Transfer Guide

from conventional column to SunShell (core-shell) column

1) Choice of column dimension. Terms: same efficiency, same theoretical plate (TP)

In case of using HPLC

C18 5 µm 250 x 4.6 mm, 20,000 plate	SunShell C18 2.6 µm 100 x 4.6 mm, 25,000 plate (UHPC) 20,000 plate (HPLC)
C18 5 µm 150 x 4.6 mm, 12,000 plate	SunShell C18 2.6 µm 75 x 4.6 mm, 15,000 plate (UHPC) 12,000 plate (HPLC) SunShell C18 2.6 µm 50 x 4.6 mm, 12,500 plate (UHPC) 10,000 plate (HPLC)
C18 3 µm 150 x 4.6 mm, 20,000 plate	SunShell C18 2.6 µm 100 x 4.6 mm, 25,000 plate (UHPC) 20,000 plate (HPLC)
C18 3 µm 100 x 4.6 mm, 13,000 plate	SunShell C18 2.6 µm 75 x 4.6 mm, 15,000 plate (UHPC) 12,000 plate (HPLC) SunShell C18 2.6 µm 50 x 4.6 mm, 12,500 plate (UHPC) 10,000 plate (HPLC)

In case of using UHPLC

C18 5 µm 250 x 4.6 mm, 20,000 plate	SunShell C18 2.6 µm 100 x 3.0 mm, 20,000 plate SunShell C18 2.6 µm 100 x 2.1 mm, 20,000 plate
C18 5 µm 150 x 4.6 mm, 12,000 plate	SunShell C18 2.6 µm 75 x 3.0 mm, 12,000 plate SunShell C18 2.6 µm 75 x 2.1 mm, 12,000 plate SunShell C18 2.6 µm 50 x 3.0 mm, 10,0000 plate SunShell C18 2.6 µm 50 x 2.1 mm, 10,0000 plate
C18 3 µm 150 x 4.6 mm, 20,000 plate	SunShell C18 2.6 µm 100 x 3.0 mm, 20,000 plate SunShell C18 2.6 µm 100 x 2.1 mm, 20,000 plate
C18 3 µm 100 x 4.6 mm, 13,000 plate	SunShell C18 2.6 µm 75 x 3.0 mm, 12,000 plate SunShell C18 2.6 µm 75 x 2.1 mm, 12,000 plate SunShell C18 2.6 µm 50 x 3.0 mm, 10,0000 plate SunShell C18 2.6 µm 50 x 2.1 mm, 10,0000 plate

2) Decision of flow rate, injection volume and gradient time program.

$$\text{Flow rate}_{\text{SunShell}} = \text{Flow rate}_{3 \text{ or } 5\ \mu m} \times \left[\frac{\text{Diameter}_{\text{SunShel}}}{\text{Diameter}_{3 \text{ or } 5\ \mu m}}\right]^2 \times \text{Coefficient (1.0 – 2.5)}$$

Terms in case of 1.0 of coefficient. (More than 1.5 of coefficient is available for all conditions.)

Molecular weight of sample		Less than 300		More than 300	
Mobile phase		Methanol/water	Acetonitrile/water	Methanol/water	Acetonitrile/water
Temperature	25°C	OK	OK	OK	OK
	40°C	OK	Avoidance	OK	OK

$$\text{Injection volume}_{\text{SunShell}} = \text{Injection volume}_{3 \text{ or } 5\ \mu m} \times \left[\frac{\text{Diameter}_{\text{SunShel}}}{\text{Diameter}_{3 \text{ or } 5\ \mu m}}\right]^2 \times \frac{\text{Length}_{\text{SunShell}}}{\text{Length}_{3 \text{ or } 5\mu\ m}}$$

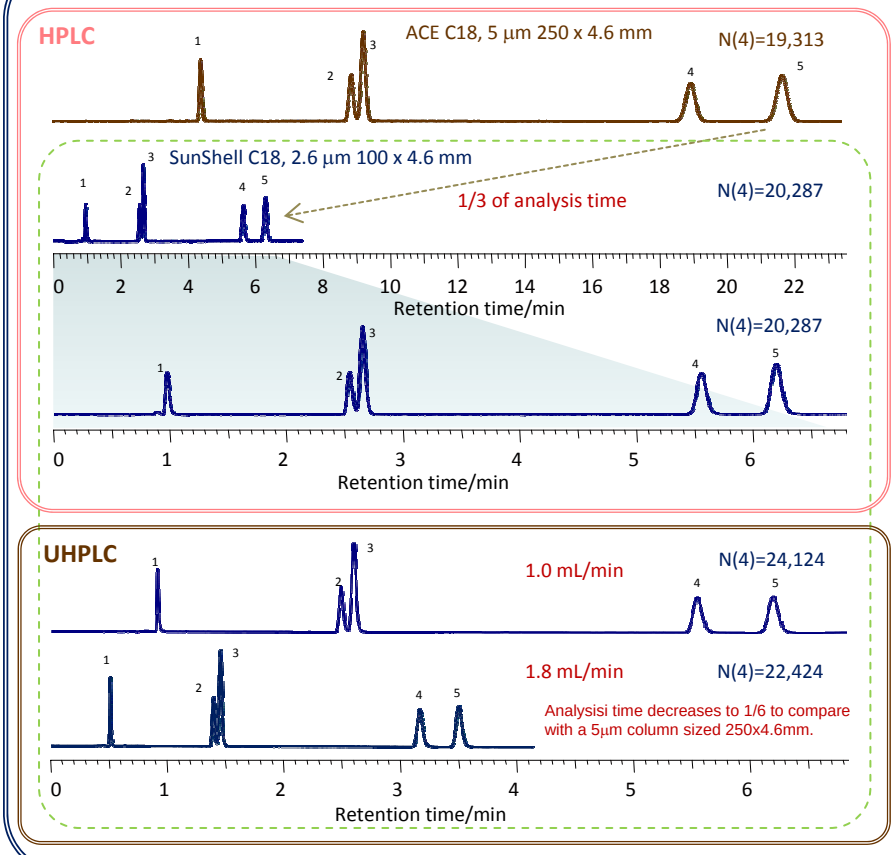
$$\text{Gradient time}_{\text{SunShell}} = \text{Gradient time}_{3 \text{ or } 5\ \mu m} \times \frac{\text{Flow rate}_{3 \text{ or } 5\ \mu m}}{\text{Flow rate}_{\text{SunShell}}} \times \left[\frac{\text{Diameter}_{\text{SunShel}}}{\text{Diameter}_{3 \text{ or } 5\ \mu m}}\right]^2 \times \frac{\text{Length}_{\text{SunShell}}}{\text{Length}_{3 \text{ or } 5\ \mu m}}$$

* HPLC system time lag of beginning gradient elution should be considered.

ChromaNik Technologies Inc.

Examples of transfer

Isocratic separation

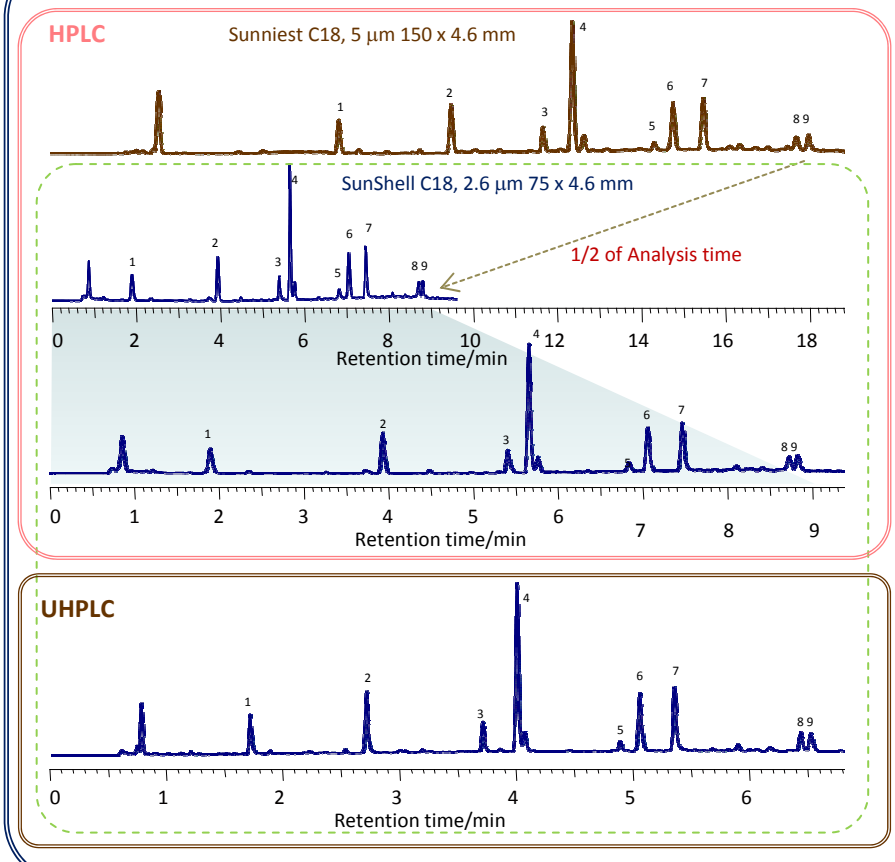


Column:
ACE C18, 5 µm 250 x 4.6 mm
SunShell C18, 2.6 µm 100 x 4.6 mm
Mobile phase:
CH_3CN/20mM Phosphoric acid = 45/55
Flow rate: 1.0 mL/min,
1.8 mL/min at the lowest chromatogram
Temperature: 25 ºC
Pressure: 9.5 MPa for Brand F C18 5 µm
13.4 MPa for SunShell C18 2.6 µm
Detection: UV@230 nm

Sample: 1 = Benzydamine
2 = Ketoprofen
3 = Naproxen
4 = Indomethacin
5 = Ibuprofen

HPLC: Hitachi LaChrom ELITE (using 0.25 mm i.d. tubing)
UHPLC: Jasco X-LC

Gradient separation



Column:
Sunniest C18, 5 µm 150 x 4.6 mm
SunShell C18, 2.6 µm 75 x 4.6 mm
Mobile phase:
A) 0.1% Phosphoric acid
B) CH_3CN
Gradient program for Sunniest C18

0 min	15 min	20 min
2%	25%	25%

for SunShell C18

0 min	7.5 min	10 min
2%	25%	25%

Flow rate: 1.0 mL/min,
Temperature: 25 ºC
Detection: UV@250 nm
Sample: Oolong tea
1 = Gallocatechin, 2 = Epigallocatechin,
3 = Catechin, 4 = Caffeine, 5 = Epicatechin,
6 = Epigallocatechin gallate, 7 = Gallocatechin gallate, 8 = Epicatechin gallate, 9 = Catechin gallate

HPLC: Hitachi LaChrom ELITE (using 0.25 mm i.d. tubing)
UHPLC: Jasco X-LC

<<Caution>>

There are difference of system time lag between HPLC and UHPLC. UHPLC has much less than system time lag than HPLC because of high pressure gradient system for UHPLC and low pressure gradient system for HPLC.

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