SHIMADZU
Excellence in Science

Application Data Sheet

No. AD-0058

Nexera X2- UHPLC

Ultra High Sensitivity of New Generation Photodiode Array Detector: SPD-M30A

The new generation photodiode array detector SPD-M30A of Shimadzu Nexera X2 UHPLC achieves next levels of sensitivity and peak resolution due to adoption of a number of new techniques such as extra small-volume capillary cell, optimized cell structure design, high intensity D2 lamp and new electrical design. The SR-Cell (standard) with 10 mm optical path length and a very small cell volume (1 uL) minimizes peak dispersion. As a result, greater signal intensity and reduced peak width are achieved. The detector is ideal for ultra high speed (200 Hz), high sensitivity and high resolution UHPLC analysis. This data sheet demonstrates the improved performance of SPD-M30A for anthracene analysis on Nexera SR in comparison with SPD-M20A.

❑ Analysis Conditions

Table 1A: Experimental conditions

System	Nexera SR
Mobile Phase	ACN/Water (70/30)
Column	XR-ODSIII 50x2 mm, 1.6 µm
Flow Rate	0.4 mL/min
Detection wavelength	250 nm
Slit width	8 nm
Cell temperature	40 ºC
Injection Volume	5 µL

Table 1B: Types of PDA detectors

Detector:	SPD-M30A	SPD-M20A
PDA elements	1024	512
Cell i.d.	0.36 mm	1 mm
Path length	10 mm	10 mm
Cell volume	1 µL	10 µL

❑ Results of Anthracene Chromatograms

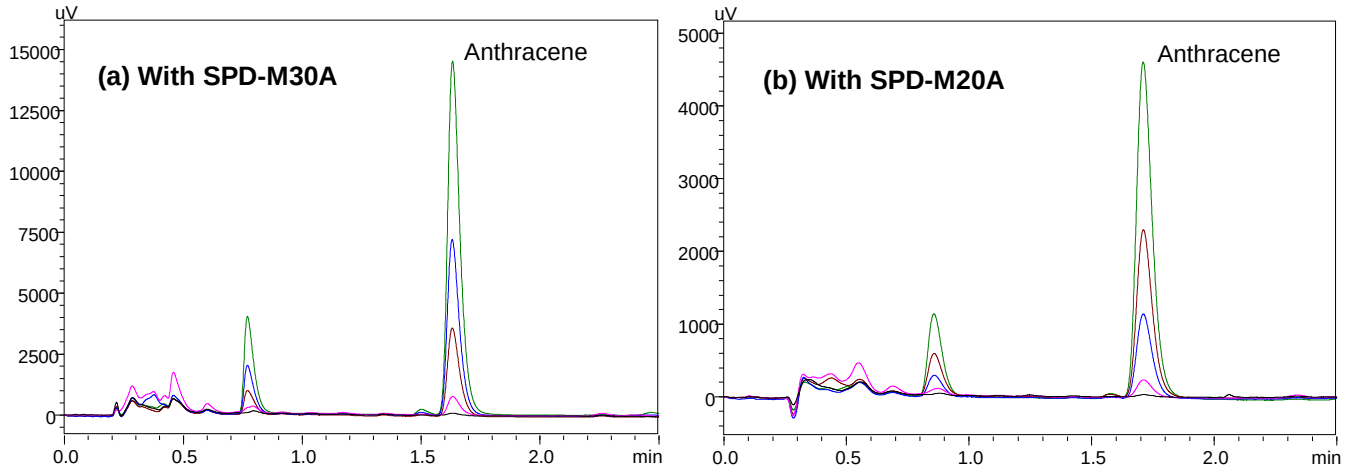

Fig 1: Chromatograms of anthracene standard samples using different PDA detectors. Sample Conc.: 1, 10, 50, 100 and 200 ng/mL (ppb).

❑ Sensitivity and Resolution

Table 2: Sensitivity (peak intensity) and peak width of SPD-M30A with SPD-M20A, anthracene 10 ng/mL

	SPD-M30A	SPD-M20A	Numerical ratio (SPD-M30A / SPD-M20A)
Peak intensity (µV)	731	231	3.2
Peak width at 50% (min)	0.056	0.070	0.80
Peak width at 10% (min)	0.110	0.134	0.82

Notes: SPD-M30A SR-cell, ID = 0.36mm, optical path length = 10mm, volume = 1.0 µL
SPD-M20A standard cell, ID = 1.0mm, optical path length = 10mm, volume = 10 µL

❑ Calibration curves

Calibration curves of five levels were established using anthracene std : 1, 10, 50, 100 and 200 ng/mL (ppb).

Fig 2: Calibration curves of anthracene std with SPD-M30A and SPD-M20A

❑ Repeatability

Repeatability test was performed by injecting anthracene standard 10 ng/mL six times (n=6), with 5 µL injection volume.

Table 3: Repeatability comparison of SPD-M30A with SPD-M20A, 10 ng/mL

	SPD-M30A		SPD-M20A	
	Ret. time	Peak area	Ret. time	Peak area
RSD (%)	0.052	1.43	0.041	1.23

❑ Summary

- By comparing peak intensity of anthracene, the sensitivity of SPD-M30A is 3.2 times higher than SPD-M20A.
- The peak width (at 50% peak height) of anthracene on SPD-M30A decreases 20% comparing to that of SPD-M20A due to the smaller volume of the SR-cell (1 µL).

SHIMADZU
Excellence in Science

SHIMADZU (Asia Pacific) Pte. Ltd
79 Science Park Drive, #02-01/08, Cintech IV, Singapore 118264
www.shimadzu.com.sg
Tel: +65-6778 6280 Fax: +65-6778 2050