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(54) **METHOD AND APPARATUS FOR SELECTIVE FILTERING OF IONS**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 204 days.

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(57) **ABSTRACT**

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An adjustable, low mass-to-charge (m/z) filter is disclosed employing electrospray ionization to block ions associated with unwanted low m/z species from entering the mass spectrometer and contributing their space charge to down-stream ion accumulation steps. The low-mass filter is made by using an adjustable potential energy barrier from the conductance limiting terminal electrode of an electrodynamic ion funnel, which prohibits species with higher ion mobilities from being transmitted. The filter provides a linear voltage adjustment of low-mass filtering from m/z values from about 50 to about 500. Mass filtering above m/z 500 can also be performed; however, higher m/z species are attenuated. The mass filter was evaluated with a liquid chromatography-mass spectrometry analysis of an albumin tryptic digest and resulted in the ability to block low-mass, “background” ions which account for 40-70% of the total ion current from the ESI source during peak elution.

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(52) **U.S. Cl.** **250/288**; 250/281; 250/282;
250/286; 250/287; 250/290; 250/291; 250/292;
250/396 R; 250/423 R

(58) **Field of Classification Search** 250/281,
250/282, 286, 287, 288, 292, 423 R, 396 R,
250/290, 291

See application file for complete search history.

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15 Claims, 9 Drawing Sheets

