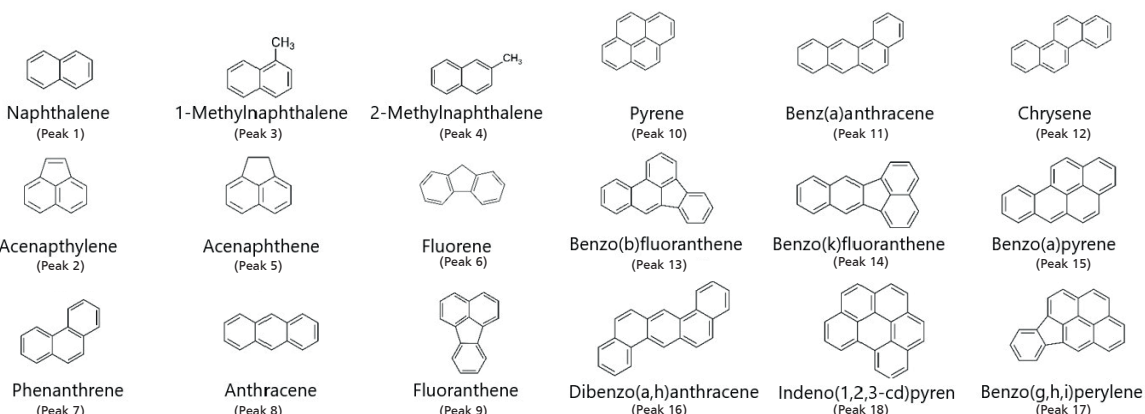


Analysis of **PAHs** with **Shim-C18-PAH**



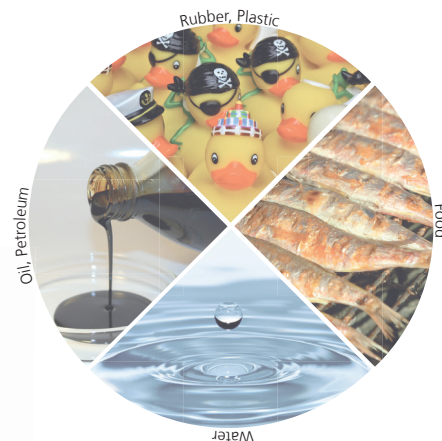
➤ Polycyclic Aromatic Hydrocarbons

Polycyclic aromatic hydrocarbons (PAHs) are a risk for the human health as many of them are carcinogenic, mutagenic and toxic for reproduction. They are also hardly degradable in the environment.^[1] Therefore, PAH analysis is crucially important. The U.S. Environmental Protection Agency (EPA)^[2] designated sixteen PAHs as "priority pollutants".^[3] Further, the PAHs are frequently monitored by the EU Scientific Committee for Food (SCF) and the European Union (EU)^[4].



➤ Shim-C18-PAH

Shim-C18-PAH is a column specially designed for the challenging PAH analysis. Shim-C18-PAH delivers perfect resolution and fast analysis for all used PAHs.



➤ PAH Analysis / Analytical Conditions

Table 1 Analytical Conditions: System parameters and gradient for PDA.

System:	Nexera X3 system
Mobile Phase A:	Water
Mobile Phase B:	Acetonitrile
Column Temperature:	40 °C
Injection volume :	1 µL
Detector :	PDA (254 nm) and Fluorescence
Sample conc.:	PDA: 2 µg/mL; Fluorescence: 10 µg/L



Nexera X3

Shim-C18-PAH; 100 mm x 4.0 mm; I.D. 3 µm P/N 961-18002		Shim-C18-PAH; 150 mm x 2.0 mm; I.D. 3 µm P/N 961-18001	
Flow rate: 2.0 mL/min		Flow rate: 0.8 mL/min	
Gradient (for PDA analysis):		Gradient (for PDA analysis):	
Time [min]	% ACN	Time [min]	% ACN
0.0	50	0.0	40
5.0	70	1.0	40
9.5	100	7.0	55
9.9	100	9.5	100
10.9	50	11.0	100
		12.0	40

› Shim-C18-PAH + Nexera X3 ‹

The perfect combination

› Fast Analysis

The analysis with the 100 x 4.0 mm ID column ends approx. after 10 minutes. The analysis with the 150 x 2.0 mm ID column ends approx. after 12 minutes.

Both chromatograms with fluorescence detection show well separated peaks with a very high intensity for the 10 ppb sample, especially compared to the PDA results.

The wavelengths shown in table 2 were adjusted to the PAHs in order to receive sufficient sensitivity for detection. Acenaphthylene (Peak 2) is not fluorescent and therefore not visible in the results with fluorescence detection.

Only 10-12 min.



› Highest Resolution and Sensitivity

The combination of the UFLC Nexera X3 system and the high-quality Shim-C18-PAH, together with best detection properties, offers a complete high-end PAH package for users. Our PAH analysis reaches the next level, offering one of the fastest PAH analysis with highest resolution and sensitivity within the market.

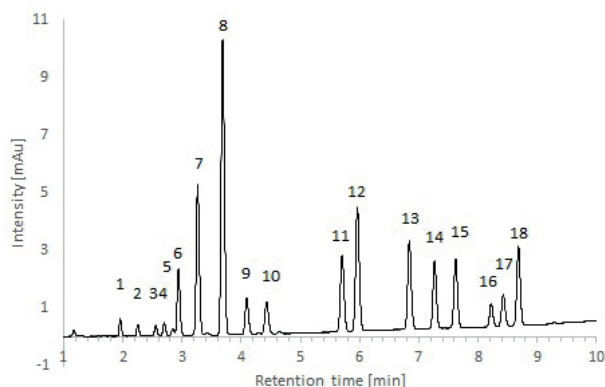


Fig. 2 Column: Shim-C18-PAH; 3 µm; 100 x 4.0, PDA detection.

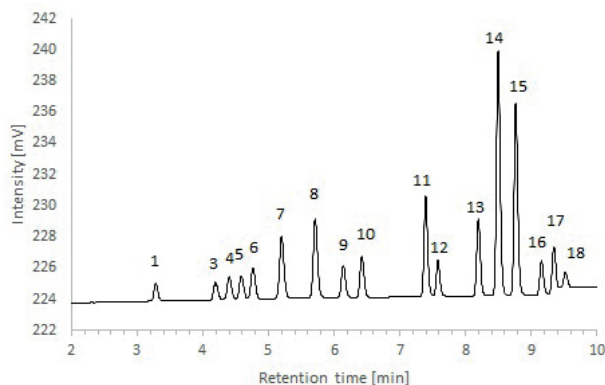


Fig. 4 Column: Shim-C18-PAH; 3 µm; 100 x 4.0, fluorescence detection.

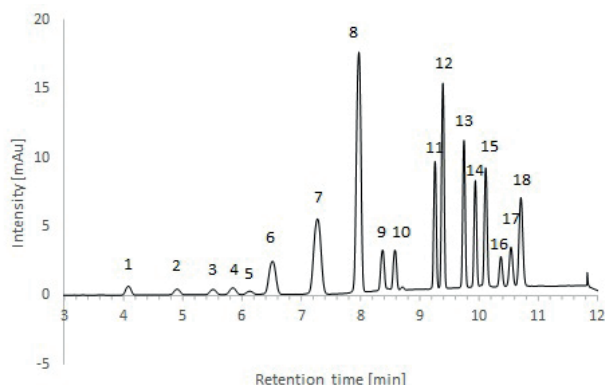


Fig. 3 Column: Shim-C18-PAH; 3 µm; 150 x 2.0, PDA detection.

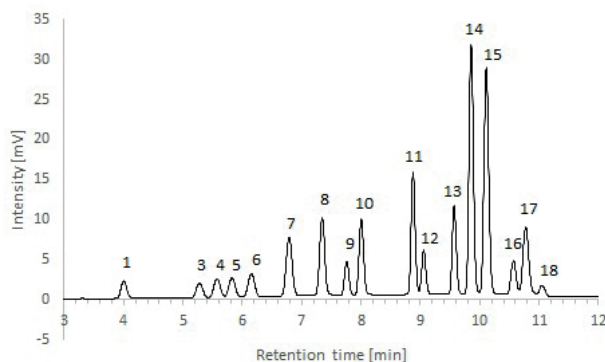


Fig. 5 Column Shim-C18-PAH; 3 µm; 150 x 2.0, fluorescence detection.

Table 2 Analytical Conditions: Gradient for fluorescence measurements.

Shim-C18-PAH 100 mm x 4.0 mm; I.D. 3 µm P/N 961-18002		Shim-C18-PAH 150 mm x 2.0 mm; I.D. 3 µm P/N 961-18001	
Time [min]	% ACN	Time [min]	% ACN
0.0	40	0.0	40
5.0	60	1.0	40
9.5	100	6.0	55
9.9	100	9.0	90
10.9	40	12.0	100
		13.0	100
		13.1	40

Time [min]	Wavelength [nm]	Time [min]	Wavelength [nm]
0.01	Ex: 260 Em: 350	0.01	Ex: 260 Em: 350
5.50	Ex: 260 Em: 420	7.07	Ex: 260 Em: 420
5.90	Ex: 285 Em: 440	7.62	Ex: 285 Em: 440
6.30	Ex: 260 Em: 420	7.84	Ex: 260 Em: 420
9.40	Ex: 305 Em: 495	10.92	Ex: 305 Em: 495

› Product Lineup

P/N	Description	Particle size	Length	I.D.
961-18002	Shim-C18-PAH	3 µm	100 mm	4.0 mm
961-18001	Shim-C18-PAH	3 µm	150 mm	2.0 mm
961-18003	Shim-C18-PAH	3 µm	150 mm	4.6 mm

Phase	C18, Octadecylsilane (ODS)
USP Code	L118
Particle Size	3 µm
Recommended Applications	PAHs (EPA) and EU Regulation (EC) No 1881/2006
Endcapping	Yes
Carbon Load	Proprietary
Pore Size	110 Å
Surface Area	340 m ² /g
pH Range	2.0 - 8.0
Max. Temperature	60° C (Phosphate buffer: 40 °C)
Max- Pressure	600 bar

References

- [1] Umweltbundesamt: PAHs,- Harmful to the environment! Toxic! Inevitable? January 2016
- [2] Appendix A to 40 CFR, Part 423–126: Priority Pollutant List 2014 (EPA)
- [3] EPA Method 610 – Polynuclear aromatic hydrocarbons (Appendix to part 136)
- [4] EU commission regulation No 1881/2006; last addition: commission regulation No 2020/1255



Get more information on Shimadzu Consumables & Accessories at www.shimadzu.eu/columns-and-consumables



Shimadzu Europa GmbH
www.shimadzu.eu

For Research Use Only. Not for use in diagnostic procedure.

This publication may contain references to products that are not available in your country. Please contact us to check the availability of these products in your country.

The content of this publication shall not be reproduced, altered or sold for any commercial purpose without the written approval of Shimadzu.

See <http://www.shimadzu.com/about/trademarks/index.html> for details.

Third party trademarks and trade names may be used in this publication to refer to either the entities or their products/services, whether or not they are used with trademark symbol "TM" or "®".

The contents of this publication are provided to you „as is“ without warranty of any kind and are subject to change without notice. Shimadzu does not assume any responsibility or liability for any damage, whether direct or indirect, relating to the use of this publication.