CAPCELL PAK CR

CR...Strong Cation Exchange & Reversed Phase

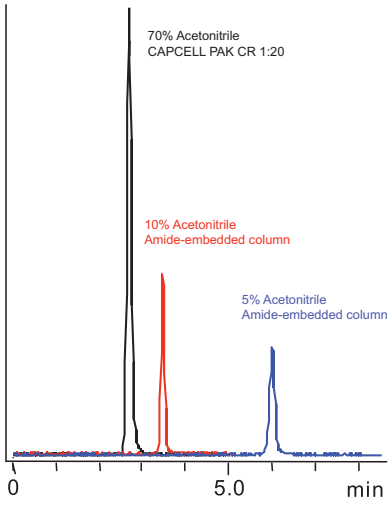
As a method to improve the sensitivity of basic drugs and their metabolites in LC-MS, Shiseido has developed a unique stationary phase.

The new product, "CAPCELL PAK CR," is a single column in which SCX and C_{18} are mixed inside. The CR column is available with different mixing ratios that were not possible to obtain by connecting two columns; SCX:C_{18} = 1:50, 1:20 and 1:4. Simply choose the optimum column that best suits your separation.

They are intended to elute basic compounds possessing a certain level of hydrophobicity under a mobile phase with a higher organic content than that for C_{18} phases, for obtaining a higher sensitivity in LC-MS, or simply to obtain an altered separation selectivity.

Sensivity increase in LC-MS

When a very hydrophilic and basic compound is to be analyzed in LC-MS, the choice of mobile phase may not be straightforward. An acidity and a large organic content are preferred to obtain a good ionization efficiency (sensitivity), while an organic content is limited in order to keep an adequate retention on reversed phase. CAPCELL PAK CR makes it possible to use a large organic content in a mobile phase for hydrophilic compounds, such as procain, while only a very small organic content is allowed even for an amide-embedded column, a column considered suitable for such polar compounds.

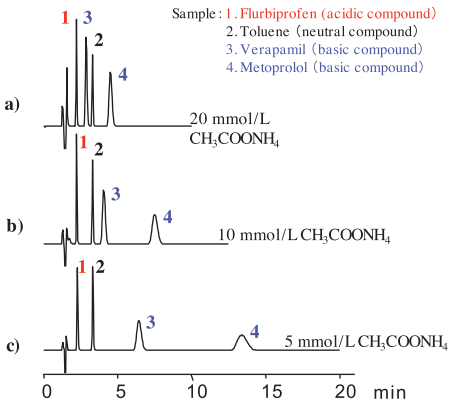


Conditions

Column	: Black : CAPCELL PAK CR 1 : 20 2.0 mm i.d. x 150 mm
	Red and blue : Amide-embedded column 2.1 mm i.d. x 150 mm
Mobile phase	: A) 10 mmol/L $HCOONH_4$ (adjusted at pH3 with HCOOH)
	B) CH_3CN
	A / B : Black 30 / 70, Red 90 / 10, Blue 95 / 5
Flow rate	: 200 µL/min
Temp.	: 40 ˚C
Detection	: MS, ESI, Positive mode
Inj. vol.	: 2 µL
Sample	: Procaine

Simultaneous analysis of acidic/neutral/basic materials

CAPCELL PAK CR allows the analysis of not only basic compounds but the simultaneous analysis of neutral and acidic compounds. By varying the salt concentration in the mobile phase, it is also possible to independently adjust the retention of the basic compound.

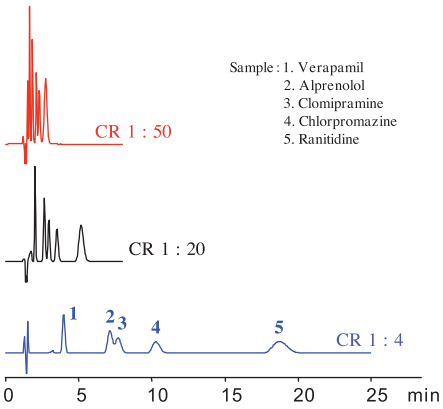


Conditions

Column	: CAPCELL PAK CR 1 : 4
Column size	: 2.0 mmi.d. x 150 mm
Mobile phase	: a) 20 mmol/L CH_3COONH_4 (adjusted at pH4.0 with CH_3COOH) / CH_3CN = 30 / 70
	b) 10 mmol/L CH_3COONH_4 (adjusted at pH4.0 with CH_3COOH) / CH_3CN = 30 / 70
	c) 5 mmol/L CH_3COONH_4 (adjusted at pH4.0 with CH_3COOH) / CH_3CN = 30 / 70
Flow rate	: 200 µL/min
Temp.	: 40 ˚C
Detection	: UV 220 nm
Inj. vol.	: 1 µL

Choice of three different ratios

Reducing run time and improving the separation profile are possible with the same mobile phase condition by choosing a different mixing ratios available in CAPCELL PAK CR.



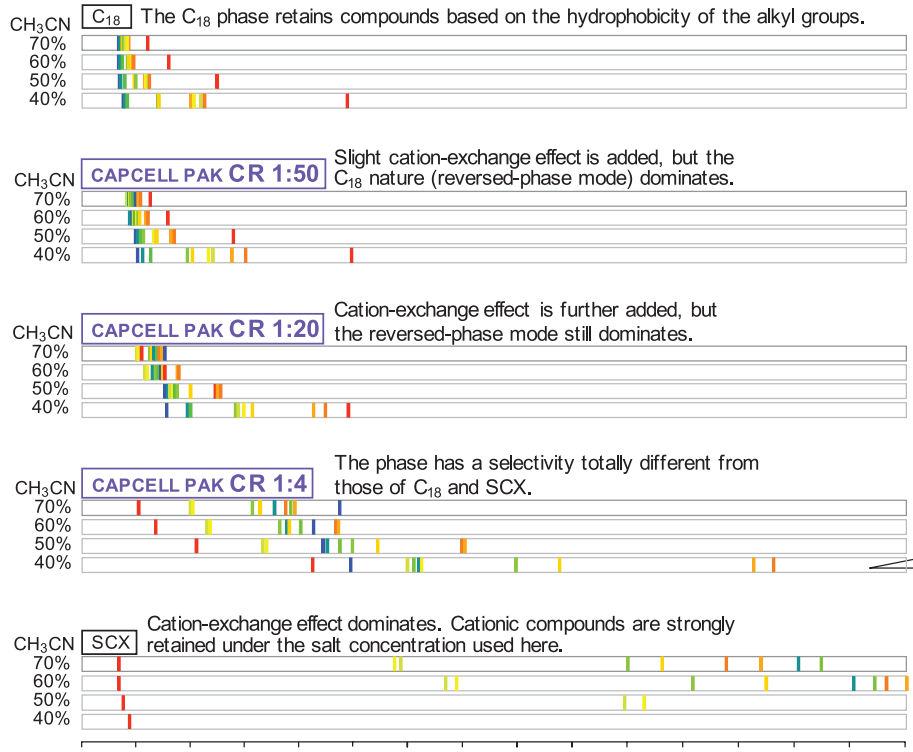
Conditions

Column	: Red : CAPCELL PAK CR 1 : 50
	Black : CAPCELL PAK CR 1 : 20
	Blue : CAPCELL PAK CR 1 : 4
Column size	: 2.0 mm i.d. x 150 mm
Mobile phase	: 10 mmol/L $HCOONH_4$ (adjusted at pH 3.0 with HCOOH) / CH_3CN = 30 / 70
Flow rate	: 200 µL/min
Temp.	: 40 ˚C
Detection	: UV 220 nm
Inj. vol.	: 2 µL
Sample	: Basic compounds 5 types

CAPCELL PAK CR -Atlas-

CAPCELL PAK C_{18}, CAPCELL PAK SCX, and three types of CAPCELL PAK CR columns were compared in the separations of ten typical basic compounds. The figures below show structure, pKa value, and change in retention time and selectivity under different mobile phases, for each compound. While CR 1:50 and CR 1:20 generally show selectivity close to those of C_{18}, CR 1:4 has selectivity totally different from those of C_{18} and SCX. It is advised to utilize the results for method developments of other basic compounds.

A. Ohkubo et al. *J. Chromatogr. A* 779 (1997) 113-122.



HPLC Conditions

Column size	: 2.0 mm i.d. x 150 mm
Mobile phase	: 10 mmol/L $HCOONH_4$ (pH3, HCOOH) / CH_3CN
Flow rate	: 200 ml/min
Temp.	: 40 ˚C
Inj. vol.	: 2mL
Sample dissolved in	: CH_3OH