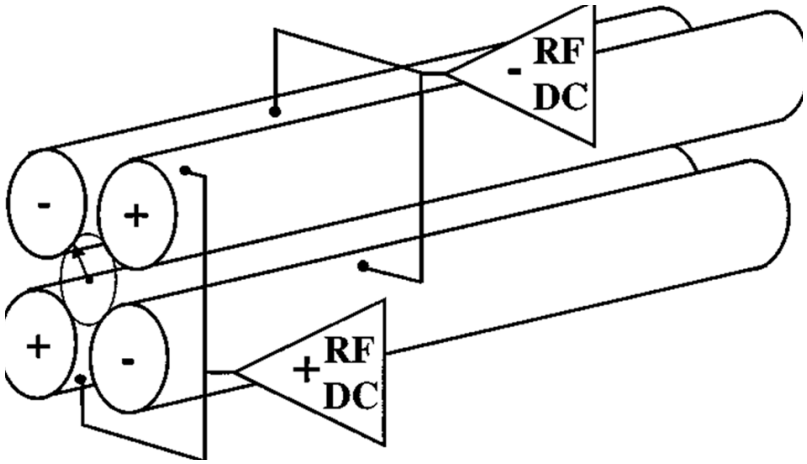
MINIATURIZED MASS SPECTROMETER

US Pat. No.: 6,452,167; 6,633,041
Technology Readiness Level: 3
Active research and development is initiated and the concepts were demonstrated analytically or experimentally

Sandia has developed an improved quadrupole mass spectrometer (QMS). The improvement lies in the substitution of the conventional hot flament electron source with a cold cathode field emitter array (FEA), which in turn, allows the operations of a small QMS at much higher internal pressures then are currently achievable. By eliminating the hot flament, problems such as the thermal "cracking of delicate analytes molecules, outgassing of a "hot" flament, high-power requirements, flament contamination by outgas species, and spurious electromagnetic fields are avoided altogether. In addition, the ability to produce FEAs using well-known and well-developed photolithographic techniques permits the building of a QMS that has multiple redundancies of the ionization source at very low additional cost.



TECHNICAL BENEFITS

- Low cost compared to other types of mass spectrometers
- Simple and reliable
- Relatively high pressure

INDUSTRIES & APPLICATIONS

- Real-time exhaust gas analysis for automotive applications
- Leak detection, residual gas analysis
- Thermal desorption mass spectroscopy
- Molecular beam analysis
- Environmental analysis for liquid and gas samples

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