SHIMADZU

Nexera
Ultra High Performance Liquid Chromatograph

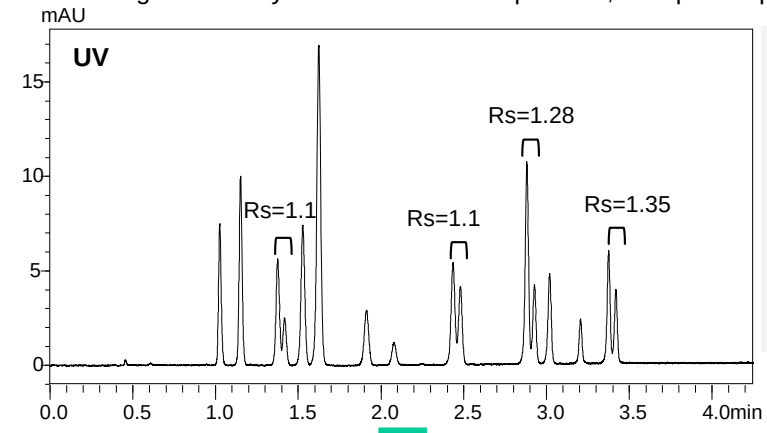
Nexera Application Data Sheet No.12

Ultra-High-Resolution Analysis of Polycyclic Aromatic Hydrocarbons

As the analysis of polycyclic aromatic hydrocarbons in the environment demands the highly efficient resolution of multiple components, long sub-2 µm columns or multiple columns are often used. Such cases demand a UHPLC system with a high system pressure tolerance. The 130 MPa pressure tolerance of the Shimadzu Nexera can safely and flexibly accommodate such demands. This Application Data Sheet introduces the ultra-high-resolution simultaneous analysis of polycyclic aromatic hydrocarbons using Nexera with two Phenomenex Kinetex columns.

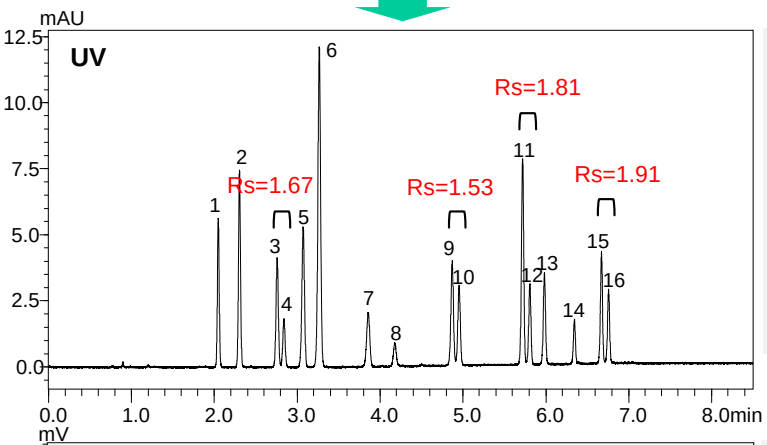
Simultaneous Analysis of 16 Polycyclic Aromatic Hydrocarbon Components

Resolution was investigated using a standard mixture of 16 polycyclic aromatic hydrocarbon components (1 to 20 mg/L, acetonitrile solution). The performance was compared for one and two Phenomenex Kinetex columns with 2.6 µm particle size. (Kinetex columns are core-shell columns with a 0.35 µm porous membrane bonded to a 1.9 µm solid core.) Connecting two columns achieved 1.5 minimum resolution for all components. The fluorescence detector achieved high sensitivity detection of all components, except Component 2.

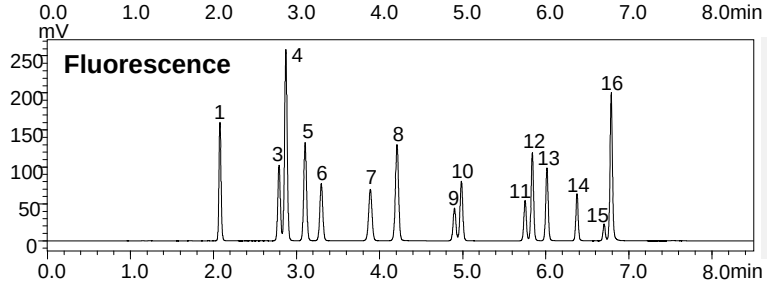


Column	: Phenomenex Kinetex 2.6 µm C18
100 Å	(100 mmL. x 4.6 mm I.D., 2.6 µm)
Mobile Phase	: A : Water/Acetonitrile=1/1
	B : Acetonitrile
Gradient	: B 42% (0-1.5 min)→85% (3-4 min)
Flow Rate	: 2.0 mL/min
Column Temp.	: 25 ℃
Injection Volume	: 5 µL
Detection	: UV 254 nm
Flow Cell	: Semi-micro cell
Pressure	: 31 MPa

Rs: resolution



Column	: Phenomenex Kinetex 2.6 µm C18
100 Å	(100 mmL. x 4.6 mm I.D., 2.6 µm) X 2
Mobile Phase	: A : Water/Acetonitrile=1/1
	B : Acetonitrile
Gradient	: B 42% (0-3 min)→85% (6-8 min)
Flow Rate	: 2.0 mL/min
Column Temp.	: 25 ℃
Injection Volume	: 5 µL
Pressure	: 53 MPa
Detection	: UV 254 nm
Flow Cell	: Semi-micro cell



Detection	: Fluorescence
	Ex. 270 nm, Em. 330 nm (Peak 1-4)
	Ex. 250 nm, Em. 370 nm (Peak 5-6)
	Ex. 330 nm, Em. 430 nm (Peak 7-8)
	Ex. 270 nm, Em. 390 nm (Peak 9-10)
	Ex. 290 nm, Em. 430 nm (Peak 11-14)
	Ex. 370 nm, Em. 460 nm (Peak 15-16)
Flow Cell	: Conventional cell

Peaks :
1. Naphthalene, 2. Acenaphthylene, 3. Fluorene, 4. Acenaphthene, 5. Phenanthrene, 6. Anthracene, 7. Fluoranthene, 8. Pyrene, 9. Chrysene, 10. Benzo(a)anthracene, 11. Benzo(b)fluoranthene, 12. Benzo(k)fluoranthene, 13. Benzo(a)pyrene, 14. Dibenz(a,h)anthracene, 15. Indeno(1,2,3-cd)pyrene, 16. Benzo(g,h,i)perylene

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