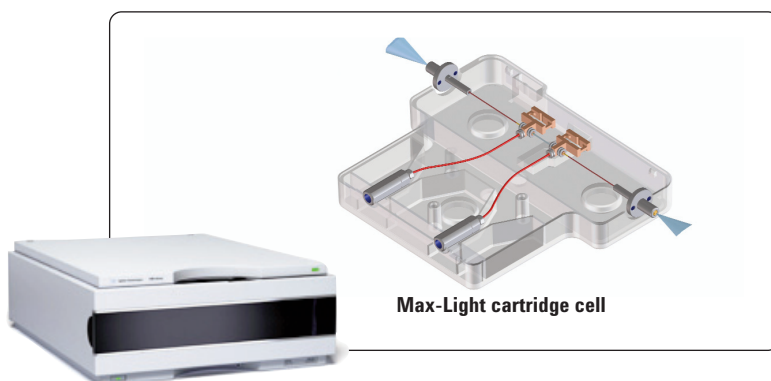


10 x more sensitivity with the Agilent 1290/1260 Infinity Diode Array Detector compared to Agilent 1200 Series UV Detectors

Technical Note



Introduction

The sensitivity of ultraviolet (UV) detectors is the most important factor for many analytical challenges. With the Agilent 1290/1260 Infinity Diode Array Detector (DAD), which incorporates the new Agilent Max-Light cartridge cell, it is now possible to increase sensitivity to more than ten times that of the Agilent 1200 Series UV detectors. This significant sensitivity increase simplifies sample preparation methods because small samples are needed for extraction and cleanup. In addition, lower levels of impurities such as genotoxins can be detected, in preparation for the possibility of more stringent regulatory requirements in the future.



Agilent Technologies

New optical design

The Agilent 1290/1260 Infinity Diode Array Detector features a completely new optical design based on the Agilent Max-Light cartridge cell with optofluidic waveguides. This new cell technology uses the principle of total internal reflection along a noncoated fused silica capillary to increase the light transmission. Use of this technology achieves a new level of sensitivity without the decreased resolution that can be caused by cell dispersion effects. Furthermore, this flow cell design minimizes baseline perturbations caused by the refractive index variations within the cell that are generated by gradient analysis, temperature variations or solvent composition inhomogeneities. The stable baseline results in a more reliable integration of the peak areas.

Two types of Max-Light cartridge flow cells are available:

- 10 mm path length Max-Light cartridge cell (dispersion volume $\sigma_V = 1 \mu\text{L}$) provides high sensitivity and universal applicability for all analytical column dimensions from 2.1 to 4.6 mm inner diameters (detector noise: $< \pm 3 \mu\text{AU/cm}$)
- 60 mm path length Agilent Max-Light high sensitivity cartridge cell (dispersion volume $\sigma_V = 4 \mu\text{L}$) for ultra sensitivity (typical detector noise level: $< \pm 0.6 \mu\text{AU/cm}$)

Agilent 1290/1260 Infinity DAD compared to Agilent 1200 Series DAD SL

The experiments were performed on the Agilent 1200 Series Quaternary LC system. A conventional 150 mm \times 4.6 mm column was used. The detector settings such as data rate, and slit width were set to the same values for both detectors. However, the path length of the cells were different. The Max-Light cartridge cell had a path length of 60 mm and the Agilent 1200 Series DAD SL cell had a path length of 10 mm (Figure 2). The results are combined and shown in Table 1.

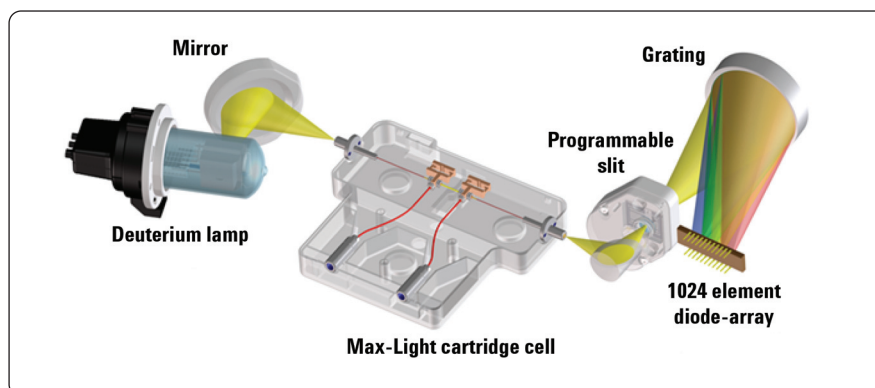


Figure 1
Design of the Agilent 1290/1260 Infinity DAD.

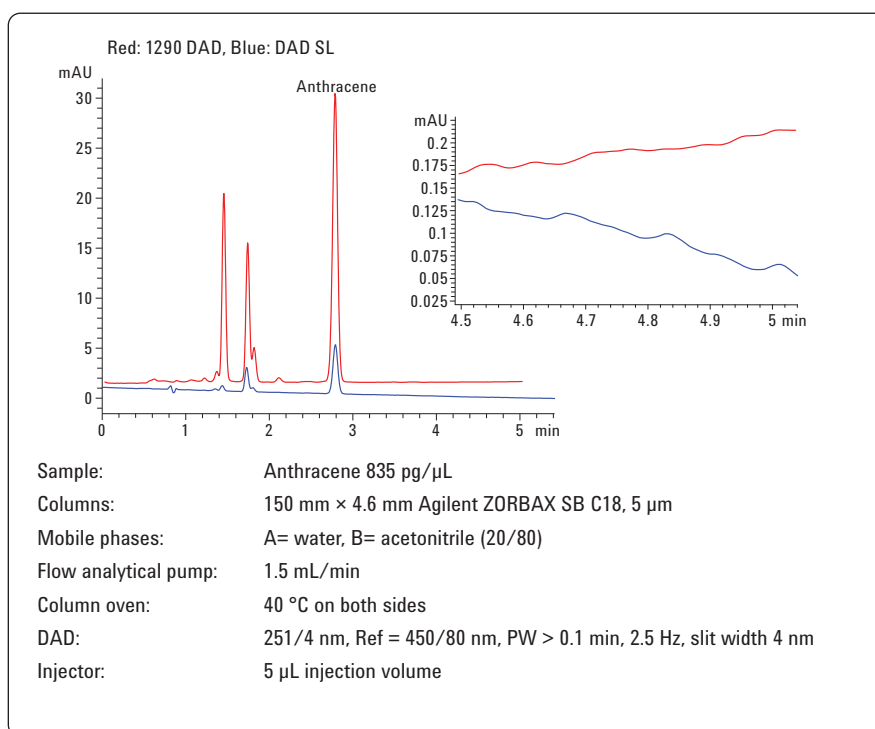


Figure 2
Agilent 1290/1260 DAD 60 mm cell vs Agilent 1200 Series DAD SL 10 mm cell. The signal-to-noise is 11.4 times better on the Agilent 1290-1260 Infinity DAD.

	Agilent 1290/1260 Infinity DAD 60 mm	Agilent 1200 Series DAD SL 10 mm
Height	28.87579	4.93845 mAU
Noise (ptop)	0.009806	0.01908 mAU
Signal/ noise	2944	259
Factor	+11.4	

Table 1
Performance comparison of Agilent 1290/1260 Infinity DAD vs Agilent 1200 Series DAD SL.

Agilent 1290/1260 Infinity DAD compared to Agilent 1200 Series VWD A/B

In a second experiment the Agilent 1200 Series Variable Wavelength Detector (VWD) A/B was compared to the Agilent 1290/1260 Infinity DAD. The same chromatographic conditions were applied (Figure 2). The VWD standard cell was also used with a 10 mm path length (Figure 3).

Conclusion

More than 10 times higher sensitivity can be obtained using the Agilent 1290/1260 Infinity DAD with the 60 mm path length cell compared to the Agilent 1200 Series DAD SL and Agilent 1200 Series VWD A/B using conventional conditions.

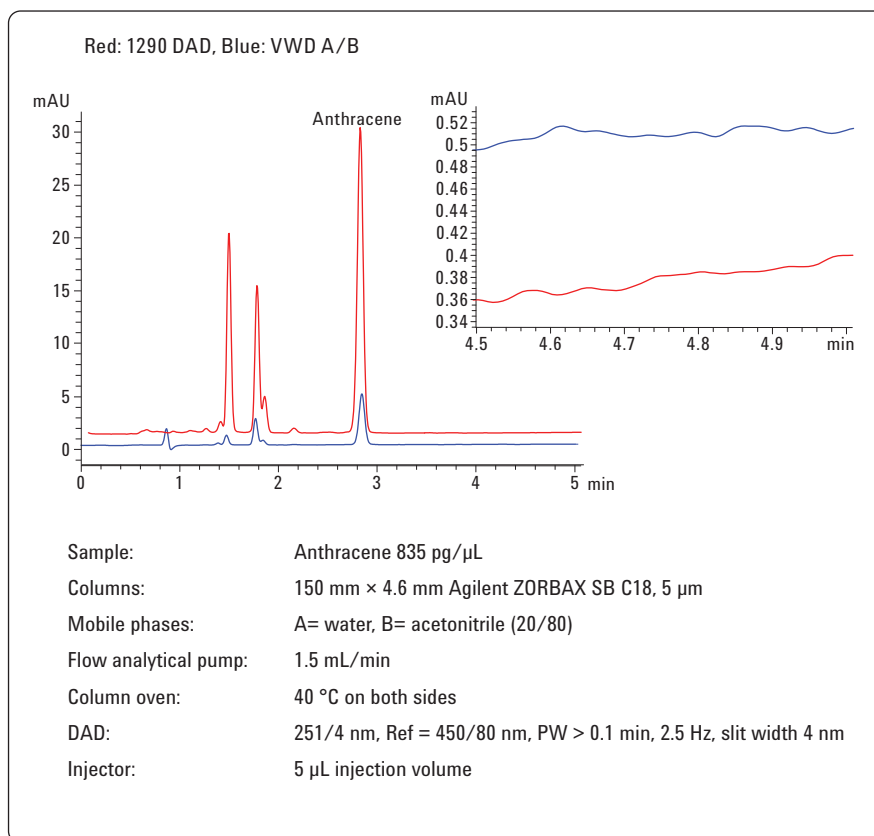


Figure 3. Agilent 1290/1260 Infinity DAD 60 mm cell vs. Agilent 1200 Series VWD A/B 10 mm cell. The Agilent 1290/1260 Infinity DAD shows a 11.6 times higher sensitivity.

	Agilent 1290 Infinity DAD 60 mm	Agilent 1200 Series VWD A/B 10 mm
Height	28.87579	4.79998 mAU
Noise (ptop)	0.009806	0.01894 mAU
Signal/ noise	2944	253
Factor	+11.6	

Table 2
 Performance comparison of Agilent 1290/1260
 Infinity DAD vs Agilent 1200 Series VWD A/B.

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