

# Performance Note

## Limit of detection obtained with standard Prominence HPLC system under Analytical conditions

Demonstration of System Sensitivity by determination of the detection limit for a 10 pg/μl Anthracene standard.

Minimised baseline noise and excellent baseline stability are determining the system performance in terms of sensitivity. Low noise and drift are very important, especially when compounds at trace levels have to be analyzed. Stable solvent delivery of the Prominence HPLC pumps in combination with the small noise and drift of the Prominence UV detectors and PDA as well as precise system temperature control are the main factors which affect these performance characteristics.

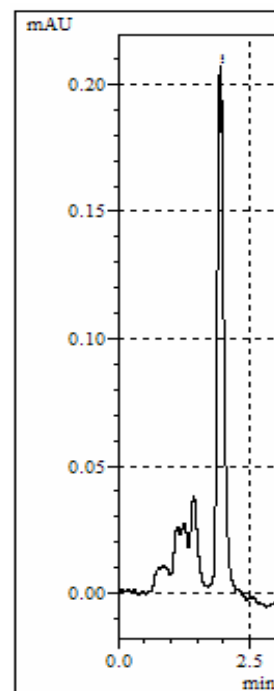
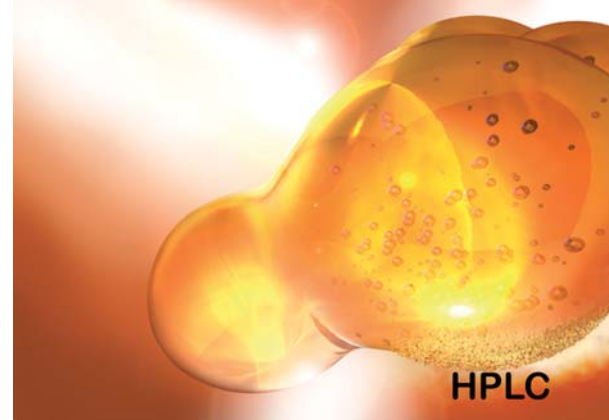
To demonstrate Prominence HPLC is the right choice, sensitivity examination was done on a system with the following components:

Degassing Unit: DGU-20A3  
Solvent Delivery Pump: LC-20AT  
Sample Injector: SIL-20AC  
Column Oven: CTO-20AC  
UV/Vis Detector: SPD-20A  
Photo Diode Array Detector: SPD-M20A

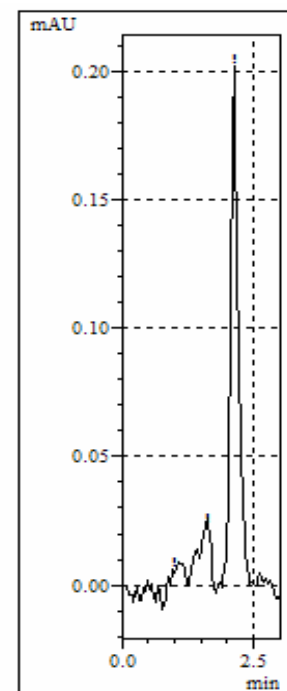
The following chromatographic conditions have been used to determine the detection limit for Anthracene, which is shown on the Chromatograms on the right side.

Sample: Anthracene 10 pg/μl in ACN/Water  
Mobile Phase: Acetonitrile/Water (80/20)  
Column: ODS Hypersil 2,1 x100 mm, 5 μm

Flow Rate: 0,3 ml/min  
Oven Temperature: 36 °C  
UV Det. Wavelength: 251 nm  
UV Det. Cell Temperature: 36 °C  
PDA Wavelength: 251 nm  
PDA Slit Width: 1,2 nm  
PDA Cell Temperature: 36 °C  
Injection Volume: 0,5 μl



SPD-20A trace



SPD-M20A trace

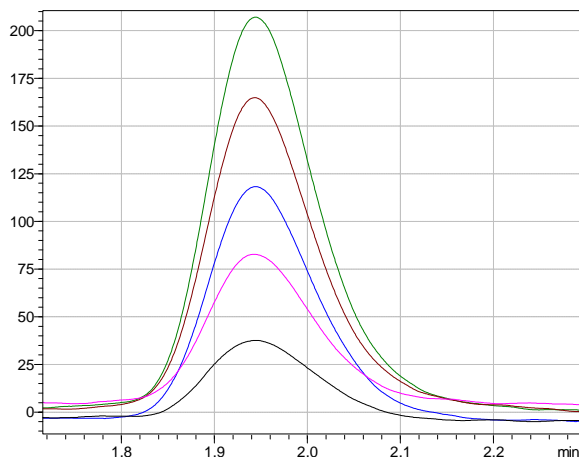
### Result

With a standard Prominence System it is possible to achieve a detection limit (S/N > 3,3) for Anthracene of 229 fg on SPD-20A, while an LOD of 634 fg can be achieved using the SPD-M20A.

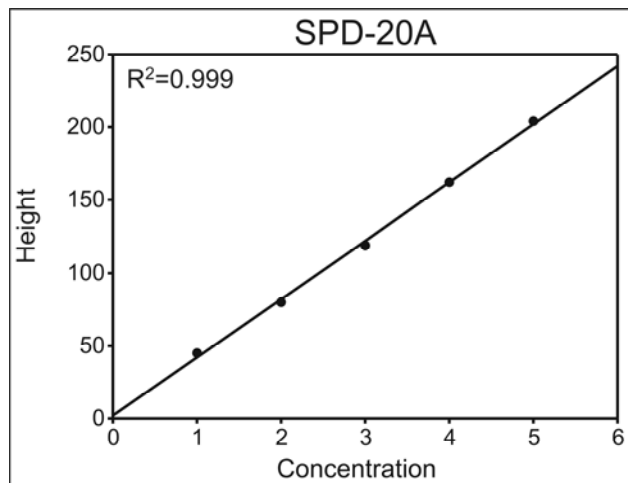
## Further Examinations

A 5-level calibration curve has been generated by injecting the following injection volumes of the 10 pg/ $\mu$ l Anthracene Standard:

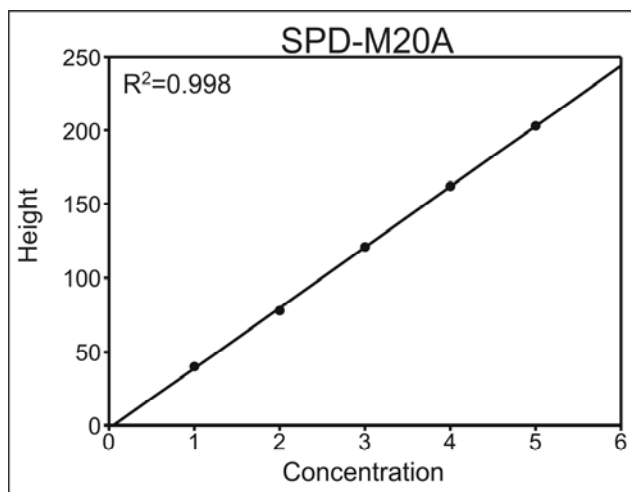
- 0,1  $\mu$ l (equivalent to 1 pg) > Level 1
- 0,2  $\mu$ l (equivalent to 2 pg) > Level 2
- 0,3  $\mu$ l (equivalent to 3 pg) > Level 3
- 0,4  $\mu$ l (equivalent to 4 pg) > Level 4
- 0,5  $\mu$ l (equivalent to 5 pg) > Level 5



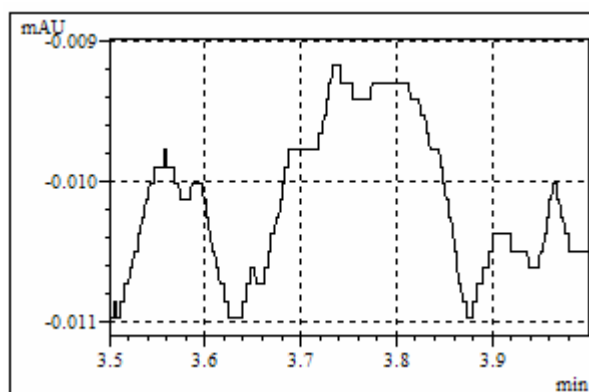
Peak overlay from 5 injections (range: 0,1 – 0,5  $\mu$ l)



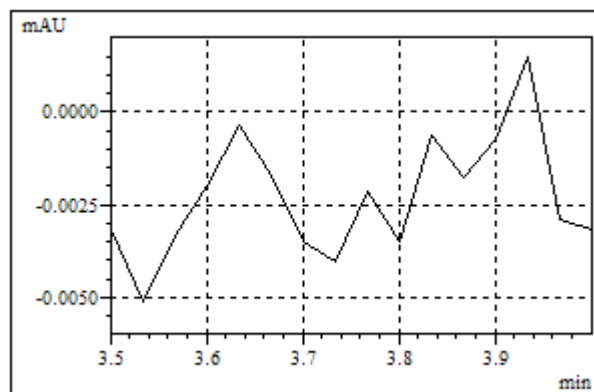
Calibration curve obtained with SPD-20A



Calibration curve obtained with SPD-M20A



2  $\mu$ AU Noise and 10  $\mu$ AU/h Drift on SPD-20A



5  $\mu$ AU Noise and 90  $\mu$ AU/h Drift on SPD-M20A

## Final Result

The data shows that due to system stability and sensitivity compounds can be properly quantified even at trace levels.

The given specifications serve purely as technical information for the user. No guarantee is given on technical specification of the described product and/or procedures.