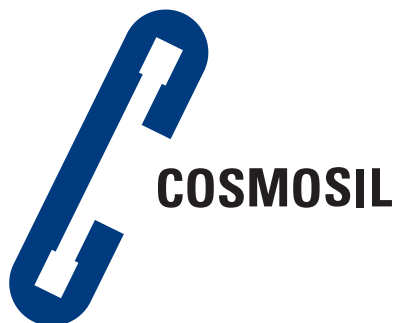
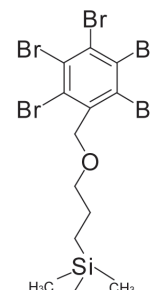




# Pentabromobenzyl Group Bonded HPLC Column

## COSMOSIL PBr

- **Separate hydrophilic compounds in reversed-phase conditions**
- **Simple mobile phase condition compared to HILIC**
- **More sample loading capacity than HILIC**
- **Alternative selectivity to C<sub>18</sub> column**



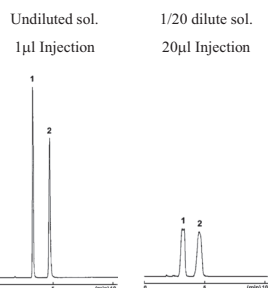
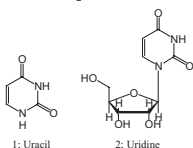
### ◆ Separation of hydrophilic compounds in reversed-phase conditions

Hydrophilic interaction chromatography (HILIC) is an increasingly popular analytical technique. However, it is often difficult to develop a robust method due to users' less familiarity with HILIC conditions. Furthermore, high concentration of acetonitrile used in HILIC mobile phase makes it extremely sensitive to samples' water concentration; injecting samples in high water concentration often results in poor peak shapes. COSMOSIL PBr enables separation of hydrophilic compounds in reversed-phase conditions, maintaining sharp peak shapes even with aqueous samples.

#### COSMOSIL Application Data

Column: HILIC  
 Column size: 4.6mm I.D.-150mm  
 Mobile phase: Acetonitrile/ H<sub>2</sub>O = 90/10  
 Flow rate: 1.0 ml/min  
 Temperature: 30°C  
 Detection: UV260nm

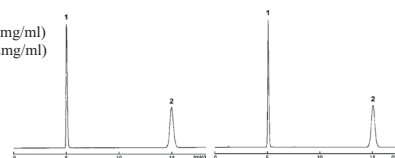
Sample: 1; Uracil (0.1mg/ml)  
 2; Uridine (0.2mg/ml)  
 Sam. Solution H<sub>2</sub>O



Column: PBr  
 Column size: 4.6mm I.D.-150mm  
 Mobile phase: H<sub>2</sub>O  
 Flow rate: 1.0 ml/min  
 Temperature: 30°C  
 Detection: UV260nm

Sample: 1; Uracil (0.1mg/ml)  
 2; Uridine (0.2mg/ml)  
 Sam. Solution H<sub>2</sub>O

Undiluted sol. 1µl Injection  
 1/20 dilute sol. 20µl Injection



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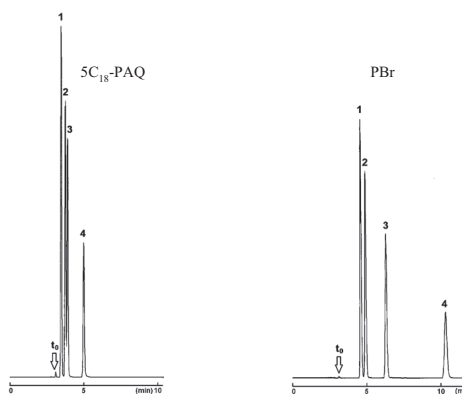
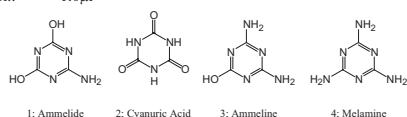
### ◆ Comparison with C<sub>18</sub> Columns

COSMOSIL PBr retains hydrophilic compounds stronger than C<sub>18</sub> columns under the same reversed-phase conditions.

#### COSMOSIL Application Data

Column: 4.6mm I.D.-250mm  
 Mobile phase: 20mmol/l Phosphate buffer(pH7.0)  
 Flow rate: 1.0 ml/min  
 Temperature: 30°C  
 Detection: UV225nm

Sample: 1; Ammelide (0.1mg/ml)  
 2; Cyanuric Acid (0.5mg/ml)  
 3; Ammeline (0.1mg/ml)  
 4; Melamine (0.1mg/ml)  
 Inj.Vol.: 1.0µl

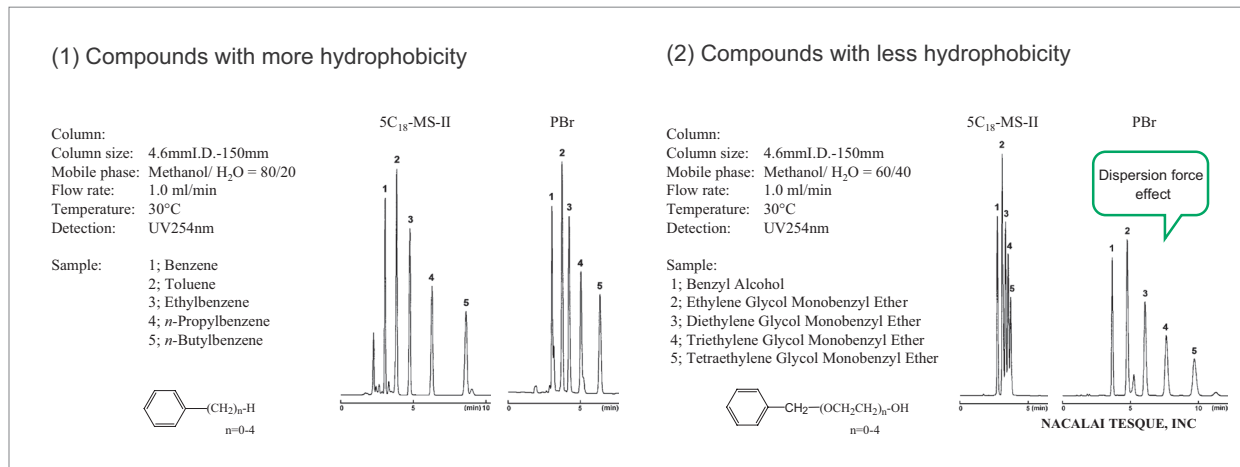


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T<sub>0</sub>; Retention time of unretained peak



In reversed-phase chromatography, compounds are separated by difference in hydrophobicity (the number of CH<sub>2</sub> bases, see chromatogram on the left (1)). Compounds with little hydrophobicity (the number of OCH<sub>2</sub>CH<sub>2</sub>, see chromatogram on the right (2)), are not retained by a C<sub>18</sub> column. However, these compounds can easily be separated by dispersion force interaction using the COSMOSIL PBr column.



► **Dispersion force (instantaneous dipole-induced dipole force)**

London Dispersion force is a weak intermolecular force that results from dipoles temporarily induced from random unsymmetrical electron positions in two adjacent atoms, also known as “instantaneous dipole–induced dipole force”. It is present in all molecules regardless if they are polar or non-polar. Compounds with high polarizability have stronger dispersion force.

► **Compounds with stronger dispersion force**

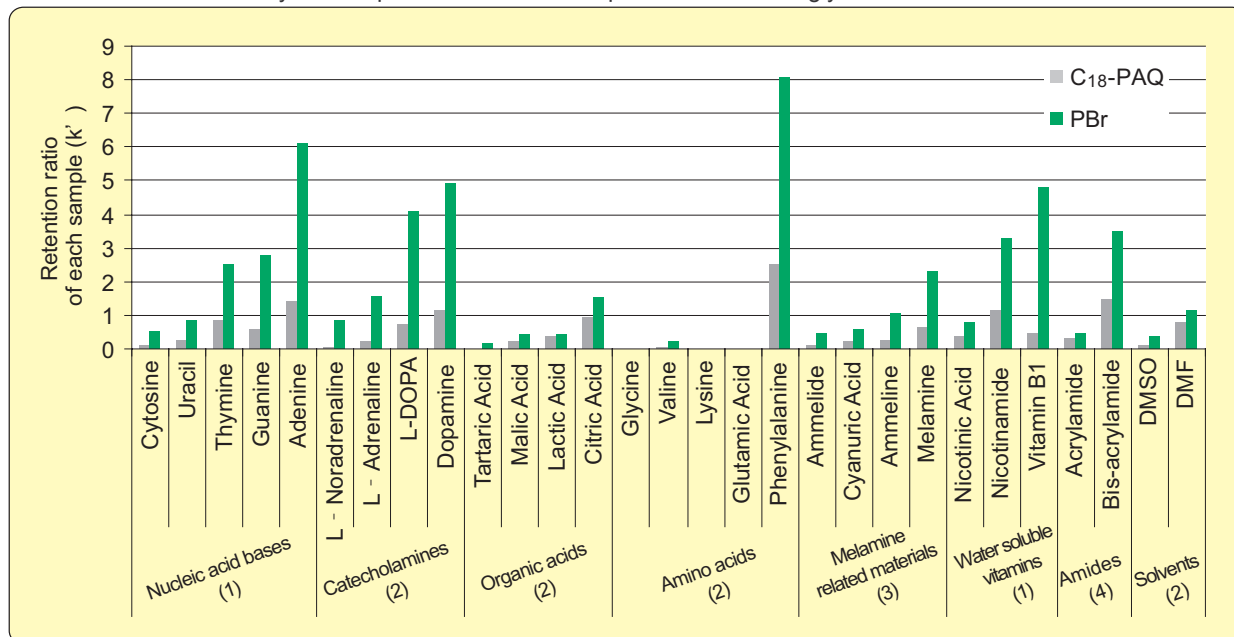
- Larger and heavier molecules
- Molecules with larger and heavier atoms (e.g. from weakest to strongest in halogens,  $F_2$ ,  $Cl_2$ ,  $Br_2$ , and  $I_2$ )
- Molecules with delocalized electrons and resonance (e.g. aromatic compounds)



COSMOSIL PBr column is packed with pentabromobenzyl bonded silica that enables separation by dispersion force interaction.



COSMOSIL PBr retains cyclic compounds or amide compounds more strongly than C<sub>18</sub> columns.



(Mobile phase)

(1) Methanol/ 20mmol/l Phosphate buffer(pH7.0) = 10/90

(2) 20mmol/l Phosphate buffer(pH2.5)

(3) 20mmol/l Phosphate buffer(pH7.0)

(4) Methanol/ H<sub>2</sub>O = 10/90

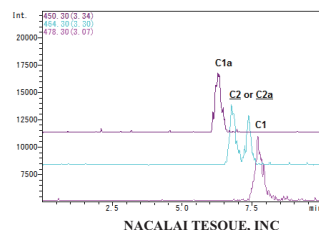
## Applications

### Gentamicin

#### COSMOSIL Application Data

Column: PBr  
 Column size: 2.0mm I.D.-150mm  
 Mobile phase: 0.1% Pentafluoropropionic Acid  
 -Acetonitrile/ H<sub>2</sub>O = 10/90  
 Flow rate: 0.2 ml/min  
 Temperature: 40°C  
 Detection: ESI-MS, Positive, SIM

Sample: Gentamicin  
 (C1a, C2, C2a, C1)  
 Inj.Vol.: 1.0µl

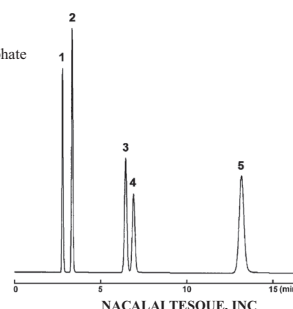


### Nucleic Acid Base

#### COSMOSIL Application Data

Column: PBr  
 Column size: 4.6mm I.D.-150mm  
 Mobile phase: Methanol/ 20mmol/l Phosphate  
 buffer(pH7.0) = 10/90  
 Flow rate: 1.0 ml/min  
 Temperature: 30°C  
 Detection: UV260nm

Sample: 1; Cytosine (0.05mg/ml)  
 2; Uracil (0.05mg/ml)  
 3; Thymine (0.05mg/ml)  
 4; Guanine (0.05mg/ml)  
 5; Adenine (0.05mg/ml)  
 Inj.Vol.: 1.0µl

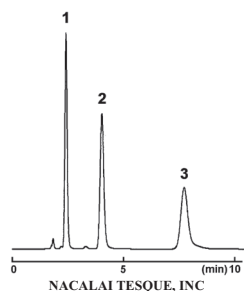


### Coenzyme A

#### COSMOSIL Application Data

Column: PBr  
 Column size: 4.6mm I.D.-150mm  
 Mobile phase: Methanol/ 20mmol/l Phosphate  
 buffer(pH7.0) = 20/80  
 Flow rate: 1.0 ml/min  
 Temperature: 30°C  
 Detection: UV260nm

Sample: 1; Malonyl Coenzyme A (0.25mg/ml)  
 2; Coenzyme A (0.25mg/ml)  
 3; Acetyl Coenzyme A (0.25mg/ml)  
 Inj.Vol.: 2.0µl

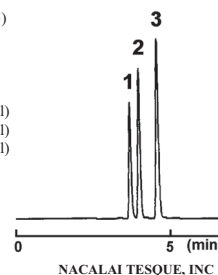


### Methylimidazole Isomers

#### COSMOSIL Application Data

Column: PBr  
 Column size: 4.6mm I.D.-250mm  
 Mobile phase: 20mmol/l Phosphate buffer(pH2.5)  
 Flow rate: 1.0 ml/min  
 Temperature: 30°C  
 Detection: UV220nm

Sample: 1; 1-Methylimidazole (0.1mg/ml)  
 2; 2-Methylimidazole (0.1mg/ml)  
 3; 4-Methylimidazole (0.1mg/ml)  
 Inj.Vol.: 1.0µl



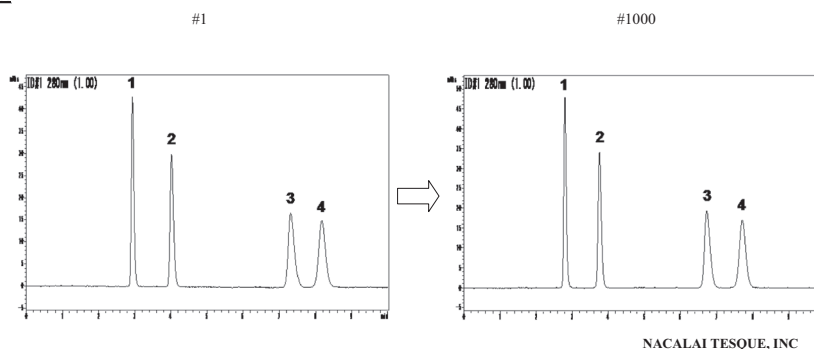
## Column Stability Test

COSMOSIL PBr column remains stable after 1000 injections under 100% aqueous condition.

#### COSMOSIL Application Data

Column: PBr  
 Column size: 4.6mm I.D.-150mm  
 Mobile phase: 20mmol/l Phosphate buffer(pH2.5)  
 Flow rate: 1.0 ml/min  
 Temperature: 40°C  
 Detection: UV280nm

Sample: 1; L-Noradrenaline (0.5mg/ml)  
 2; L-Adrenaline (0.5mg/ml)  
 3; Dopamine (0.5mg/ml)  
 4; L-DOPA (0.5mg/ml)  
 Inj.Vol.: 1.0µl



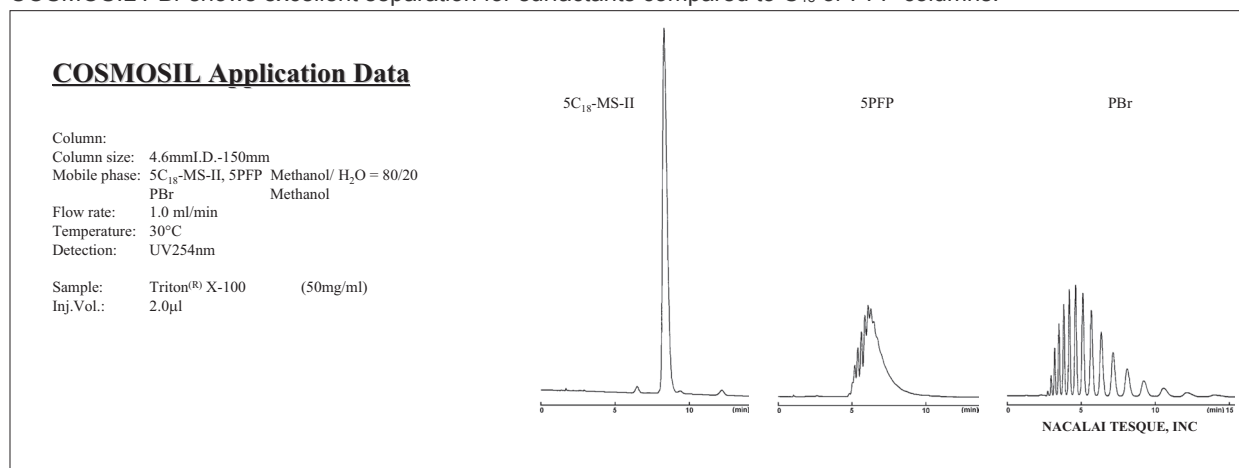
## Specifications

| Packing Material      | 5PBr                                |
|-----------------------|-------------------------------------|
| Silica gel            | High-purity porous spherical silica |
| Average particle size | 5 µm                                |
| Average pore size     | approx. 120 Å                       |
| Specific surface area | approx. 300 m <sup>2</sup> /g       |
| Stationary phase      | Pentabromobenzyl group              |
| Bonding type          | Monomeric                           |
| Endcapping treatment  | Yes                                 |
| Carbon load           | approx. 8%                          |
| Usable pH range       | 2-7.5                               |

## Applications for Surfactants and Halogen Compounds

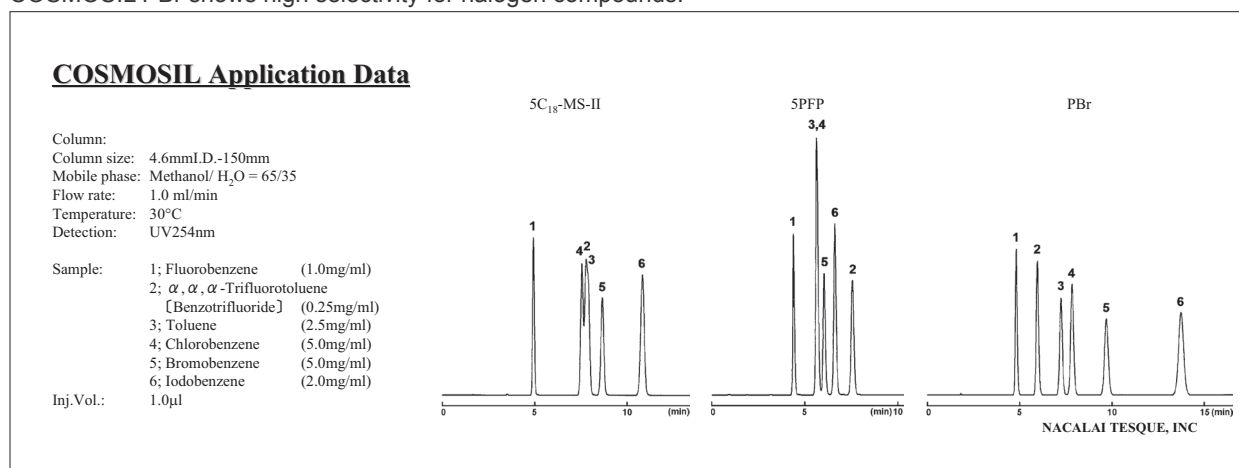
### Surfactants

COSMOSIL PBr shows excellent separation for surfactants compared to C<sub>18</sub> or PFP columns.



### Halogen Compounds

COSMOSIL PBr shows high selectivity for halogen compounds.



## Ordering Informations

| Column Size<br>I.D. x Length (mm) | Product Number | Column Size<br>I.D. x Length (mm) | Product Number | Column Size<br>I.D. x Length (mm) | Product Number |
|-----------------------------------|----------------|-----------------------------------|----------------|-----------------------------------|----------------|
| 2.0 x 50                          | 12943-61       | 10 x 50                           | 13253-71       | 4.6 mm I.D. x 10 mm cartridge*    | 12444-14       |
| 2.0 x 100                         | 13245-81       | 10 x 100                          | 13254-61       | 10 x 20                           | 12396-41       |
| 2.0 x 150                         | 12392-81       | 10 x 150                          | 13255-51       | 20 x 20                           | 13256-41       |
| 2.0 x 250                         | 13247-61       | 10 x 250                          | 12397-31       | 4.6 mm I.D. Cartridge Holder      | 38009-79       |
| 3.0 x 50                          | 12592-61       | 20 x 50                           | 13257-31       | *Cartridge Holder is required.    |                |
| 3.0 x 100                         | 13249-41       | 20 x 100                          | 13258-21       |                                   |                |
| 3.0 x 150                         | 13250-01       | 20 x 150                          | 13259-11       |                                   |                |
| 3.0 x 250                         | 13251-91       | 20 x 250                          | 12398-21       |                                   |                |
| 4.6 x 50                          | 13252-81       | 28 x 100                          | 13260-71       |                                   |                |
| 4.6 x 150                         | 12394-61       | 28 x 150                          | 13261-61       |                                   |                |
| 4.6 x 250                         | 12395-51       | 28 x 250                          | 13262-51       |                                   |                |

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