

Hidden DLS-10 QMS

Ultra High Resolution
Quadrupole Mass Spectrometer
Specifically for the Analysis of
Hydrogen, Hydrogen Isotopes and Light Gases

Introduction

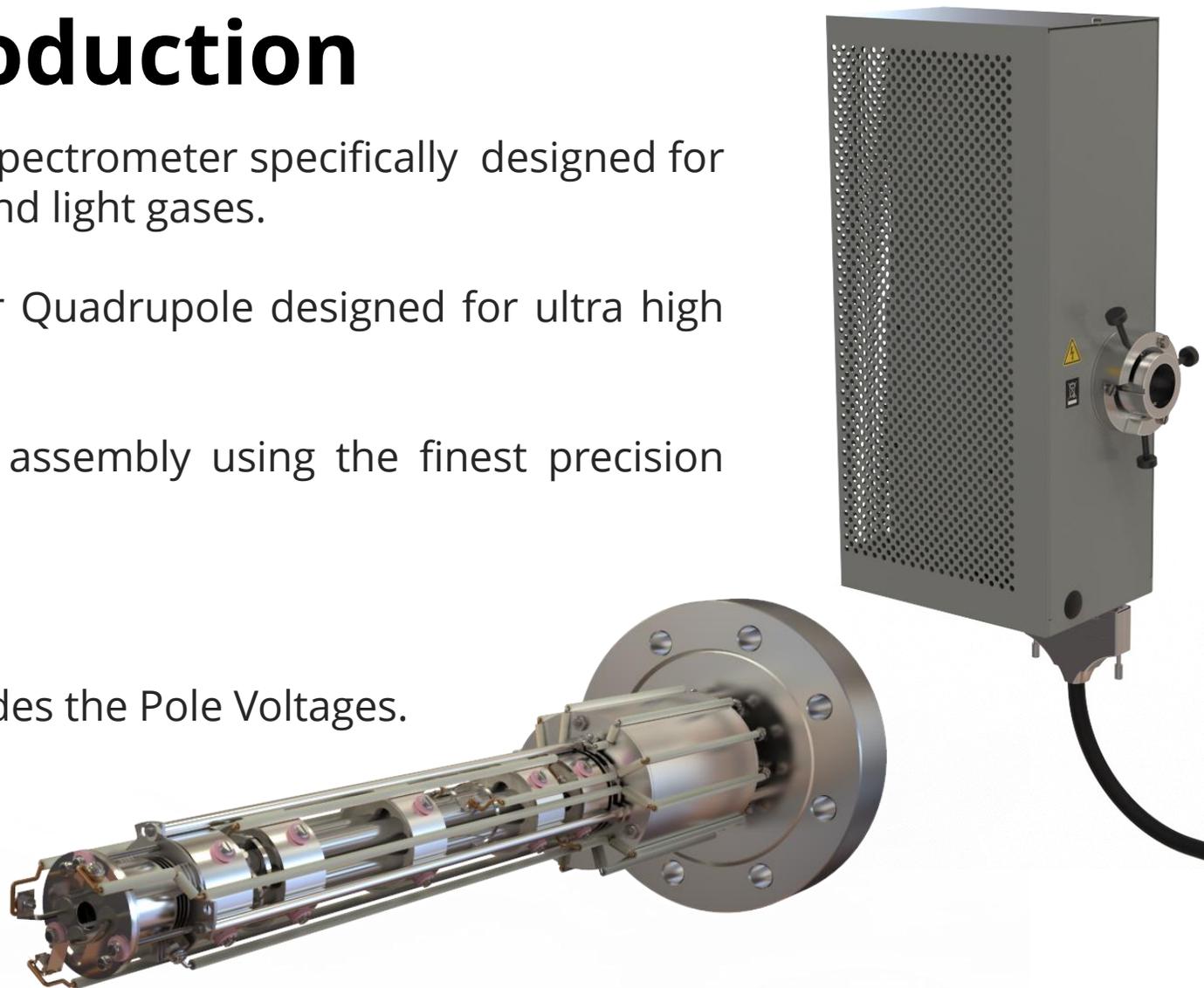
The Hiden DLS-10 QMS is a quadrupole mass spectrometer specifically designed for the analysis of Hydrogen, Hydrogen Isotopes and light gases.

The DLS-10 QMS includes a Hiden Triple Filter Quadrupole designed for ultra high resolution.

The mass filter design is a micron precision assembly using the finest precision machined components.

The DLS-10 QMS has a pole diameter of 6 mm.

A high stability, high frequency RF supply provides the Pole Voltages.

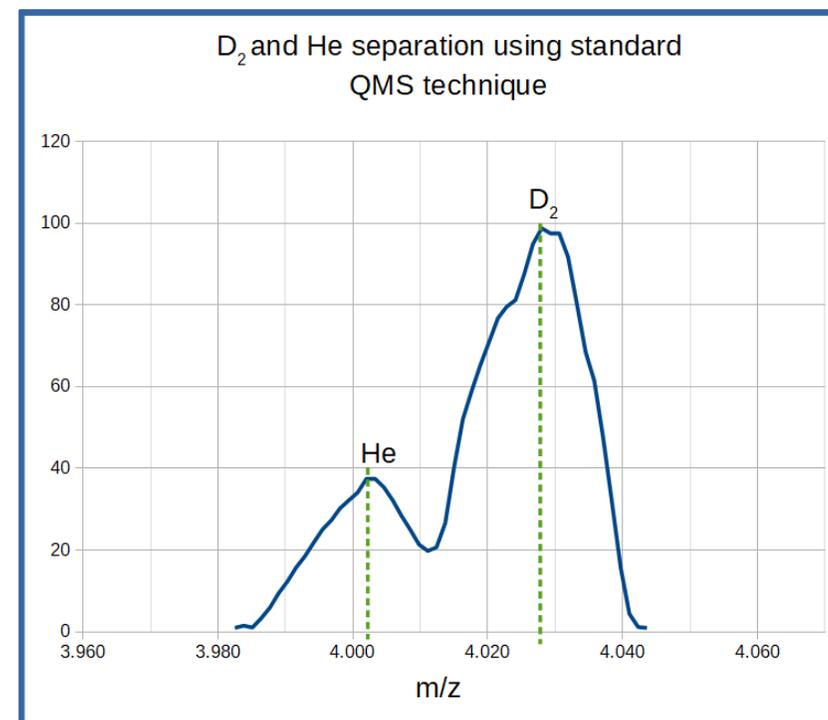


Quad Resolving Power

Species such as D₂ and He with a difference in mass of just 0.026 amu pose a real challenge to Quadrupole Mass Spectrometers because of the high level of Resolving Power needed to separate them.

The chart shows a typical response from a 6 mm Quadrupole on a fusion reactor. It's achieved a valley separation of just 20%. This level of resolving power limits measurement to concentrations of just a few per cent.

Hiden offers a solution by operating the Quadrupole in a different mode.

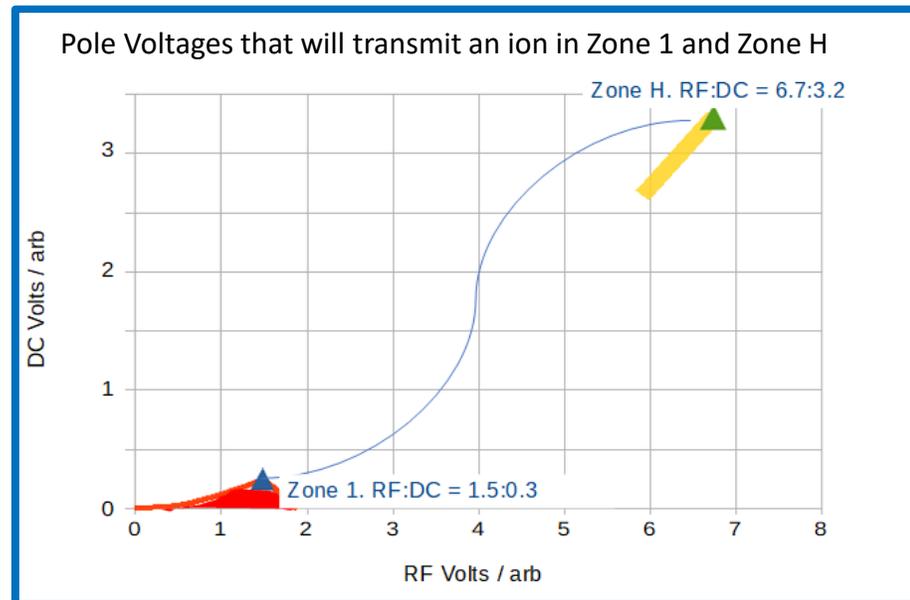


Quad Zones of Operation

Quadrupole Mass Spectrometers filter ions of different m/z by applying RF and DC Voltages to each of the four Poles. The resulting Electric Field allows ions of a single m/z ratio onto the detector.

Commercial Quadrupole Mass Spectrometers are normally operated in what is termed 'Stability Zone 1'. The Pole Voltages are relatively low and are shown in the red shaded region within the chart.

There is a second Stability Zone, termed 'Zone H'. This needs much higher Pole Voltages, shown in the yellow shaded region, but Zone H has much greater resolving power.

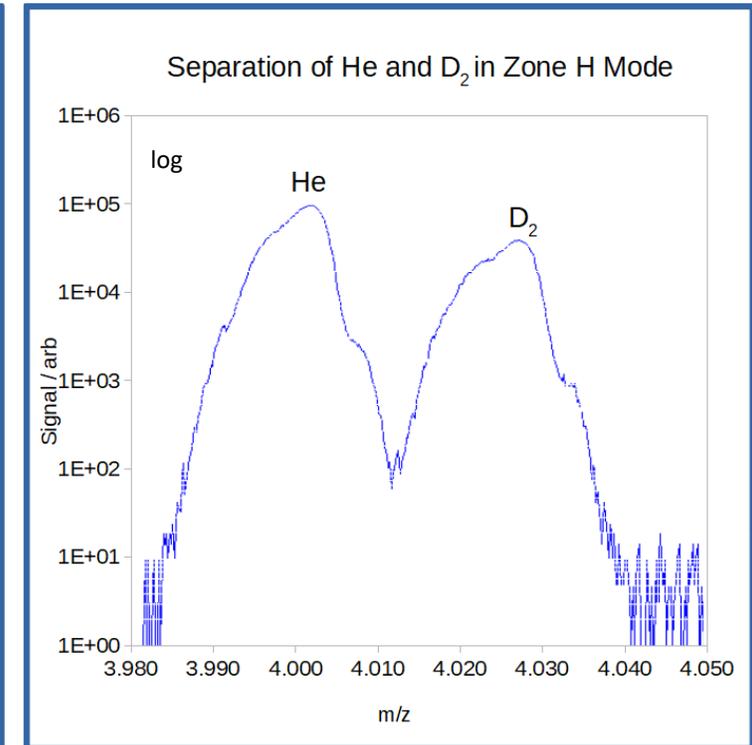
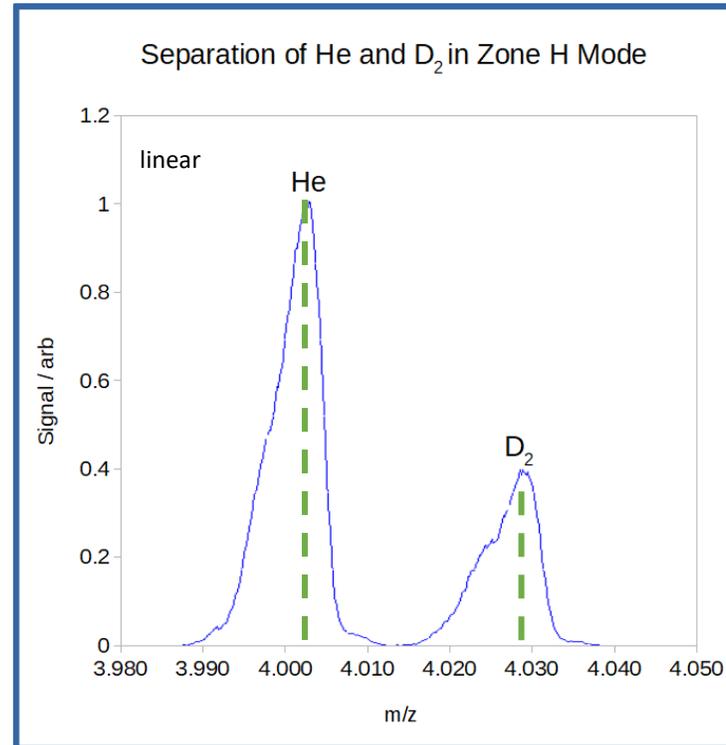


Operation in Zone H achieves Resolving Power

The charts show how the DLS-10 operating in Zone H has the resolving power to fully separate He and D₂.

The separation, when viewed in log mode, indicates that the contribution of the adjacent species is less than 10 ppm.

The DLS-10 is capable of detecting concentrations as low as 10 ppm of He in D₂, or 10 ppm D₂ in He.

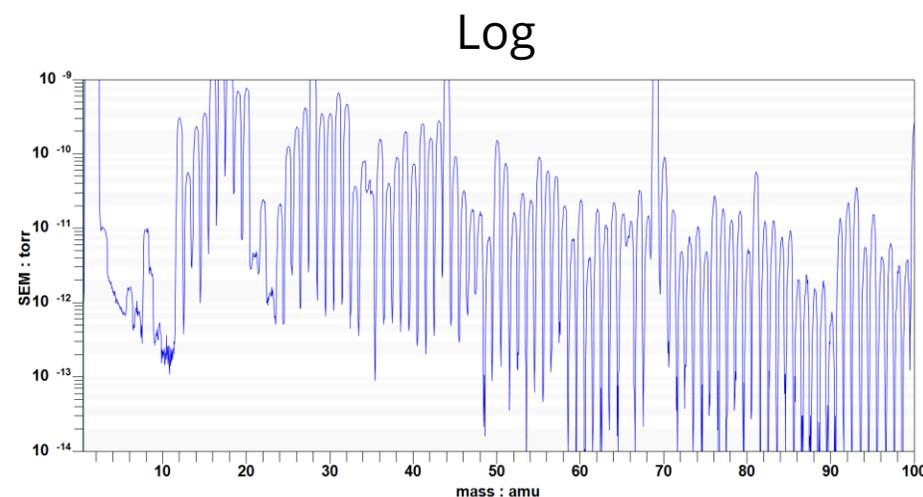
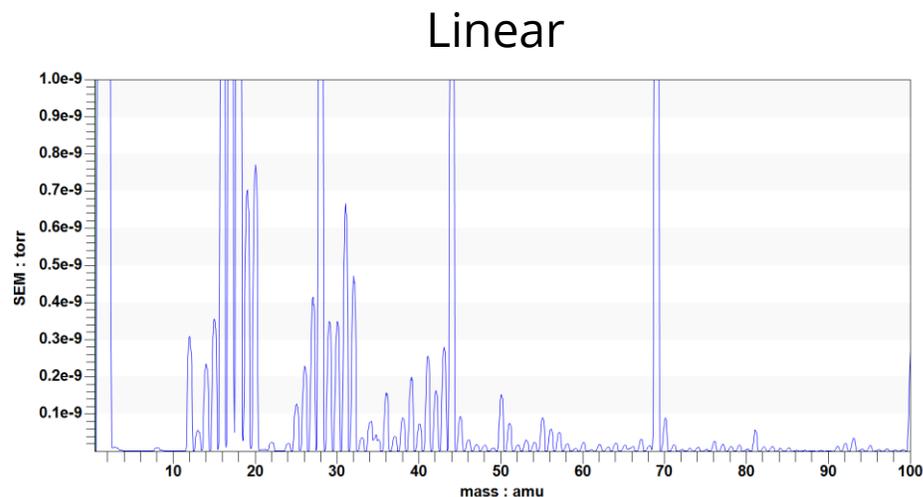


DLS-10 Zone H and Zone 1

The DLS-10 is offered in two options

- Operating in Zone H only and with a mass range of 0 to 10 amu
- Dual Zone. Operating in Zone H with a mass range 0 to 10 amu, and Zone 1 with mass range options of either 1 to 100, 1 to 200, 1 to 300 or 1 to 510 amu. The system is supplied with two RF Head Electronic Modules. To change operating zones, the RF Heads are simply exchanged.

The charts shows typical performance in Zone 1 for 100 amu option.



Summary

- Species such as He and D₂ require High Resolving Power to separate them by mass.
- Mass Spectrometers operating in Zone 1 give limited separation
- Operating the Mass Spectrometer in Zone H gives significantly greater separation
- Hiden's DLS-10 can enable detection of He in D₂ down to 10 ppm
- The DLS-10 can be supplied with Dual Zone functionality, enabling both Zone H and Zone 1 analysis

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- A photograph of a modern, two-story office building with a grey facade and large glass windows. The building has a prominent "HIDEN ANALYTICAL" sign on its side. The sky is clear blue, and there are green trees and bushes in the foreground. A large, semi-transparent white circle is overlaid on the left side of the image, containing a list of bullet points.
- www.HidenAnalytical.com
 - The Hiden website is an excellent resource with product pages, brochures, catalogues, product pages with some application notes, presentation and other information.
 - Contact +44 1925 445225 for direct support.