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**Battelle Number(s):**

15369-E

Patent(s) Issued

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Available Technologies

## Low-Pressure (~30 torr or less) Electrospray Source

### SUMMARY

Electrospray ionization (ESI) is one of the most widely used ionization techniques in mass spectrometry. The efficiency of ESI increases with decreasing liquid flow rates, and can theoretically reach 100% at low nanoliter per minute flow rates. However, in conventional electrospray designs, the gains from such efficiencies are limited by large ion losses during the transmission of ions from atmospheric pressure to the low-pressure region of the mass analyzer, with the greatest losses occurring at the inlet and skimmer of the ESI-MS interface. A number of techniques and devices (including the electrodynamic ion funnel) have been developed to reduce these losses, but it would be advantageous to perform electrospray within the first vacuum region of the mass spectrometer and completely eliminate the need to transmit the ions through a capillary, orifice, or other type of conductance restricting inlet.

PNNL has developed a novel design and process for effectively performing ESI at pressures typical of an MS interface (first stage) region. The new design, known as Subambient Pressure Ionization with Nanoelectrospray (SPIN) source and interface, has been shown to provide a 5-fold increase in sensitivity compared to conventional atmospheric pressure electrospray. Although development work on the new source design is continuing, these first results are a promising milestone in the overall goal of designing a "loss free" ESI mass spectrometer in which every amenable ion can be ionized and transmitted to the mass spectrometer.

### Patents & Intellectual Property

- » Patent #: 7,671,344 (B2)

### Technology Portfolio(s)

- » Mass Spectrometry Instrumentation

### Potential Industry Applications

- » Chemicals
- » Healthcare, Pharma, Biotech & Medical
- » Professional Services
- » Security

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