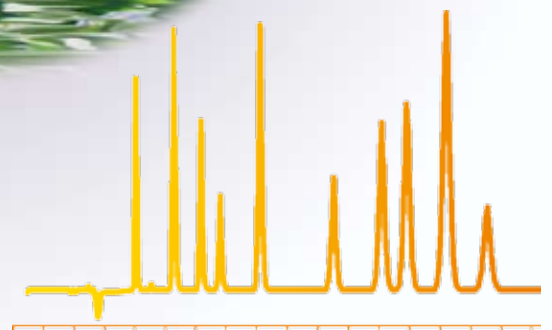


Chromatography

NUCLEODUR® C₁₈ PAH

HPLC on the fast lane



... we Meet your Needs

MACHEREY-NAGEL

www.mn-net.com





HPLC columns for environmental analyses

NUCLEODUR® C₁₈ PAH special octadecyl phase for PAH analyses

- base material NUCLEODUR® silica, particle size 3 µm, pore size 110 Å; polymeric coating · USP L1
- eluent in column acetonitrile / water 70:30
- allows efficient gradient separation of the 16 PAH according to EPA
- detection of the separated PAH by UV (250 to 280 nm), with diode array or with fluorescence detection at different wavelengths for excitation and emission (acenaphthylene cannot be analysed with fluorescence detection)

- ✓ Fastest separation of 16 EPA-PAHs in less than 3 min
- ✓ Distinct resolution due to high sterical selectivity
- ✓ Highest stability and reproducibility
- ✓ Cost, time and solvent efficiency

Analysis of 16 EPA PAHs with or without acetonitrile

Separation with acetonitrile

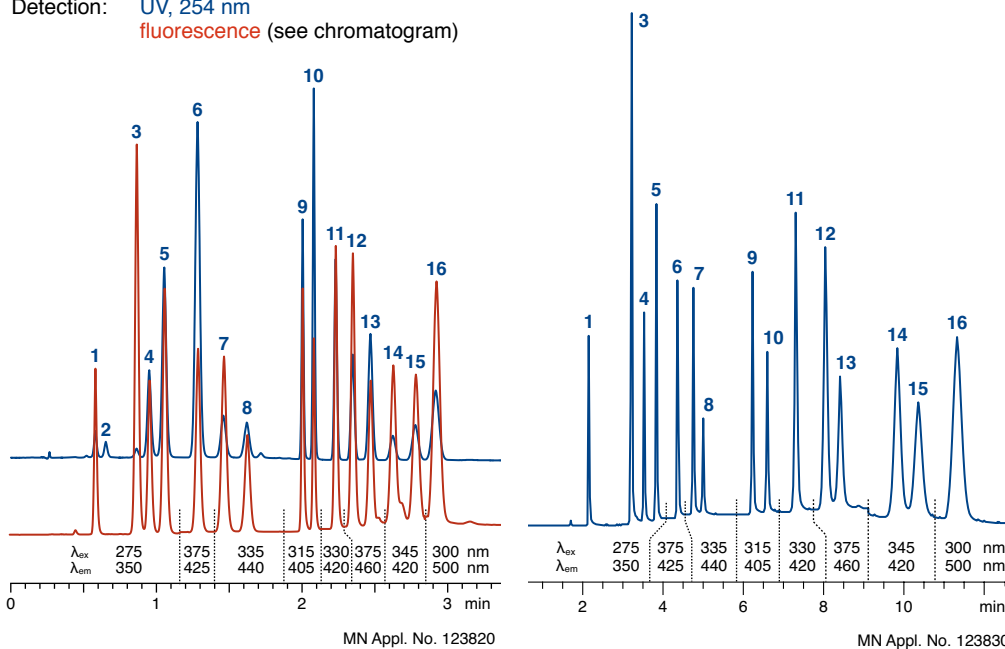
Colum: 100 x 4 mm NUCLEODUR® C₁₈ PAH, 3 µm
 Eluents: A) methanol – water (80:20, v/v)
 B) acetonitrile
 Gradient: 2 – 20 % B in 1.2 min, 20 – 100 % B in 0.5 min, 100 % B for 2.5 min, 100 – 2 % B in 0.4 min
 Flow rate: 2.5 ml/min
 Temperature: 35 °C
 Detection: UV, 254 nm
 fluorescence (see chromatogram)

Separation without acetonitrile

Colum: 125 x 4 mm NUCLEODUR® C₁₈ PAH, 3 µm
 Eluents: A) water
 B) methanol
 Gradient: 65 – 97 % B in 6 min, 97 % B for 5 min, 97 – 65 % B in 0.5 min
 Flow rate: 2 ml/min
 Temperature: 35 °C
 Detection: fluorescence (see chromatogram)

Peaks:

- Naphthalene
- Acenaphthylene (not detectable by fluorescence)
- Acenaphthene
- Fluorene
- Phenanthrene
- Anthracene
- Fluoranthene
- Pyrene
- Benz[a]anthracene
- Chrysene
- Benzo[b]fluoranthene
- Benzo[k]fluoranthene
- Benzo[a]pyrene
- Dibenz[ah]anthracene
- Benzo[ghi]perylene
- Indeno[1,2,3-cd]pyrene

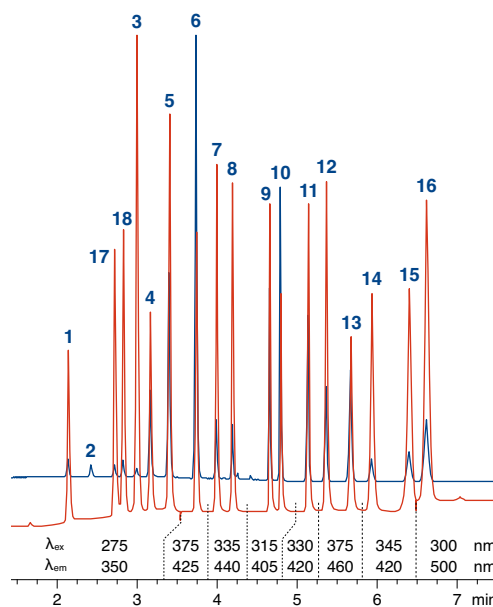




Separation of 18 PAHs on NUCLEODUR® C₁₈ PAH

Column: 125 x 4 mm
 NUCLEODUR® C₁₈ PAH,
 3 µm
Eluents: A) methanol – water
 (70:30, v/v)
 B) acetonitrile
Gradient: 0 – 20 % B in 1.5 min,
 20 – 50 % B in 1.5 min,
 50 – 100 % B in 1.0 min,
 100 % B for 3 min,
 100 – 0 % B in 0.5 min
Flow rate: 1.5 ml/min
Temperature: 35 °C
Inj. volumes: UV: 1 µl,
 fluorescence: 0.5 µl
Detection: UV, 254 nm
 fluorescence
 (see chromatogram)

Peaks:
 (concentrations 10 ng/µl per compound)
 1. – 16. see opposite page
 17. 1-methylnaphthalene
 18. 2-methylnaphthalene



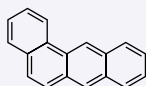
MN Appl. No. 123840

More application examples at www.mn-net.com/apps

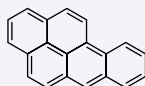
Background: Analysis of polycyclic aromatic hydrocarbons (PAHs) by HPLC

Polycyclic aromatic hydrocarbons (PAHs)

- fused aromatic rings without heteroatoms or substituents
- (suspected) carcinogenic, mutagenic and teratogenic pollutants
- natural components of coal or gas – delivered to environment by pyrolysis (incomplete burning) of organic materials like coal, oil, fuel, wood, tobacco, ... mostly by from anthropogenic processes
- found in food, water and soil
- past pollutions by production of coke and gas from black coal often origin of serious ground water pollutions
- governmental regulations in many countries (e.g. EPA method 610 of the United States Environmental Protection Agency; or German drinking water specification (TVO) / German Standard DIN 38 409)
- determination by different chromatographic techniques possible (TLC, GC, HPLC)



benz[a]anthracene



benzo[a]pyrene

HPLC columns for PAH analysis

For analyses of PAHs we have developed a specially modified C₁₈ phase based on NUCLEODUR® which allows efficient gradient separation of 16 PAHs according to EPA. Detection of the separated PAHs can be achieved by UV (250 to 280 nm), with diode array or with fluorescence detection at different wavelengths for excitation and emission. (*Please note:* acenaphthylene cannot be analysed with fluorescence detection.) For cost-effective routine PAH analysis we recommend applications using methanol instead of acetonitrile as eluent. For rapid analysis NUCLEODUR® C₁₈ PAH (3 µm) in short columns provides excellent results at high flow rates. Hereby separation of 16 PAHs according to EPA can be achieved in less than 3 minutes.


New regulations require determination of 2 additional PAHs (1- and 2-Methylnaphthalene) – so we developed highly efficient methods for 18 PAHs on the new NUCLEODUR® C₁₈ PAH.

References

Determination of PASH in Diesel fuel by HPLC and photodiode-array detection; J. Bunot, W. Herbel, H. Steinhart, J. High Res. Chrom. 15 (1992) 682 – 685
 GIT Spezial Chromat. 2 (1992) 80 – 85

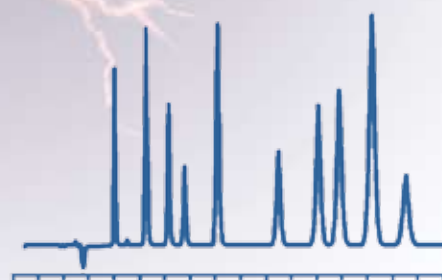


Ordering information

Length →	100 mm	125 mm	150 mm	250 mm	Guard columns
NUCLEODUR® C₁₈ PAH, 3 µm					
EC columns					
	3 mm ID	760783.30	760784.30	760785.30	760786.30
	4 mm ID	760783.40	760784.40	760785.40	760786.40
PAH standard according to EPA for HPLC					
PAH standard for HPLC	16 PAH according to EPA method 610 in acetonitrile (1mL) for composition see chromatograms				722393

As guard columns for EC columns use ChromCart® guard column cartridges with guard column adaptor EC (REF 721359).
8 mm ChromCart® guard column cartridges in packs of 3, EC columns in packs of 1.

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