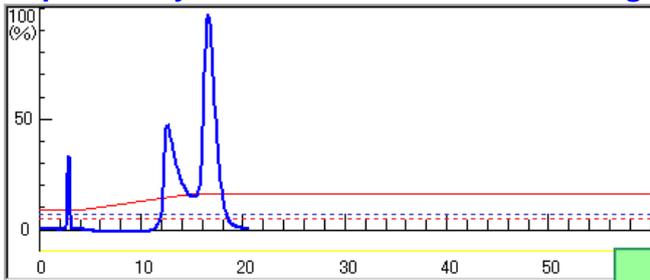


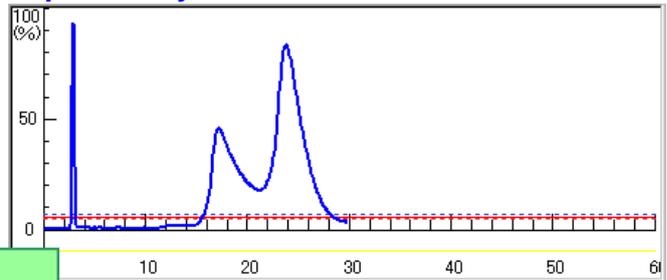
Automatic Method Setting by α -mode significantly improves sample separation performance when using highly polar solvents.

Highly polar compounds are usually difficult to separate on gradient with the use of solvents such as chloroform/methanol or ethyl acetate/methanol. Yamazen's α -mode solves this problem.

Separated by usual automatic method setting

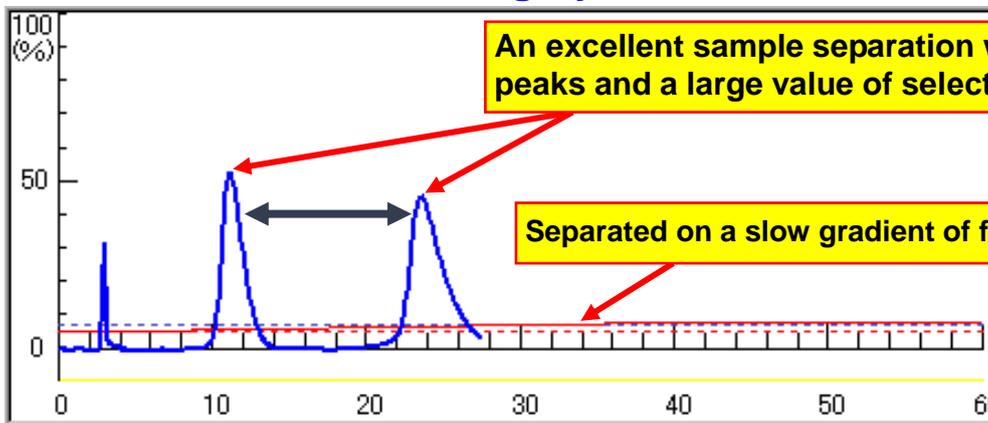


Separated by isocratic method



α -mode improves the sample separation with the use of methanol-based solvent systems.

Automatic method setting by α -mode



An excellent sample separation with sharp peaks and a large value of selectivity factor α

Separated on a slow gradient of from 3% to 6%

■ Selectivity α is given from TLC result.

(Automatically calculated by Smart Flash AKROS)



Phenomenon of the selectivity change

$\alpha_1 = 1.22$

$\alpha_2 = 2.07$

Rf = 0.50

Rf = 0.22

Rf = 0.45

Rf = 0.12

Selectivity changes.

Usually, selectivity factor α stays the same even if solvent strength changes. However, α is likely to change when highly polar solvents are used for sample separation.

α -mode is an advancement on Yamazen's Automatic Method Setting. It compares the results of TLC run twice with different solvent mixture ratio, to determine the effective range of gradient where a good sample separation will be achieved and develops the optimized gradient method automatically.

Chloroform/Methanol = 70:30

Chloroform/Methanol = 90:10

Sample separation by α -mode on slow gradient with the use of methanol-based solvent system

Theory of α -mode

■ Usual Automatic Method Setting

Generally, in silica gel chromatography, the selectivity factor α stays the same regardless of the solvent strength when the same solvent systems are used. This is true with the conventional column chromatography or flash chromatography. Thus, TLC plays a very important role to predict the separation in column chromatography as a preliminary test. The change rate of retention factor k' remains the same in relation to the change of solvent strength Bmol%. (See Fig.1). Converting this theory into numerical values, Yamazen has successfully developed the system to enable the perfect method transfer from TLC to silica gel column chromatography, which eliminates the need to rely on the chemist's past experiences, resulting in maximum resolution in sample purification and efficient chromatography as well.

■ Organic Synthetic Reaction is Monitored by TLC, then applied to Column Chromatography.

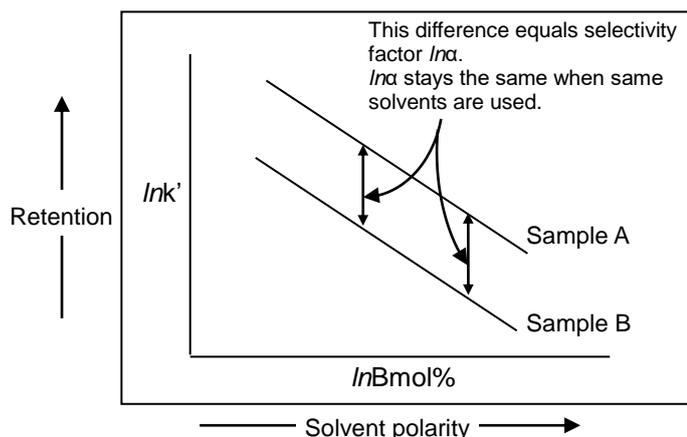
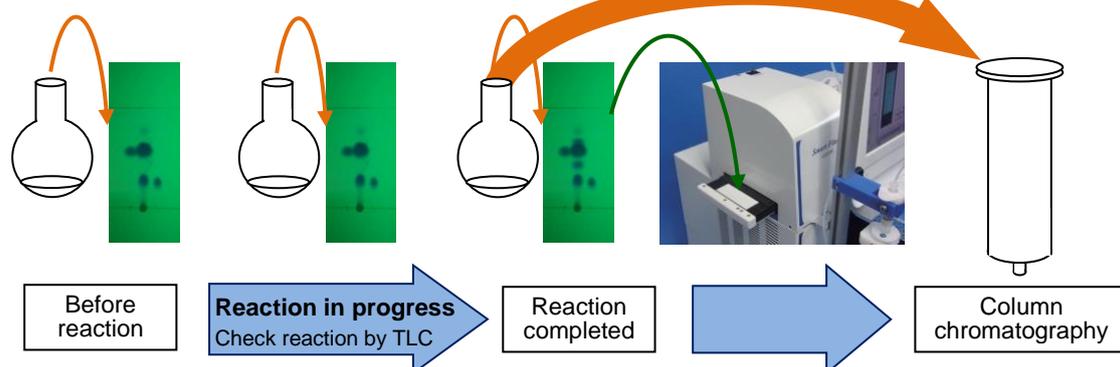


Fig.1: Relation between solvent polarity and retention in ordinary silica gel chromatography

■ Effective Gradient Pattern

Yamazen α -mode is a superb gradient method optimization that assures good separations for these samples by running the sample in the effective range of gradient where a large $\ln\alpha$ value is found even if retention factor k' changes when the solvent strength changes with the use of such solvent systems as chloroform/methanol or ethyl acetate/methanol.

A change of $\ln\alpha$ is calculated by running TLC twice. Yamazen has successfully designed the α -mode gradient pattern which achieves the best sample separations with a large value of $\ln\alpha$.

■ Samples whose selectivity factor changes

For most cases in silica gel column chromatography, good method settings can be automatically made based on this theory by using the parameters obtained from TLC results. However, there is an exception; there are such samples whose selectivity factor α changes when solvent strength changes, which causes a failure in sample separation, if such solvents as chloroform/methanol or ethyl acetate/methanol are used. Yamazen has found that there is an area of $\ln\alpha$ where those samples can be well separated. (See Fig. 2).

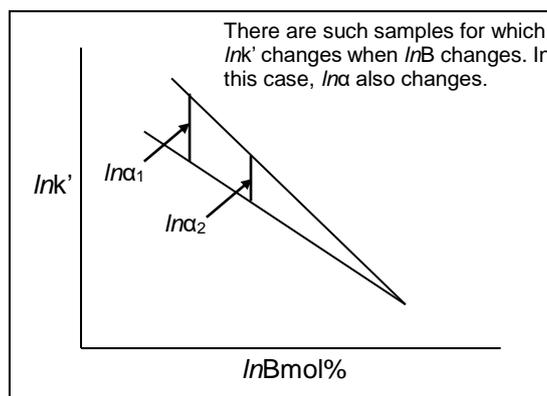


Fig. 2: Relation between the change of solvent polarity and the change of retention when methanol-based solvent systems are used



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