

Selectivity of Packings

A number of chromatographic tests to characterize and classify reversed-phase packing materials have been suggested. The results of the various tests, however, are not always qualified to describe the properties of the packing materials. We sometimes experienced that even if one packing material gives a very good chromatogram for one test, it fails in the other test or the other packing material, e.g. from a different manufacturer, gives the reversed results, etc. Therefore, GL Sciences searches

for strict tests from available literatures and combined these tests for the evaluation and the quality control to inspect the total profile of the packing materials.

As one of these tests, we introduce a method developed by Prof. Tanaka's group that gives us the inclusive information relating to selectivity, i.e. hydrophobicity, steric selectivity and hydrogen-bonding capacity, by a simple chromatographic procedure. A chromatogram of Inertsil® ODS-3 is shown below as an example.

Hydrophobicity: The $\alpha(\text{CH}_2)$ describes surface coverage of the packing material

$$\alpha(\text{CH}_2) = k'(\text{n-amylnbenzene}) / k'(\text{n-butylbenzene})$$

Steric selectivity: The $\alpha(t/o)$ is determined by the functionality of silylating reagents and the surface coverage

$$\alpha(t/o) = k'(\text{triphenylene}) / k'(\text{o-terphenyl})$$

Hydrogen-bonding capacity: The $\alpha(c/p)$ divided by $\alpha(\text{CH}_2)$ illustrates the effect of hydrogen-bonding canceling the difference in the hydrophobic property

$$\alpha(c/p) / \alpha(\text{CH}_2), \alpha(c/p) = k'(\text{caffeine}) / k'(\text{phenol})$$

GL Sciences strictly controls these three parameters of reversed-phase packing materials to avoid batch deviation of the selectivity.

