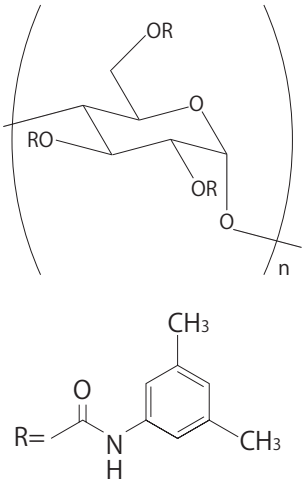
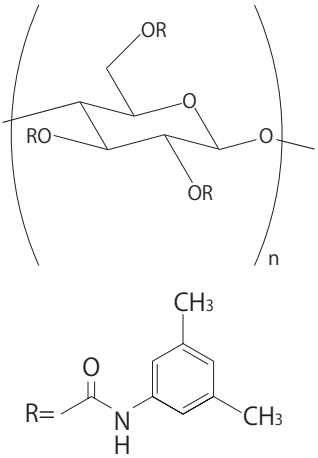
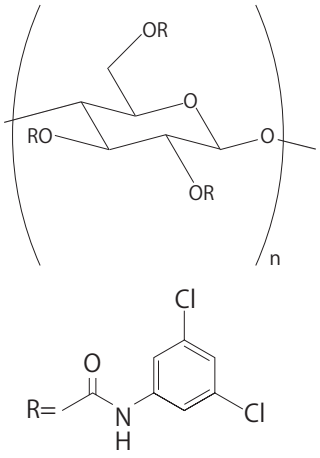
# 4. Chiral Separation Columns

## COSMOSIL CHiRAL Series

- Immobilized selectors can withstand many different solvents
- Sharpen peaks with CHiRAL 3 Series (Particle Size: 3 µm)
- Preparative separations with CHiRAL 5 Series (Particle Size: 5 µm)
- Equivalent performance to columns currently on the market
- Competitive price

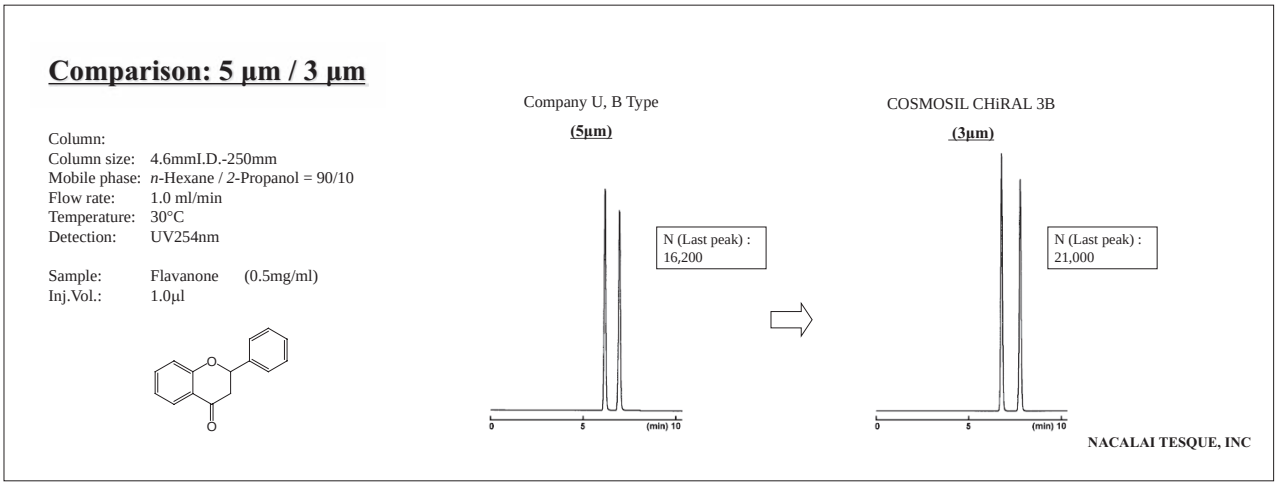
### Specifications

| Packing Material | COSMOSIL CHiRAL 3A, 5A | COSMOSIL CHiRAL 3B, 5B | COSMOSIL CHiRAL 3C, 5C |
|---|---|---|---|
| Based Material | Silica Gel | | |
| Average Particle Size (µm) | 3, 5 | | |
| Chiral Selector | Amylose tris (3,5-dimethylphenyl carbamate) | Cellulose tris (3,5-dimethylphenyl carbamate) | Cellulose tris (3,5-dichlorophenyl carbamate) |
| |  |  |  |
| Bonding Type | Immobilized | | |
| Usable pH Range | 2 ~ 9 | | |

### Available in 3 µm Particles

**Sharp Peaks**

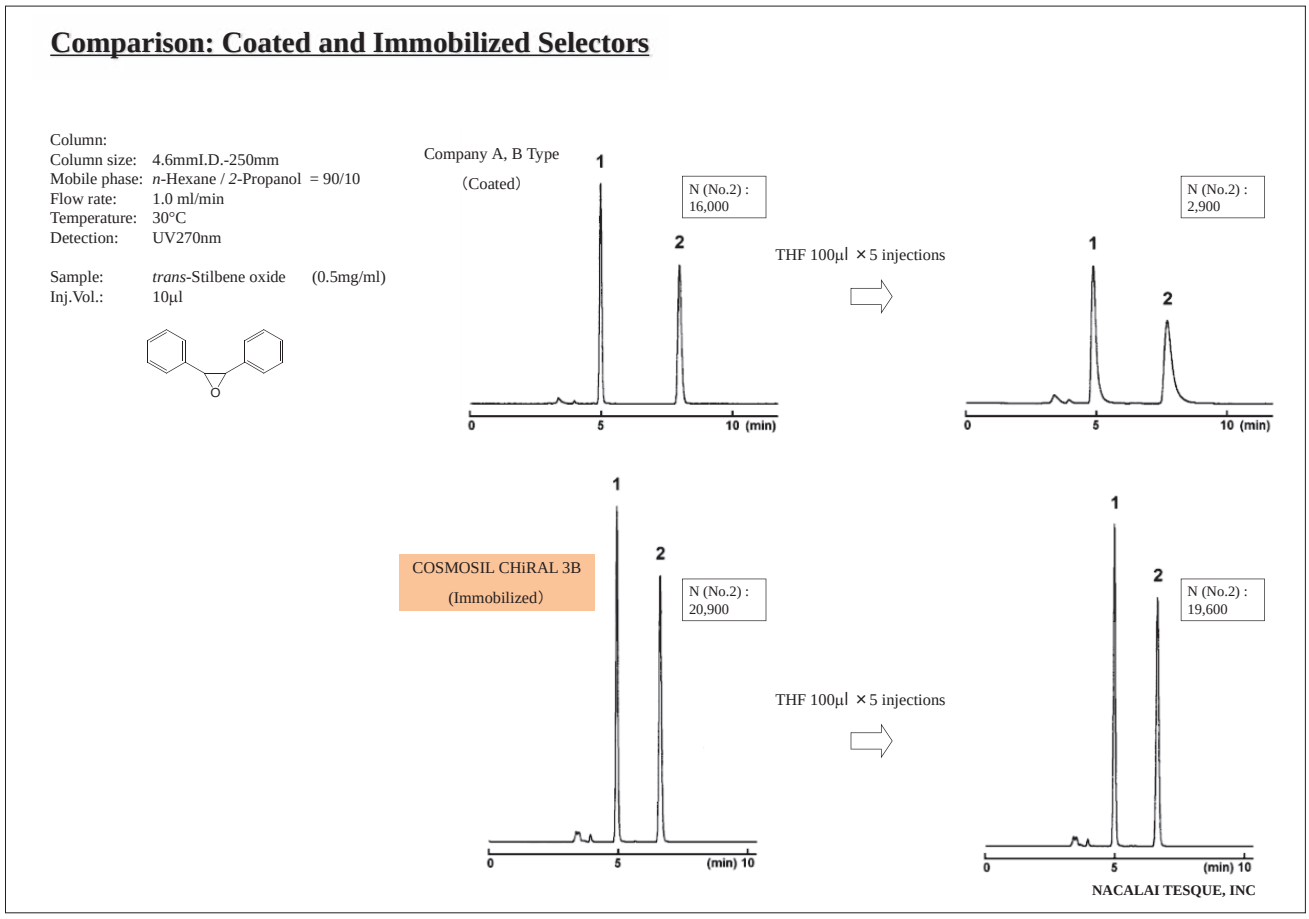
COSMOSIL CHiRAL columns are available in 3 µm particles, which yield sharper peaks than conventional 5 µm particles. Columns for preparative separations are available with 5 µm particles.



## Immobilized Stationary Phase

### High Resistance to Solvents

The COSMOSIL CHiRAL series uses a chiral selector that is chemically bonded to the silica gel, which results in high resistance to solvents. Tetrahydrofuran (THF) strips coated selectors from the stationary phase, reducing theoretical plates to less than 1/5 in our experiment. However, the same selectors bonded to the silica withstood repeated injections of THF.




### Usable Solvents

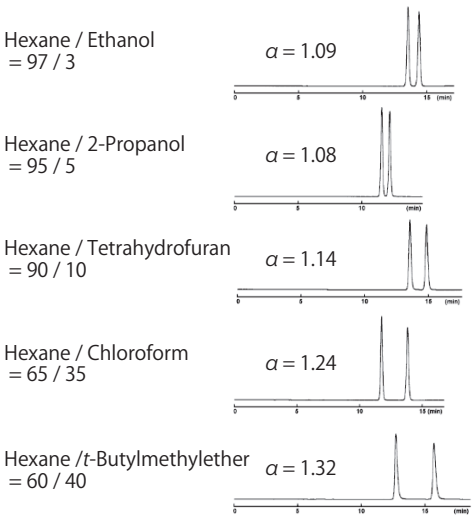
Due to its immobilized selectors, various solvents are usable with COSMOSIL CHiRAL. A wide variety of solvents increases your selectivity options.

| Solvent | Immobilized | | Coated |
|---|---|---|---|
| | Normal Phase | Reversed Phase | Normal Phase |
| *n*-Hexane | ○* | | ○* |
| *n*-Heptane | ○ | | ○ |
| Methanol | ○* | ○ | ○* |
| Ethanol | ○ | ○ | ○ |
| 2-Propanol (Isopropanol) | ○ | ○ | ○ |
| Acetonitrile | ○* | ○ | ○* |
| Tetrahydrofuran(THF) | ○ | ○ | × |
| *t*-Butyl Methyl Ether | ○ | | × |
| Toluene | ○ | | × |
| Chloroform | ○ | | × |
| Dichloromethane (Methylene Chloride) | ○ | | × |
| Ehtyl Acetate | ○ | | × |
| Water | | ○ | |
| Aqueous Buffer | | ○ | |

○ : Usable × : Unusable
* Methanol / acetonitrile and n-hexane are not miscible with each other, so they should not be mixed for LC.

### Selectivity Depends on the Solvent

Column : COSMOSIL CHiRAL 3B, 4.6 mmI.D. x 250 mm
Sample : 1-Acenaphthenol




Elution strength: alcohols, THF >> chloroform > t-butyl methyl ether >> alkanes

## Equivalent Separation to Competitors' Columns

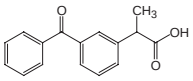
The COSMOSIL CHiRAL 5 series (5 µm particles) is equivalent to other companies' immobilized polysaccharide derivative-based chiral columns.

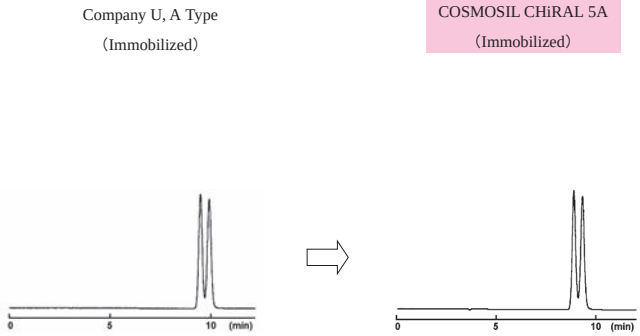
■ Chiral selector: Amylose tris (3,5-dimethylphenyl carbamate) (**A Type**)

**COSMOSIL Application Data**

Column:
Column size: 4.6mmI.D.-250mm
Mobile phase: *n*-Hexane / *2*-Propanol / TFA = 90/10/0.1
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254nm

Sample: Ketoprofen (0.3mg/ml)
Inj.Vol.: 1.0µl

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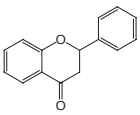
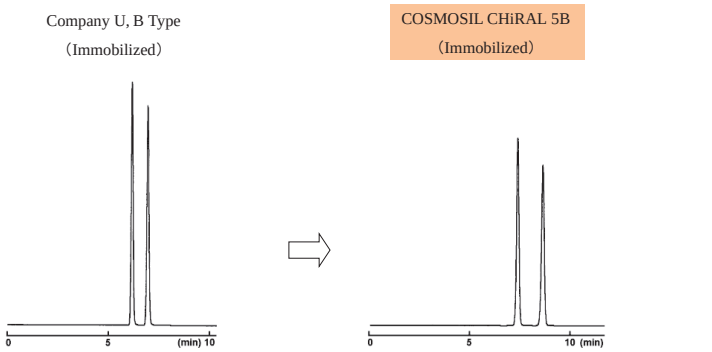
■ Chiral selector: Cellulose tris (3,5-dimethylphenyl carbamate) (**B Type**)

**COSMOSIL Application Data**

Column:
Column size: 4.6mmI.D.-250mm
Mobile phase: *n*-Hexane / *2*-Propanol = 90/10
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254nm

Sample: Flavanone (0.5mg/ml)
Inj.Vol.: 1.0µl



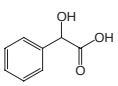

NACALAI TESQUE, INC

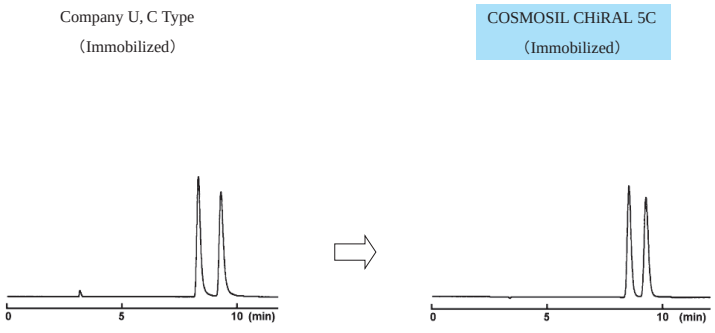
■ Chiral selector: Cellulose tris (3,5-dichlorophenyl carbamate) (**C Type**)

**COSMOSIL Application Data**

Column:
Column size: 4.6mmI.D.-250mm
Mobile phase: *n*-Hexane / *2*-Propanol / TFA = 90/10/0.1
Flow rate: 1.0 ml/min
Temperature: 30°C
Detection: UV254nm

Sample: *DL*-Mandelic Acid (10mg/ml)
Inj.Vol.: 2.0µl

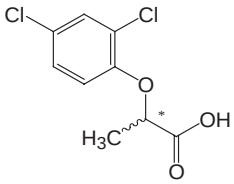
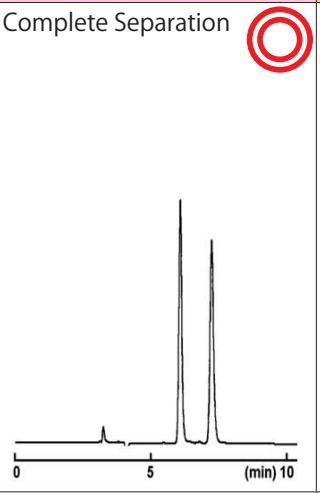
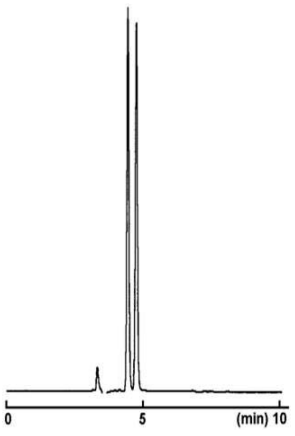
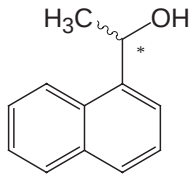
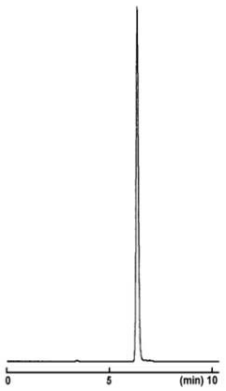
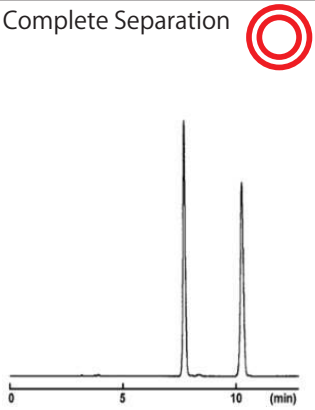
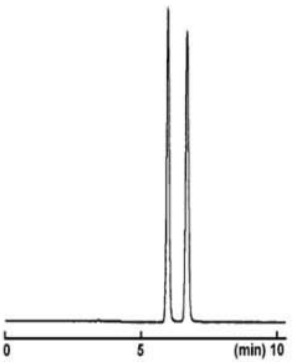
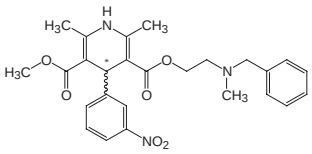
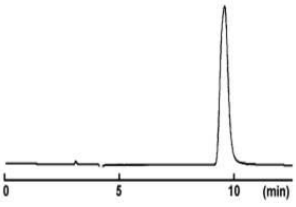
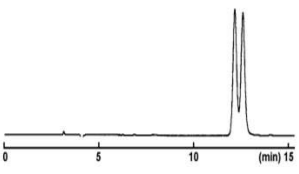
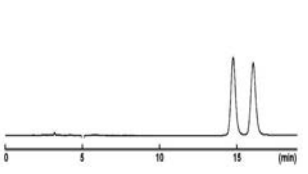



NACALAI TESQUE, INC

## Column Selection

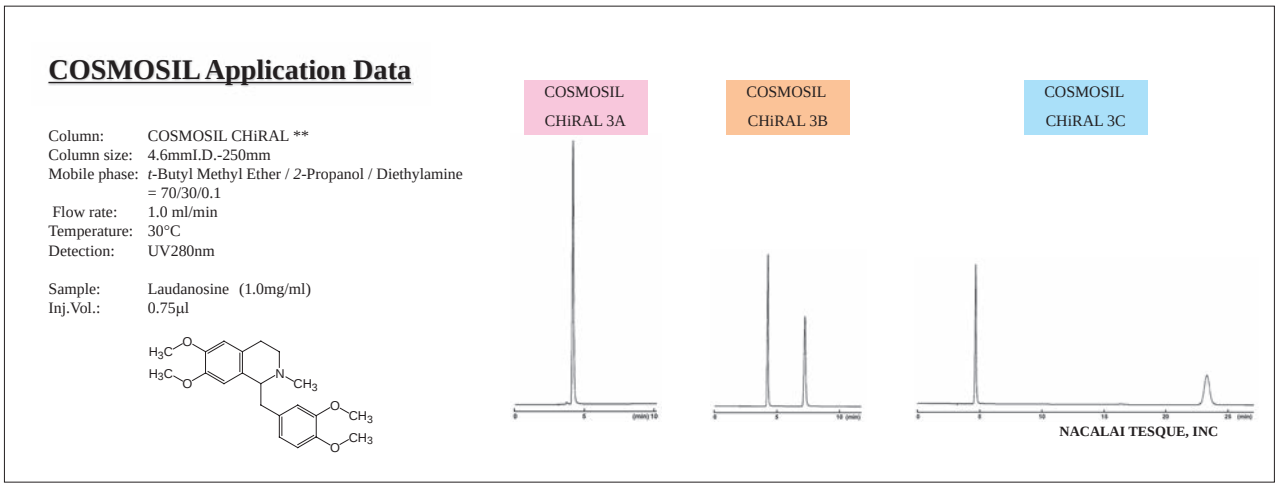
COSMOSIL CHiRAL offers 3 different chiral selectors that, together, have a high probability of separating your sample. Of 54 samples in our test, 53 pairs of enantiomers were fully separated. For samples that do not separate easily with any column, please adjust the type and concentration of solvents in your mobile phase.

| Sample, Mobile Phase | CHiRAL A | CHiRAL B | CHiRAL C |
|---|---|---|---|
| 2-(2,4-Dichlorophenoxy) propionic acid  Mobile Phase: Hexane / 2-Propanol / TFA = 95 / 5 / 0.1 | Complete Separation  |  | Complete Separation  |
| 1-(1-Naphtyl) ethanol  Mobile Phase: Hexane / 2-Propanol = 90 / 10 |  | Complete Separation  | Complete Separation  |
| Nicardipine  Mobile Phase: Hexane / 2-Propanol / Diethylamine = 90 / 10 / 0.1 |  |  | Complete Separation  |
| Chiral selector hit rate* (n=54) | 51.9% | 74.1% | 66.7% |
| Best separation (fraction of total) | 11/54 | 29/54 | 14/54 |

* Complete separation (hit) is defined as the two enantiomer peaks having resolution (Rs) greater than or equal to 1.5. The best separation for each sample is marked with double rings.

## Applications

● Laudanosine




## COSMOSIL Application

COSMOSIL CHiRAL applications are available on our website.
Please visit COSMOSIL top page at http://www.nacalai.com.

## Ordering Information

● **COSMOSIL CHiRAL 3 Fast LC Columns(Particle Size: 3 µm)**

**Packed Column**

| Product Name | I.D. x Length (mm) | Product Number |
|---|---|---|
| COSMOSIL CHiRAL 3A | 4.6×150 | 15778-51 |
| | 4.6×250 | 15779-41 |
| COSMOSIL CHiRAL 3B | 4.6×150 | 15783-71 |
| | 4.6×250 | 15784-61 |
| COSMOSIL CHiRAL 3C | 4.6×150 | 15788-21 |
| | 4.6×250 | 15789-11 |

● **COSMOSIL CHiRAL 5 Analytical / Preparative Columns (Particle Size: 5 µm)**

**Packed Column**

| Product Name | I.D. x Length (mm) | Product Number |
|---|---|---|
| COSMOSIL CHiRAL 5A | 4.6×250 | 15780-01 |
| | 10×250 | 15781-91 |
| | 20×250 | 15782-81 |
| COSMOSIL CHiRAL 5B | 4.6×250 | 15785-51 |
| | 10×250 | 15786-41 |
| | 20×250 | 15787-31 |
| COSMOSIL CHiRAL 5C | 4.6×250 | 15790-71 |
| | 10×250 | 15791-61 |
| | 20×250 | 15792-51 |

* For 10 mm I.D. and 20 mm I.D. columns, please inquire about delivery time.