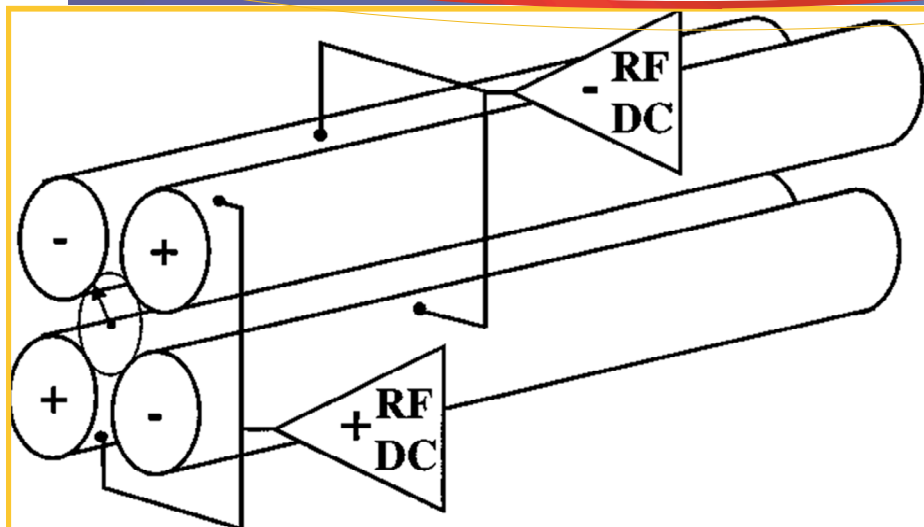




# Miniaturized Mass Spectrometer



## TECHNOLOGY SUMMARY

Sandia's invention relates to a miniaturized mass spectrometer using a silicon chip field emitter array as the source of electrons for impact ionization of chemical species.

Sandia has developed an improved quadrupole mass spectrometer (QMS). The improvement lies in the substitution of the conventional hot filament 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 than are currently achievable. By eliminating the hot filament, problems such as the thermal "cracking" of delicate analytes molecules, outgassing of a "hot" filament, high-power requirements, filament contamination by outgas species, and spurious electromagnetic fields are avoided altogether.

## BENEFITS

Low cost compared to other types of mass spectrometers

Simple and reliable

Relatively high pressure

## POTENTIAL MARKET APPLICATIONS

Real-time exhaust gas analysis for automotive applications.

Leak detection, residual gas analysis.

Thermal desorption mass spectroscopy.

Environmental analysis for liquid and gas samples.

Molecular beam analysis.

## TECHNOLOGY READINESS LEVEL

Sandia estimates this technology at approximately TRL 3. Active research and development is initiated and the concepts were demonstrated analytically or experimentally.

## INTELLECTUAL PROPERTY

US PATENT #6,452,167

SD# 8174.1

US PATENT #6,633,041

SD# 8174.2

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