

Anions at low nanogram levels

The need for universal HPLC detection in analytical laboratories is widespread. While several detection technologies (e.g., low wavelength UV, refractive index, evaporative light scattering, chemiluminescent nitrogen detectors) are currently being used, there is significant room for improvement in performance characteristics such as sensitivity, dynamic range, consistency of response factors and gradient or solvent compatibility.

To help address the many challenges of universal detection, ESA has developed the Corona CAD™ detector. This novel technology offers many benefits to analytical scientists including:

- High Sensitivity - Low ng limits of detection.
- Consistent Response Factors - Response magnitude does not significantly depend on analyte properties (e.g. molar absorptivity, proton affinity).
- Broad and Useful Dynamic Range - 4 orders of magnitude (ng - µg quantities).
- Excellent Reproducibility - Typically less than 2% RSD.
- Broad Applicability - Can be used with a wide variety of HPLC conditions to measure virtually any nonvolatile analyte including proteins, lipids, carbohydrates and small molecules.
- Ease of Use - Easy setup. Uses minimal bench space and requires only gas input pressure and signal output range to be set.

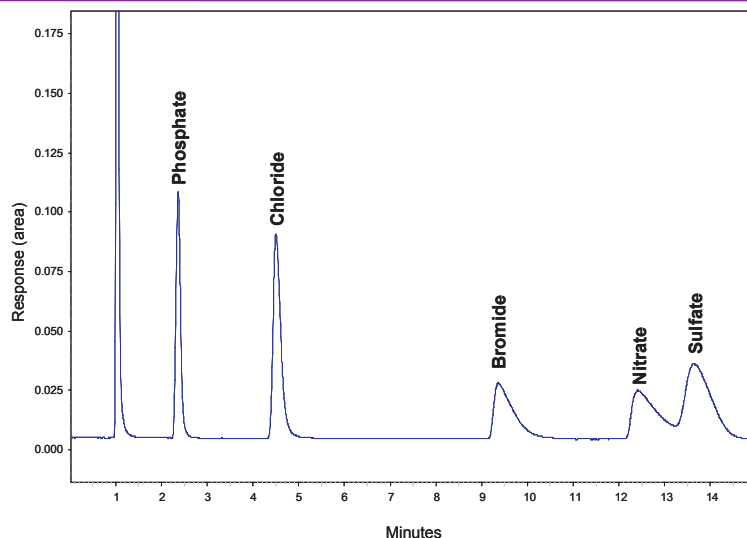


Figure 1. Separation of five anions (2µg each on column).

This application note describes the use of the Corona CAD for the measurement of anions (Figure 1). The method has a limit of detection of <10ng, on column (Figure 2). This demonstrates the use of CAD with ion chromatography for detection of analytes lacking a UV chromophore.

Corona parameters

Gas: 35psi via nitrogen generator
Filter: none
Range: 100pA

HPLC Parameters:
Mobile Phase: 60mM ammonia/100mM formic acid
Flow Rate = 1mL/min
Column: Hamilton PRP X100 4.1 x 100mm
Injection Volume = 10µL

Sample preparation

Stock - 1mg/mL of each standard dissolved in mobile phase.
Dilutions made in mobile phase.

The Corona™ Charged Aerosol Detector

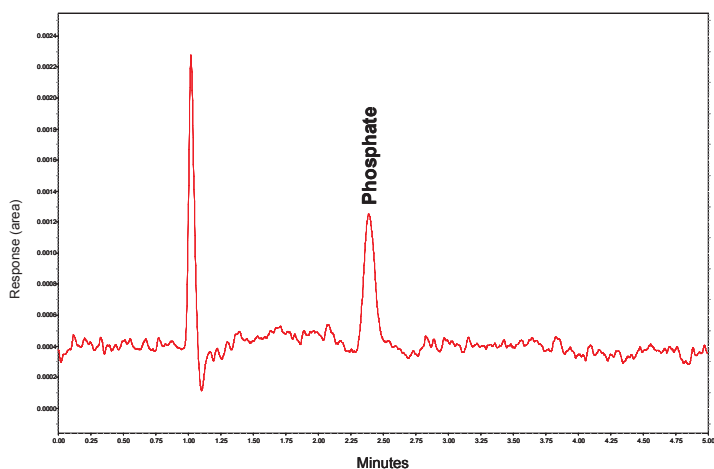


Figure 2. Measurement of low levels of phosphate (10ng on column; s/n ~8:1).

Conclusions

The Corona CAD provides universal detection of non-volatile analytes with response independent of chemical properties, a wide dynamic response range, high sensitivity and good precision. These characteristics, along with reliability and simple operation, make this a superior detector for a wide range of HPLC analyses.

For more information about this application, the Corona CAD, or charged aerosol detection visit www.coronacad.com. We are interested in your opinions and are available to answer any questions you may have: please contact a technical representative at 978.250.7082, or if e-mail is more convenient, send your questions to coronacad@esainc.com.

Ordering information

Description

Corona

Thermal Organizer Module

Nitrogen generator

Pump, model 582

Autosampler, model 542

Quaternary low pressure gradient
and degasser

Elite software including PC

Column, PRP X100

Part Number

70-6350 (100/120V)

70-6351 (230/240V)

70-5499TA

70-6003

70-4050

70-4152

70-5260

70-5073



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The Corona CAD is covered by multiple patents