CLAIMS

1. A radio frequency ion guide having a plurality of electrodes arranged about an axis and a radio frequency voltage generator applying radio frequency voltages to the plurality of electrodes for radially confining ions, wherein the ions are received at an entrance end of the ion guide, and further wherein each electrode of the plurality of electrodes has a forked front end which is located at the entrance end of the ion guide.

2. The ion guide of claim 1, wherein the forked front end comprises at least two teeth.

3. The ion guide of claim 2, further comprising a conductive mesh which covers an intermediate gap between the teeth and thereby at least partially restores an electric potential defining inwardly facing surface of each electrode.

4. The ion guide of claim 2, wherein a thickness of the teeth decreases in a direction away from the axis.

5. The ion guide of claim 2, wherein the teeth extend along the axis over about one centimeter.

6. The ion guide of claim 2, wherein a width of a gap between the teeth amounts to up to half of the total width of the electrode.

7. The ion guide of claim 2, wherein a width of a gap between the teeth tapers in a direction along the axis.

8. The ion guide of claim 1, wherein the front end is one of bifurcated and multi-furcated.

9. The ion guide of claim 1, wherein the plurality of electrodes comprises at least four rod electrodes.

10. The ion guide of claim 1, wherein the plurality of electrodes comprises one of straight electrodes and curved electrodes.

11. The ion guide of claim 1, further comprising an ion source located upstream of the ion guide so that ions originating therefrom are transmitted to the entrance end, and yet further comprising a mass analyzer located downstream from the ion guide so that ions having traversed the ion guide are further transmitted thereto.

12. The ion guide of claim 1, wherein a first portion at the entrance end of each electrode is materially detached from a subsequent second portion of each electrode.

13. The ion guide of claim 12, wherein the detached portion is located in a first pressure regime and the subsequent second portion is located in a second lower pressure regime.

14. The ion guide of claim 12, wherein the radio frequency voltage applied to the detached portion is different to that applied to the subsequent second portion.

15. The ion guide of claim 1, wherein the voltage generator is also capable of providing direct current voltage(s) to the plurality of electrodes.

16. A radio frequency ion guide having a plurality of electrodes arranged about an axis and a radio frequency voltage generator applying radio frequency voltages to the plurality of electrodes for radially confining ions, wherein the ions are received at an entrance end of the ion guide, and further wherein each electrode of the plurality of electrodes has a recessed feature at a surface facing an interior of the ion guide, the recessed feature being located at the entrance end of the ion guide, wherein the recessed feature is located at, and symmetrically around, a central portion of the electrodes.

17. The ion guide of claim 16, wherein the recessed feature comprises an elongate groove or pocket.

18. A radio frequency ion guide having a plurality of electrodes arranged about an axis and a radio frequency voltage generator applying radio frequency voltages to the plurality of electrodes for radially confining ions, wherein the ions are received at an entrance end of the ion guide, and further wherein each electrode of the plurality of electrodes has a recessed feature at a surface facing an interior of the ion guide, the recessed feature being located at the entrance end of the ion guide, further comprising a conductive mesh which covers at least a portion of the recessed feature and thereby at least partially restores the electric potential defining surface facing the interior of the ion guide of each electrode.