

Simultaneous Dual Wavelength Detection of Polycyclic Aromatic Hydrocarbons by Fluorescence Detector FP-4020

Introduction

Polycyclic aromatic hydrocarbon (PAHs) which consists of condensed aromatics are produced by the incomplete combustion of carbon-containing materials such as diesel oil and coal. Some PAHs are known to be carcinogenic, so the detection and quantitative determination of environmental PAHs is important.

In this application note, the analysis of 15 PAHs is carried out using the simultaneous Dual Wavelength Detection function of the FP-4020 fluorescence detector.

Keyword: UHPLC, polyaromatic hydrocarbons, PAH, ZORBAX Eclipse PAH, FP-4020, Semi-micro Cell, fluorescence detection

Experimental Condition

Column: ZORBAX Eclipse PAH
(2.1 mm I.D. x 50 mmL, 1.8 mm)

Eluent: A: Water, B: Acetonitrile
A/B: 60/40 (0 min) → 32/68 (3.7 min)
→ 0/100 (6 min) → 0/100 (8.2 min)
→ 60/40 (8.3 min)

Flow rate: 0.6 mL/min

Column temp.: 30 °C

Wave length: Time Program (see Table 1)

Injection volume: 1 μL

Standard: PAH Calibration Mix 200 ppb in
Dichloromethane/Methanol (1:1)

Table 1 Time program of simultaneous dual wavelength detection

Time (min)	CH1		CH2	
	Ex1 (nm)	Em1 (nm)	Ex2 (nm)	Em2 (nm)
0.0	280	330	280	340
2.5	220	315	266	310
3.25	244	360	250	360
3.6	244	360	250	402
3.95	250	420	336	392
4.8	270	400	277	376
5.7	255	420	277	376
5.9	262	408	295	410
6.35	290	500	295	410
11	280	330	280	340

Results

Figure 1 shows chromatogram of 15 components PAHs.

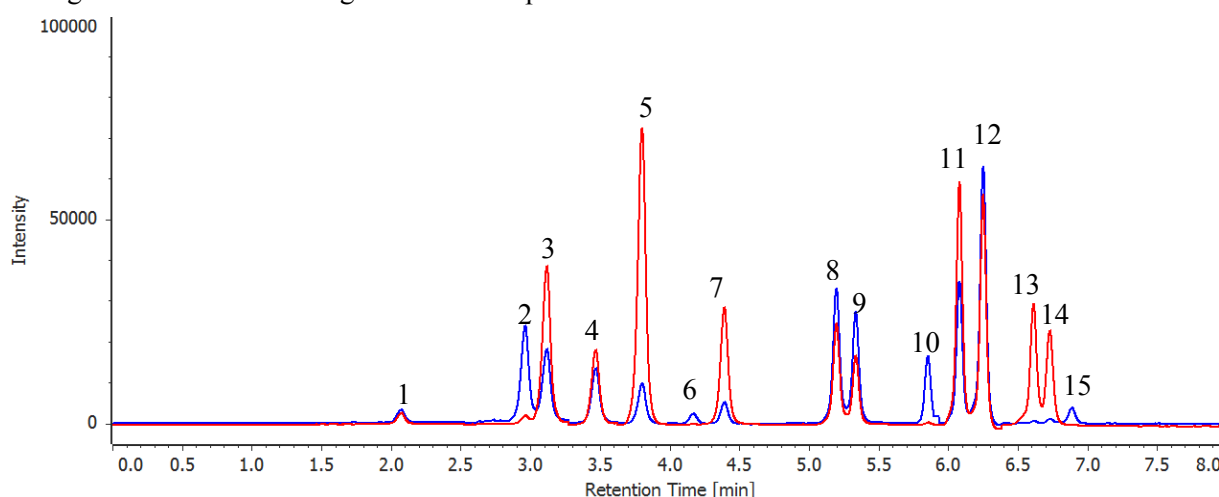


Fig. 1 Chromatogram of 15 components in PAH standard mixture. (red: CH1, blue: CH2)

1: Naphthalene, 2: Acenaphthene, 3: Fluorene, 4: Phenanthrene, 5: Anthracene, 6: Fluoranthene, 7: Pyrene, 8: Benzo[a]anthracene, 9: Chrysene, 10: Benzo[b]fluoranthene, 11: Benzo[k]fluoranthene, 12: Benzo[a]pyrene, 13: Dibenzo[a,h]anthracene, 14: Benzo[g,h,i]perylene, 15: Indeno[1,2,3-c,d]pyrene