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Felter

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(54) **METHOD FOR ANALYZING THE MASS OF A SAMPLE USING A COLD CATHODE IONIZATION SOURCE MASS FILTER**

(75) Inventor: **Thomas E. Felter**, Livermore, CA (US)

(73) Assignee: **Sandia National Laboratories**, Livermore, CA (US)

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(51) **Int. Cl.⁷** **H01J 49/14**

(52) **U.S. Cl.** **250/423 R; 250/424; 250/423 F; 250/282**

(58) **Field of Search** 250/423 R, 424, 250/427, 423 F, 281, 282

(56) **References Cited**

U.S. PATENT DOCUMENTS

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Primary Examiner—Kiet T. Nguyen

(74) *Attorney, Agent, or Firm*—Timothy P. Evans

(57) **ABSTRACT**

An improved quadrupole mass spectrometer is described. The improvement lies in the substitution of the conventional hot filament electron source with a cold cathode field emitter array which in turn allows operating a small QMS at much high internal pressures than are currently achievable. By eliminating of the hot filament such problems as thermally “cracking” delicate analyte molecules, outgassing a “hot” filament, high power requirements, filament contamination by outgas species, and spurious em fields are avoid all together. In addition, the ability of produce FEAs using well-known and well developed photolithographic techniques, permits building a QMS having multiple redundancies of the ionization source at very low additional cost.

5 Claims, 8 Drawing Sheets

