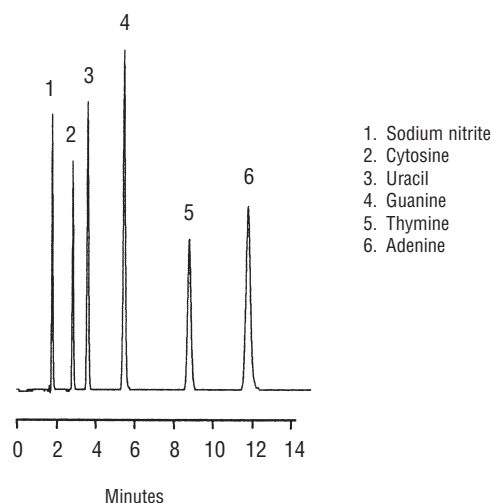
Capcell Pak AQ Series

Capcell Pak C18 AQ has a high surface polarity, which results in strong retention and high performance separations of very polar compounds. The phase is stable in 100% water and shows high acid resistance. Figure 3 shows the separation of nucleic acid bases using 100% aqueous buffer.

Capcell Pak C8 DD

Capcell Pak DD (Double Durability) has unparalleled acid and alkali resistance. The high surface polarity and lower hydrophobicity compared to C18 columns, make this product ideal for fast analyses of mixtures with diverse hydrophobicities.

Figure 3. Analysis of nucleic acid bases on Capcell Pak C18 AQ



Column: Capcell Pak C18 AQ (150 x 4.6mm)
Eluent: 20mM KH₂PO₄ + 20mM K₂HPO₄
Flow rate: 1.0ml/min
Temperature: 40°C
Detection: UV 254nm