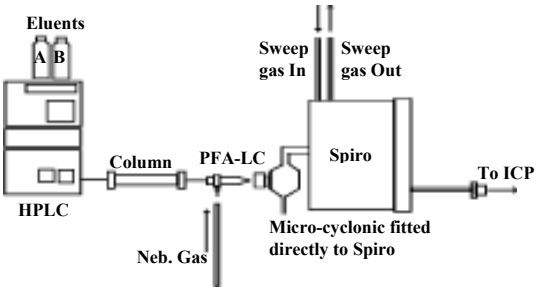
Elemental Scientific Inc Technical Note-10

Reverse Phase HPLC-ICPMS utilizing Spiro Desolvation

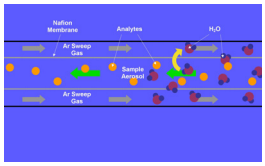
The changing organic concentration commonly used in reverse phase HPLC causes difficulties in ICPMS due to changing plasma conditions, the need to add oxygen to prevent carbon build up and use of Pt cones. A more efficient system is to remove the organic solvent from the aerosol and so maintain stable plasma conditions. Here we describe the use of the Spiro membrane desolvation system to determine Pt species used in chemotherapy drugs without the need to use added oxygen or Pt cones.

Instrumentation & Sample Intro.

- Agilent 7500ce with Ni cones
- PE HPLC
- ESI PFA-LC Nebulizer
- ESI Micro-Cyclonic Spray Chamber
- ESI Spiro TMD



Spiro TMD



The Spiro utilizes a Teflon® membrane to desolvate the aerosol. Solvent vapors pass through the Teflon® membrane and are removed by a sweep flow of dry Argon.

Operating Parameters

500µL/min Mobile phase flow rate.
28 min gradient 100% A:0% B to 0% A:100% B.
Mobile phase A: 0.3mM Octane sulfonic acid in water.
Mobile phase B: 0.3mM Octane sulfonic acid in acetonitrile.
Spiro sweep gas flow 1.6L/min
Agilent 7500ce standard tuning conditions.

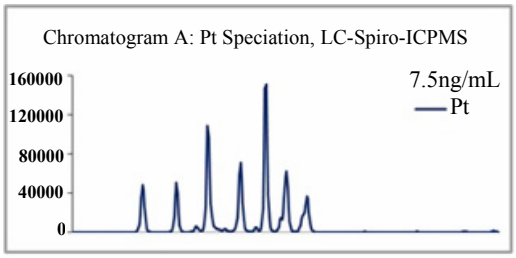
The outlet from the column was connected to a low volume PFA-LC nebulizer to prevent post column peak broadening. The nebulizer aspirates into a micro-cyclonic chamber attached directly to the Spiro TMD unit. The exit of the Spiro was attached directly to the torch injector.

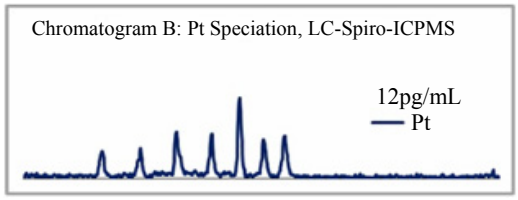
Performance and Stability

Over 12 analytical runs of 28 minutes, no plasma instability was observed during the HPLC gradient. After 6 hours there is no visible clogging on the Sampler and Skimmer cones from carbon build up.

Results

The chromatograms below show the capability to separate and detect low levels of platinum compounds using the Spiro to remove the organic solvent. The use of the Spiro does not cause increased peak broadening.





Conclusion

The removal of the organic solvent from the aerosol results in a more stable plasma. There is no need to add oxygen and so there is no need to use Pt cones. The ability to use high sample flow rates and avoid the need to split the sample flow improves the sensitivity of reverse phase HPLC applications.