

**Battelle Number(s):**

15097-E, 15789-E

Patent(s) Issued

Available for licensing in all fields

**Awards Won:**

R&D 100 Award - 2009

Available Technologies

# Improved Electrospray Technology

## SUMMARY

Electrospray is a mainstay ionization method for liquid chromatography/mass spectrometry (LC/MS). For optimal electrospray characteristics at low flow rates (nanospray), it is necessary that the electrospray emitter be tapered to a narrow orifice. However, such tapering is often difficult for fused silica tips formed using traditional mechanical methods because of inconsistencies and tip breakage. Further, although tapering of the outer diameter of the tip is needed, such tapering of the inner diameter of the tip is not desirable because it can lead to clogging.

This patented method involves a simple and inexpensive process of chemical etching that is capable of consistently producing the same taper in the outer diameter of the tips. Further, the method is also capable of producing a constant inner diameter in each tip, thus substantially reducing tip clogging. The most frequently used material for the tips is fused silica, although the method could potentially be used with other materials.

The method is capable of producing virtually any outside and inside diameter tip based on the selection of the starting fused silica tubing. The tips offer robust operation over a broad range of flow rates, from less than 20 nL/min to at least 2  $\mu$ L/min. The method is capable of being used to fabricate an integrated monolithic tip at the end of a packed-particle or monolithic liquid chromatography column, which can provide analytical advantages by reducing post-column dead volumes.

The available technology in this area also includes a design and apparatus for an array of chemically etched electrospray emitters spraying into multiple mass spectrometer inlets that is capable of generating a consistent signal from each emitter. This approach substantially increases the amount of ion signal that is produced from a given level of available sample.

## ADVANTAGES

- \* simple inexpensive process for consistently producing tapered emitter tips
- \* constant inner diameter of tips reduces clogging
- \* can be applied to a wide range of starting materials and flow rates
- \* patent pending multiemitter design increases sensitivity

### Patents & Intellectual Property

- » Patent #: 7,491,341

### Technology Portfolio(s)

- » Mass Spectrometry Instrumentation

### Potential Industry Applications

- » Chemicals
- » Healthcare, Pharma, Biotech & Medical

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