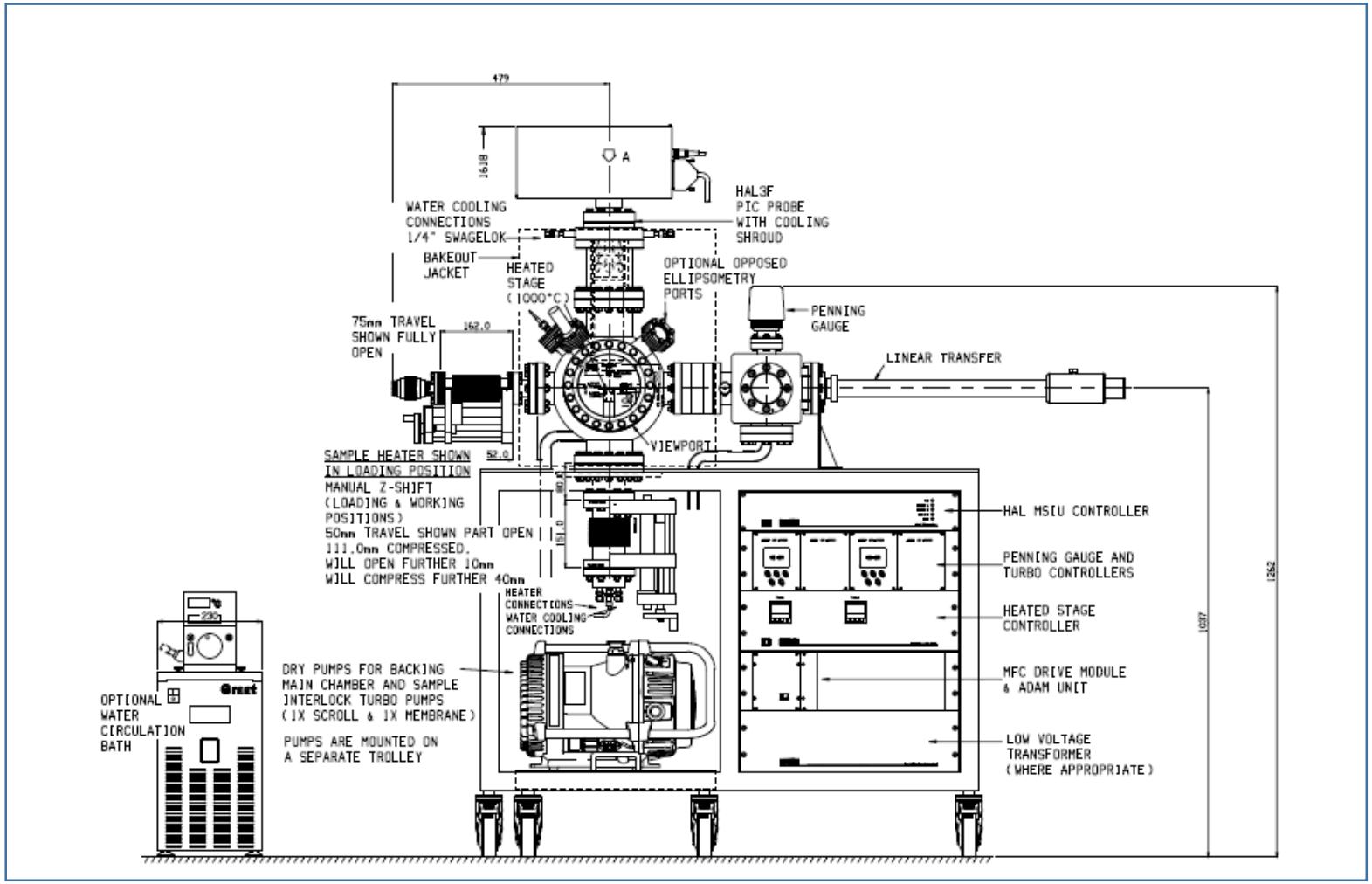
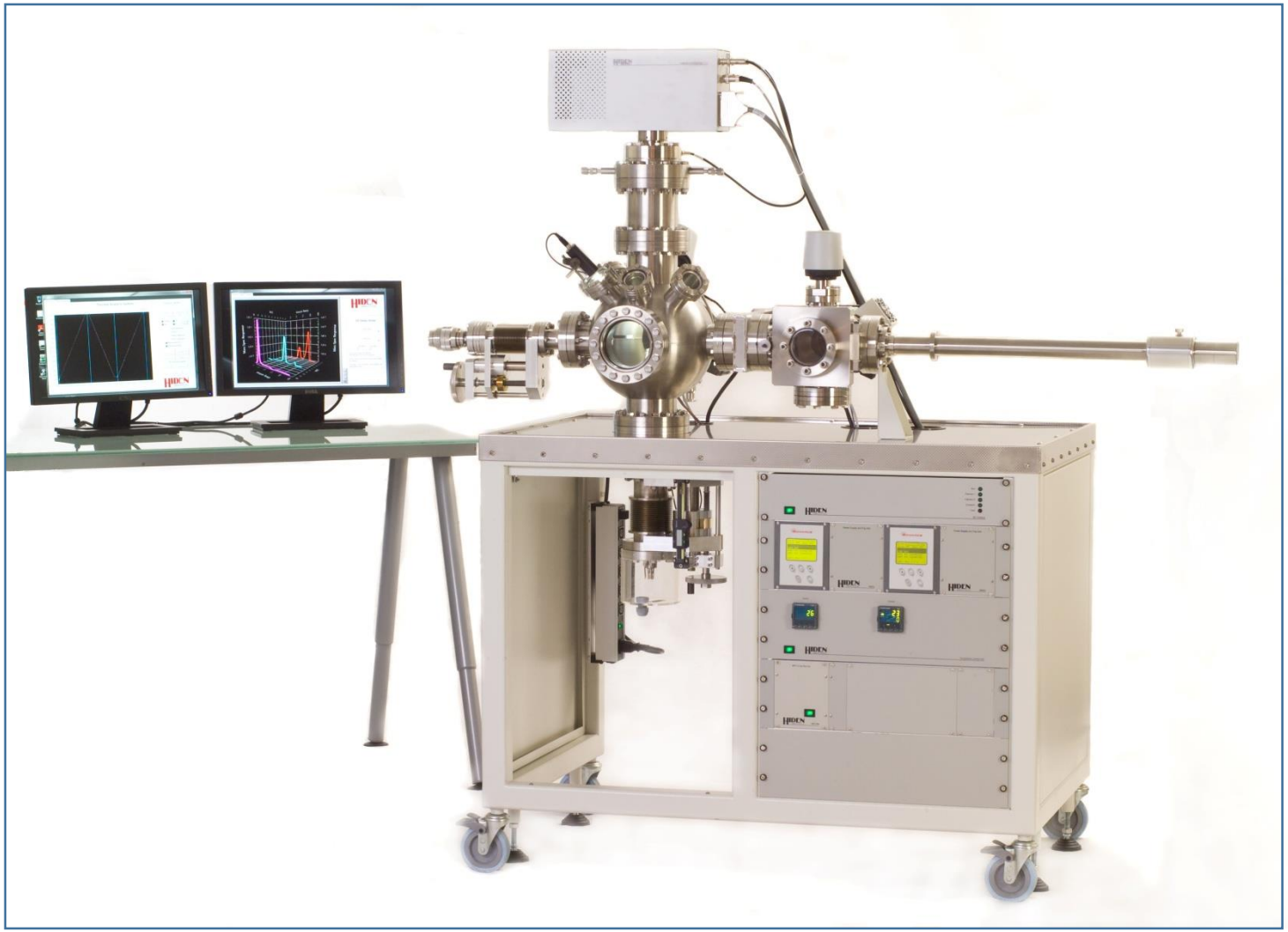
Hiden TPD Workstation

A complete experimental system for UHV temperature programmed desorption (TPD) studies

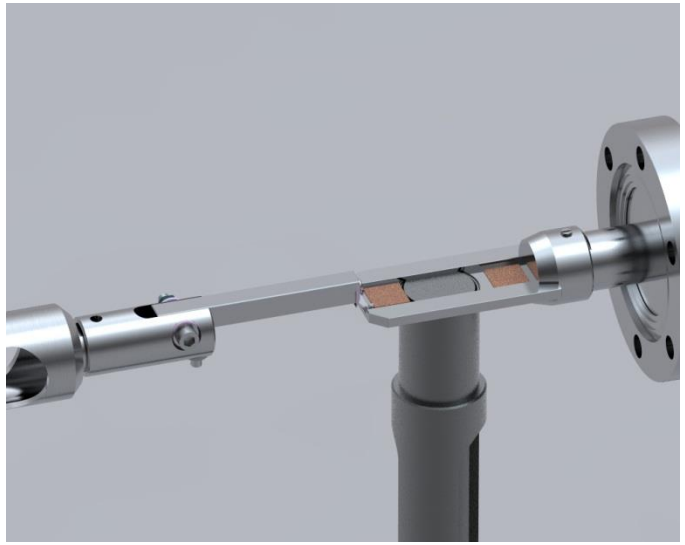
TPD Workstation

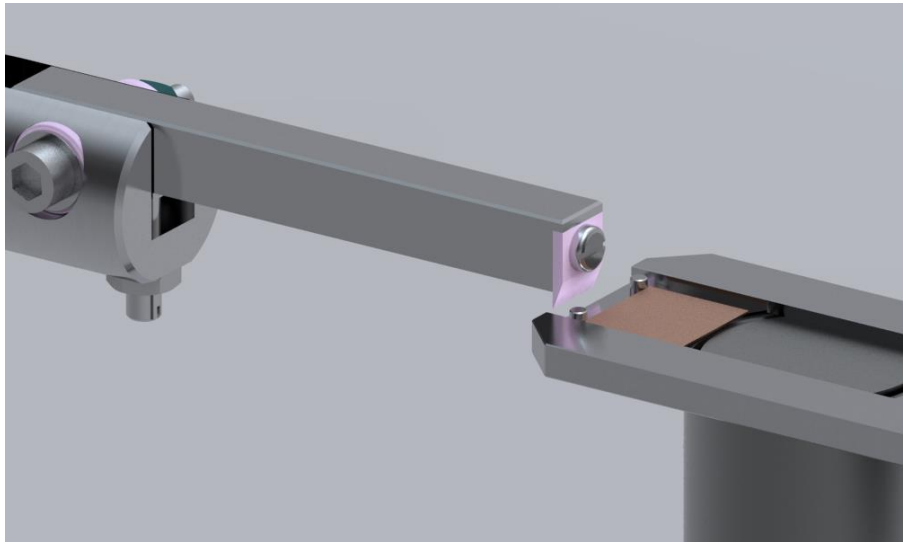


TPD Workstation



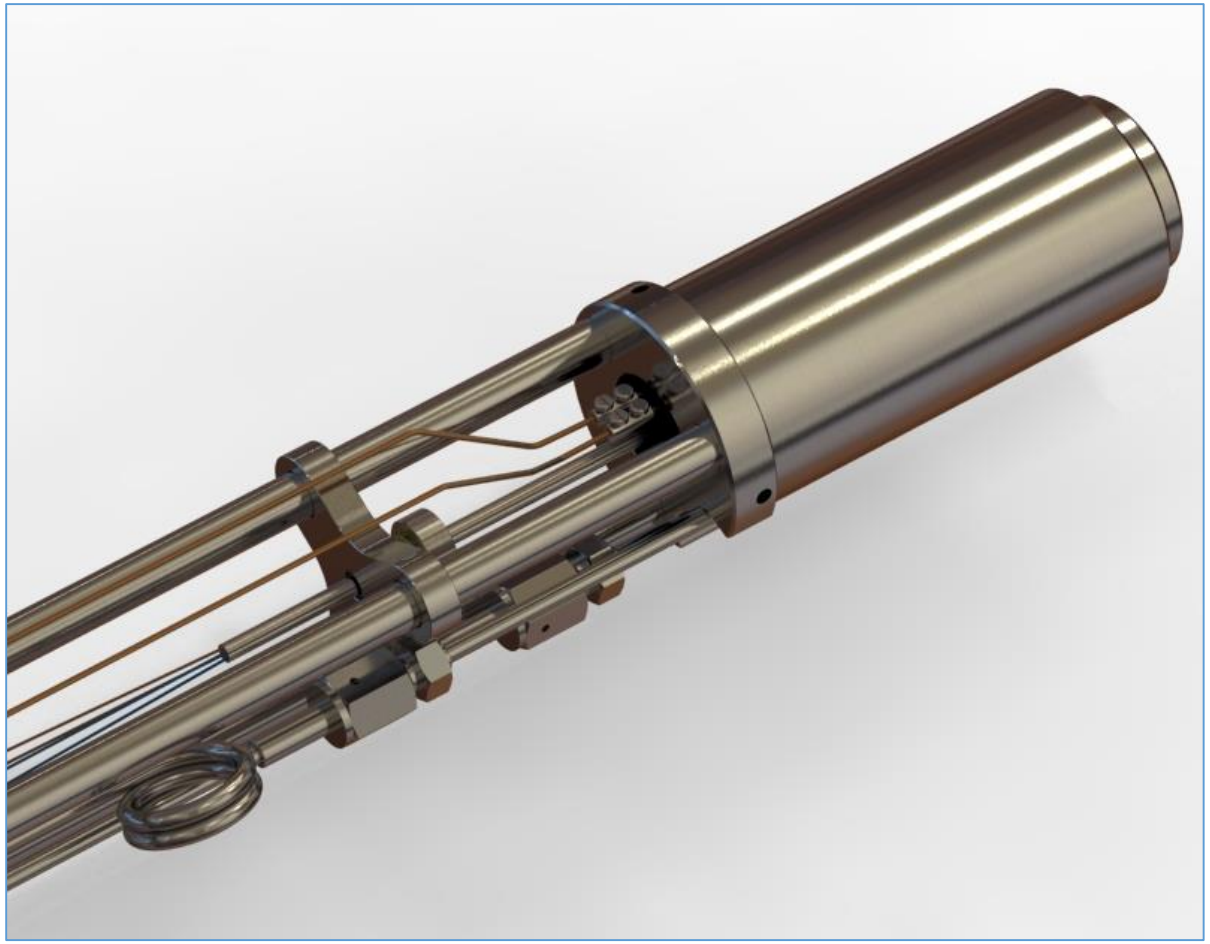
Sample Loading Mechanism



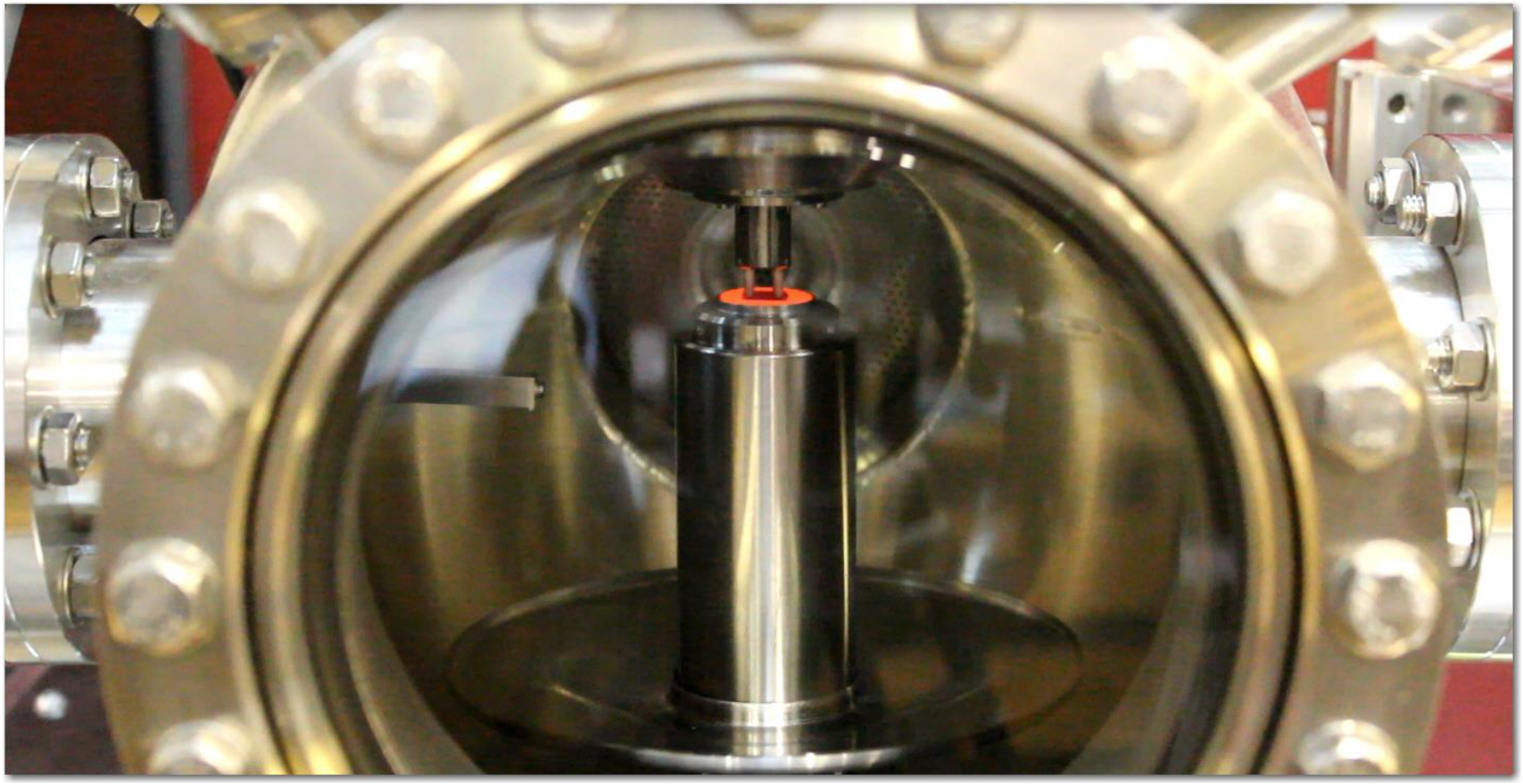


Only the sample is inserted/removed from the UHV analysis chamber to the loadlock, i.e. the heated stage remains at UHV at all times in order to minimise unwanted desorption peaks.

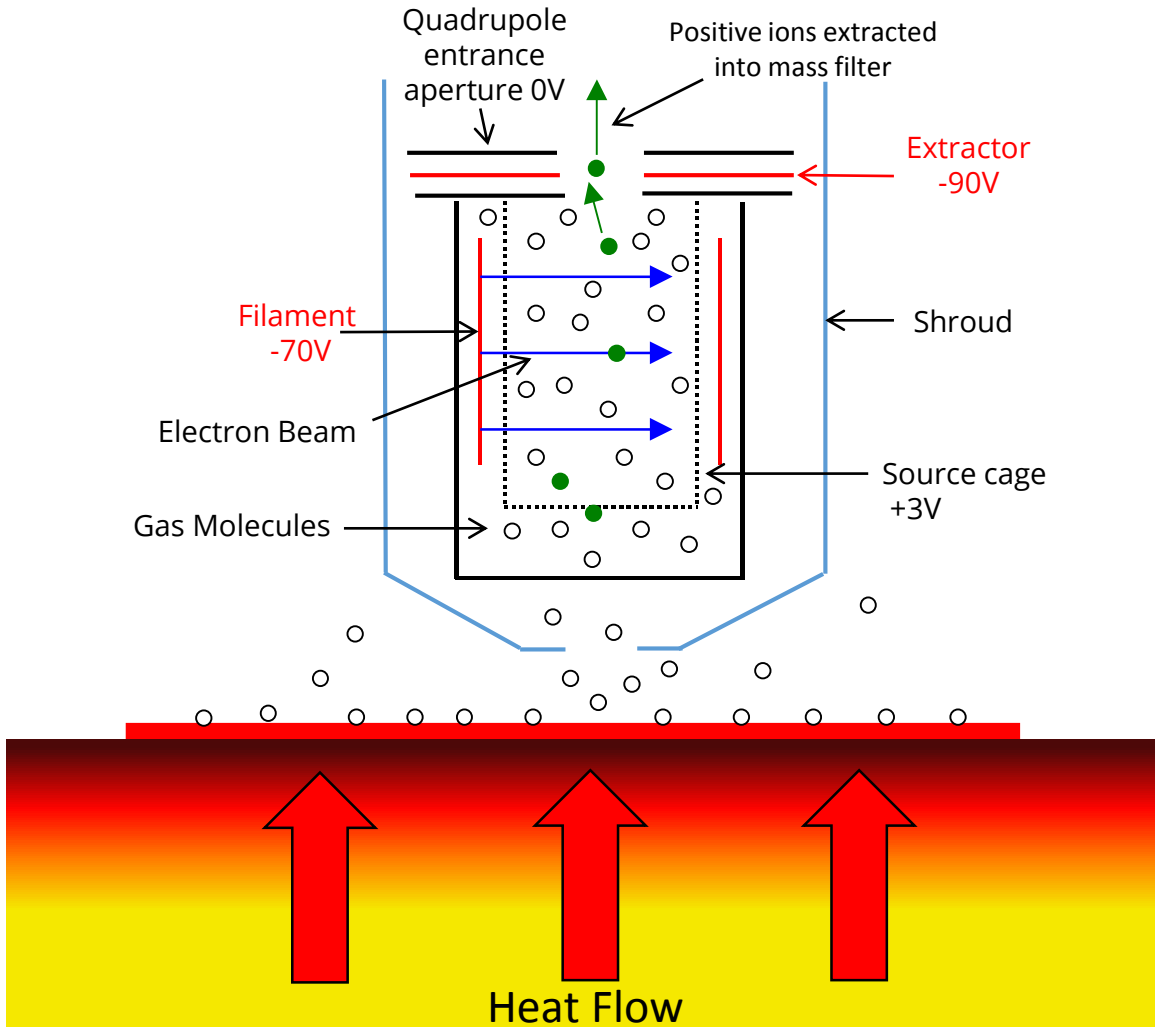
TPD Heater



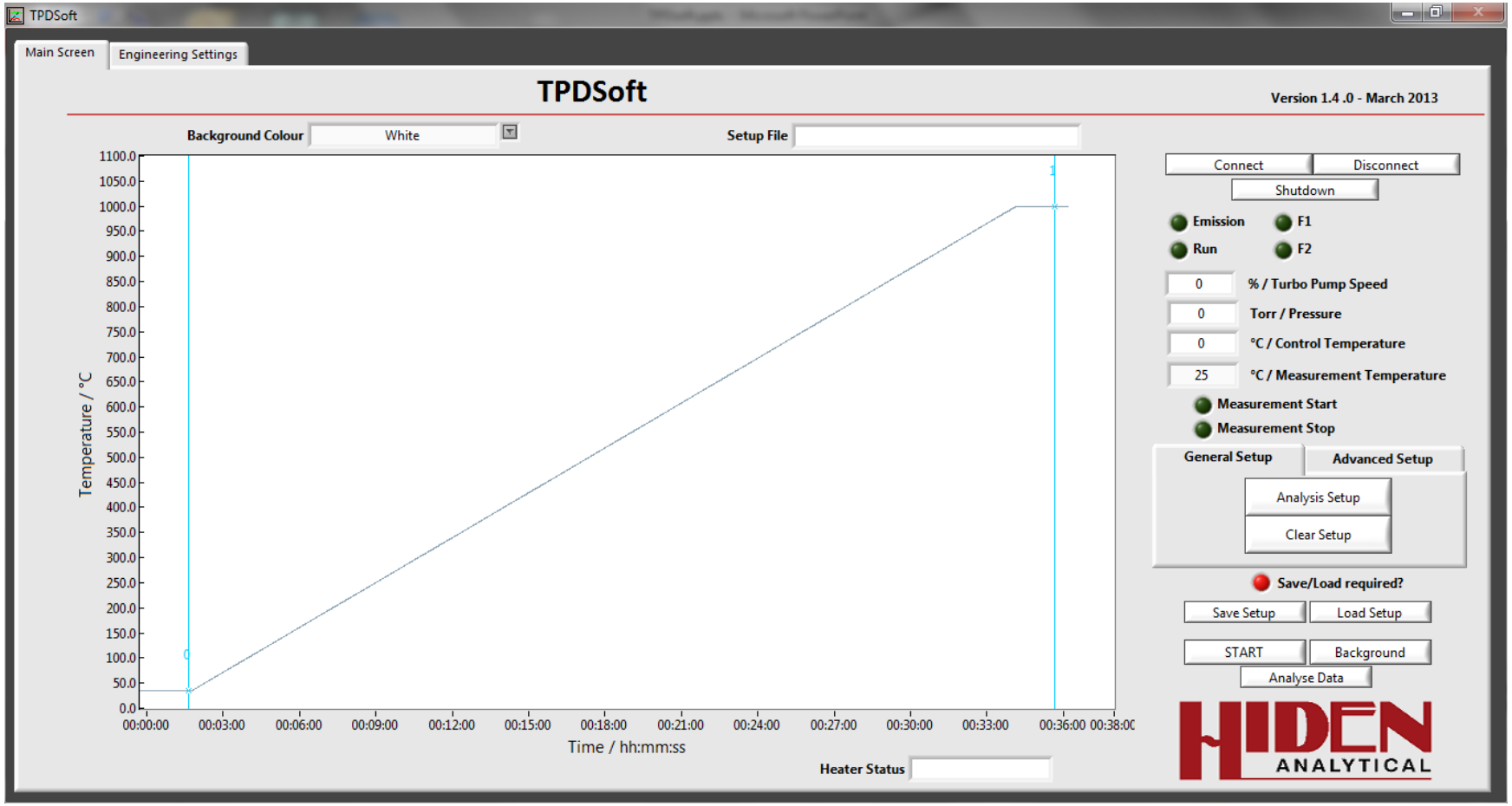
- Resistive Heating element
- Integral water cooled shroud to minimise outgassing



Thermal Desorption and Detection

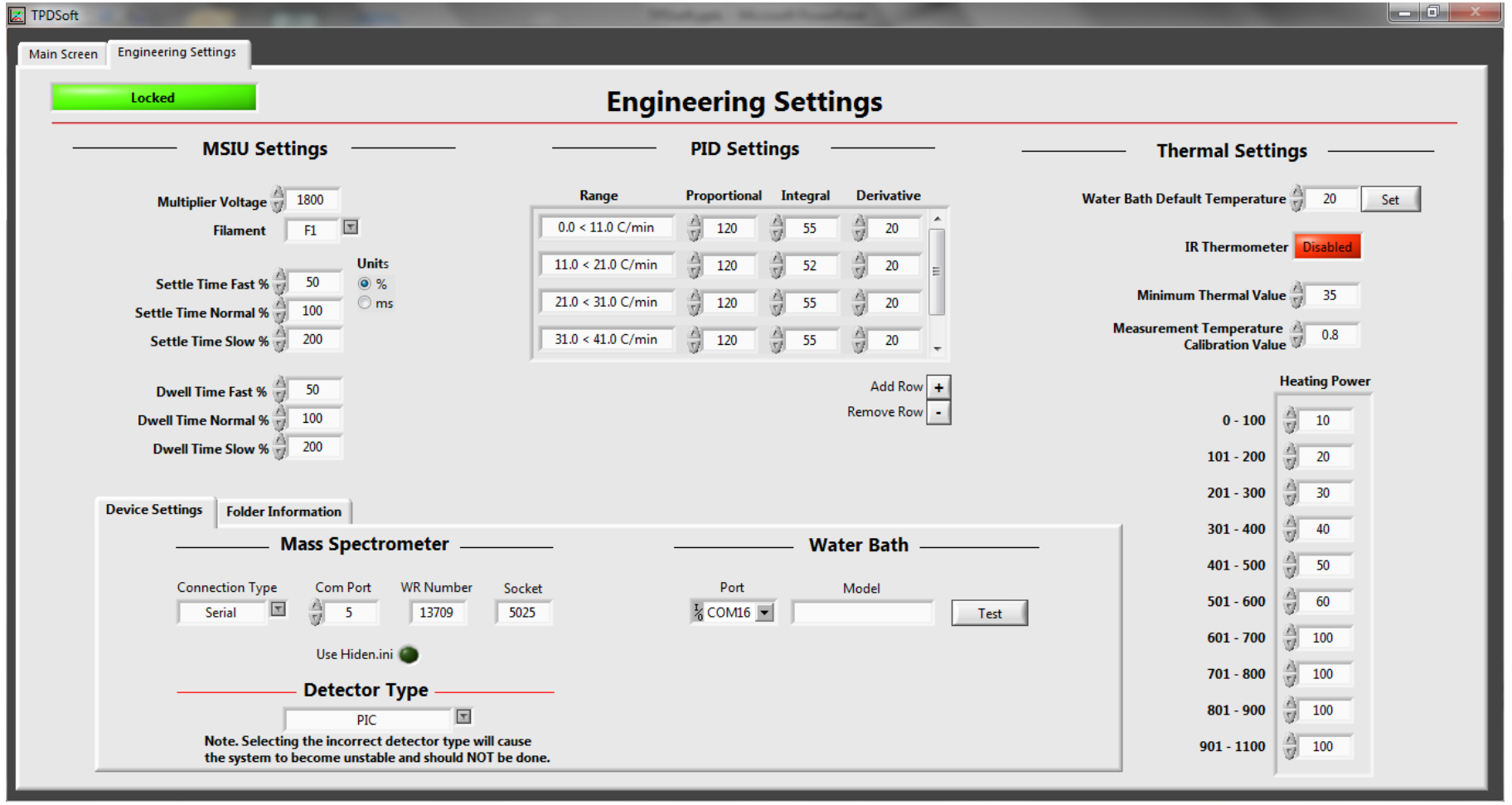


TPDsoft

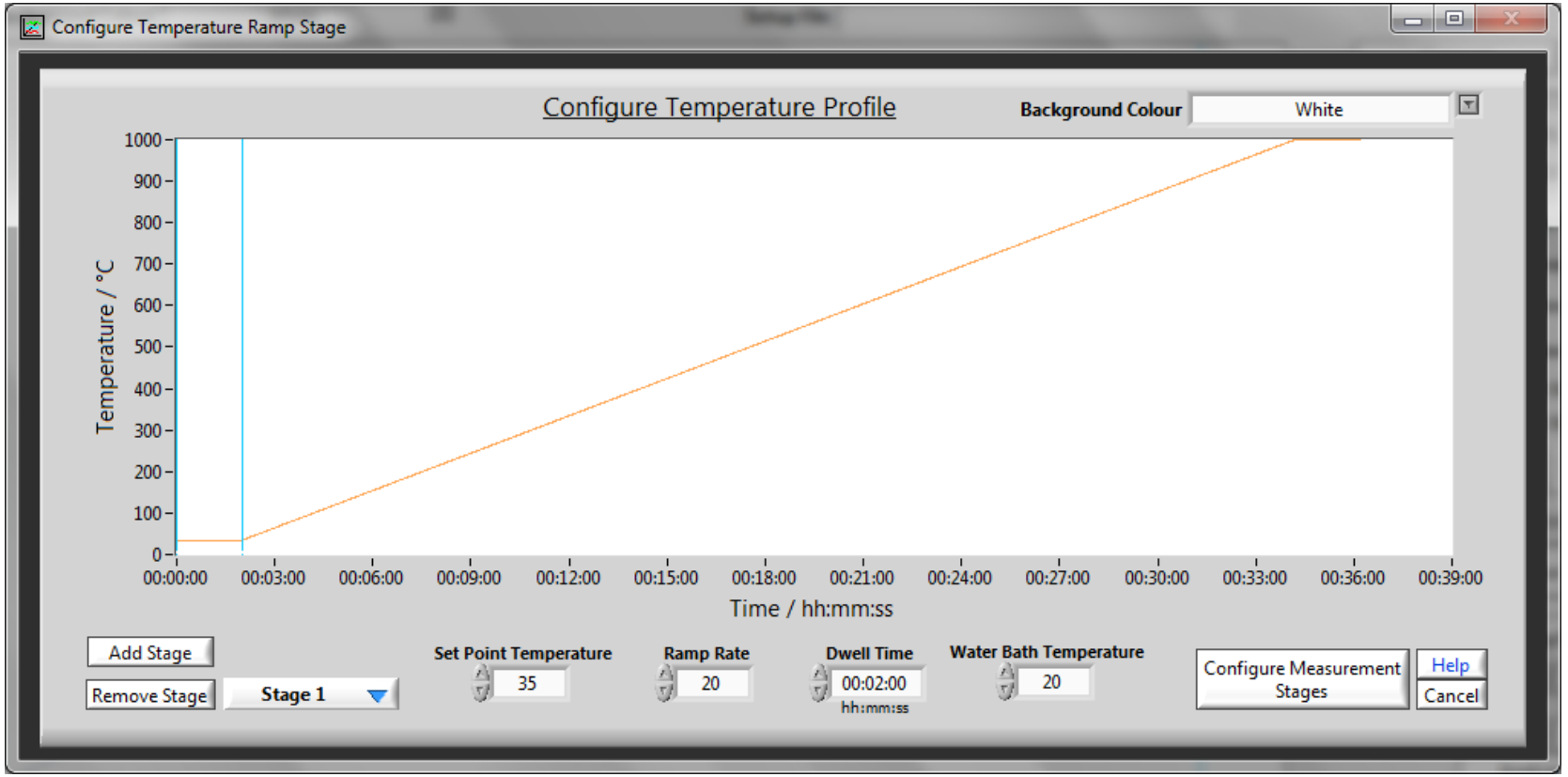


- Control of MS and Temperature in one software package.

Hardware Control Parameters

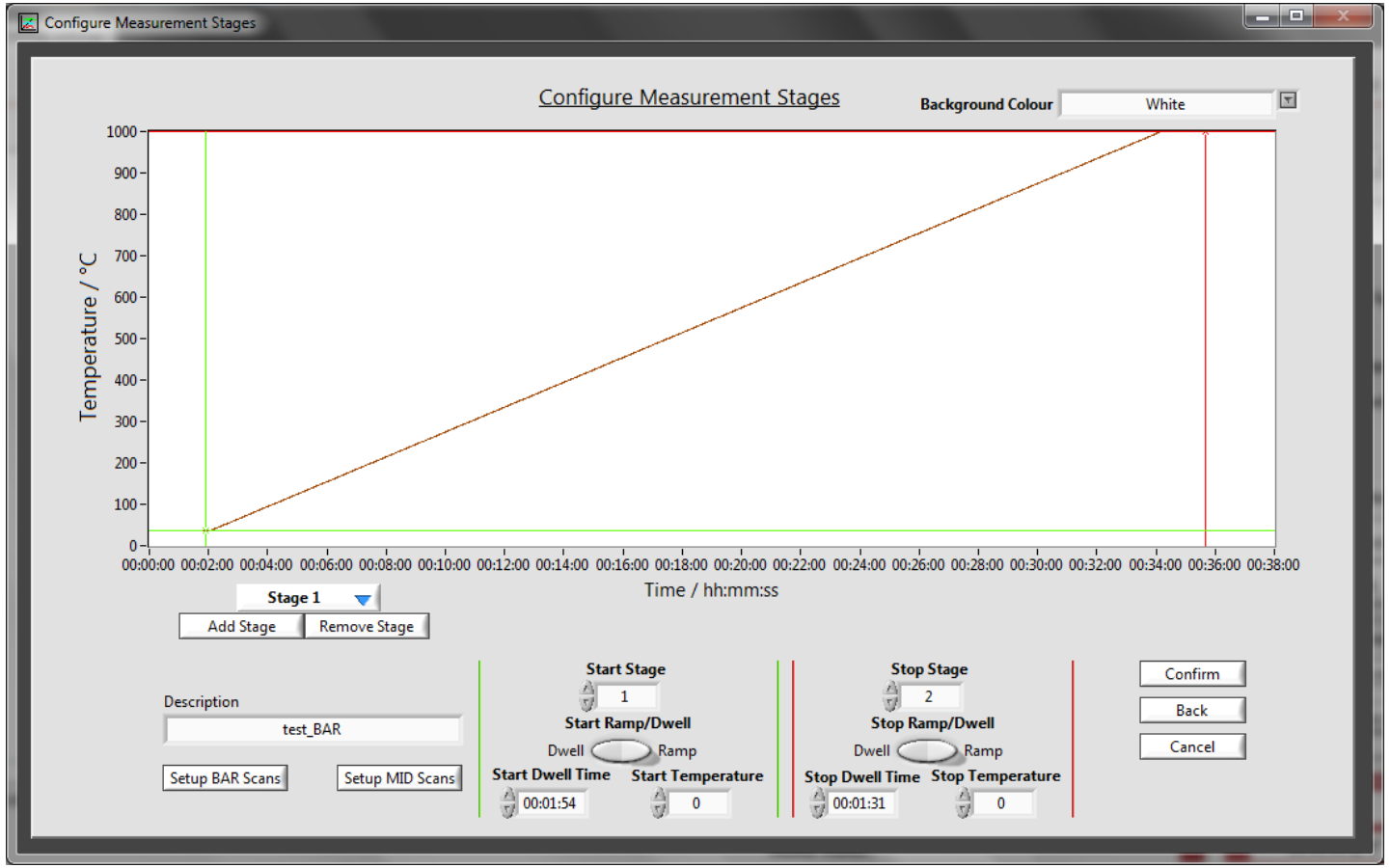


Experimental Setup



- Stage 1: Configure the temperature profile of the experiment
  - set ramp rate, set point and dwell time for each stage.

Experimental Setup

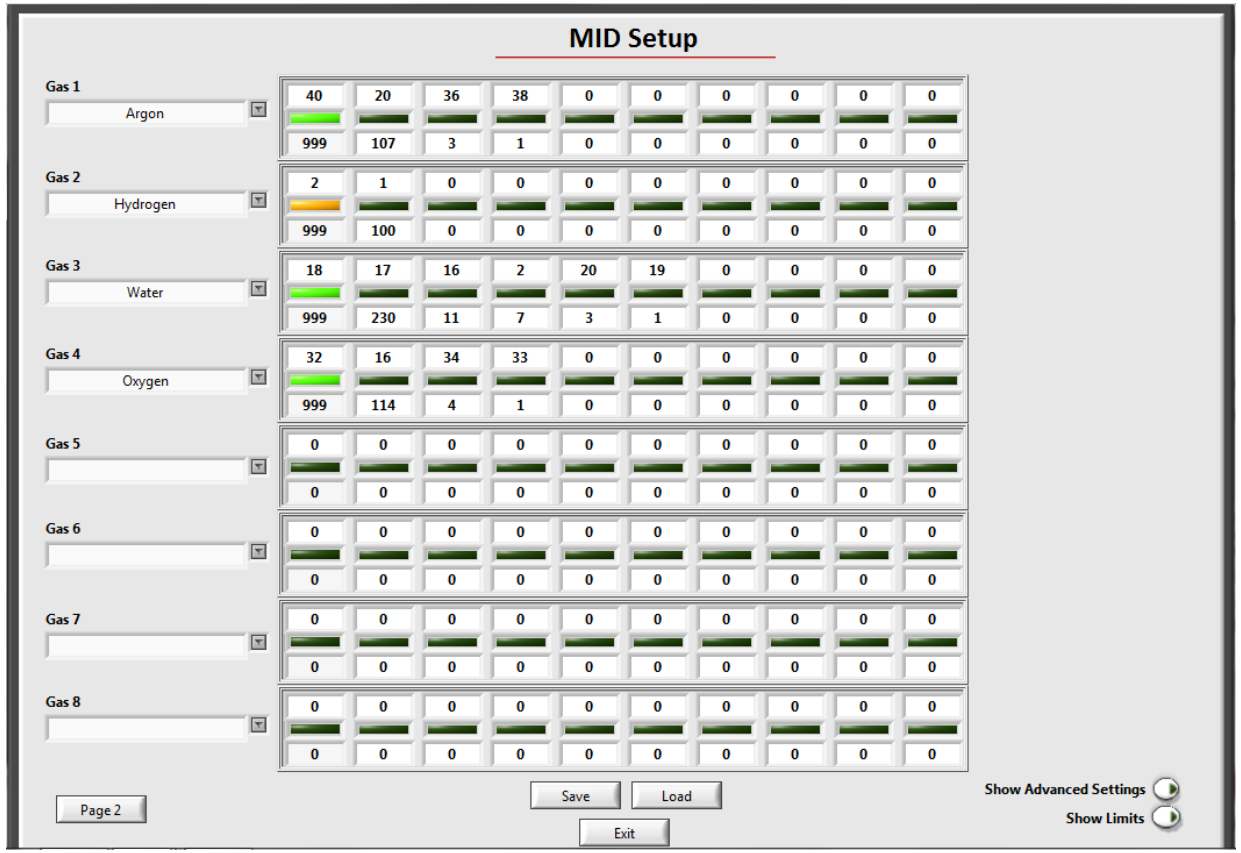


- Stage 2: Add measurement stages. Stages are triggered by time or temperature depending where on the temperature profile the start/stop is placed.
  - Different MS analysis types can be configured for each stage of the experiment.

MS Control - BAR Mode

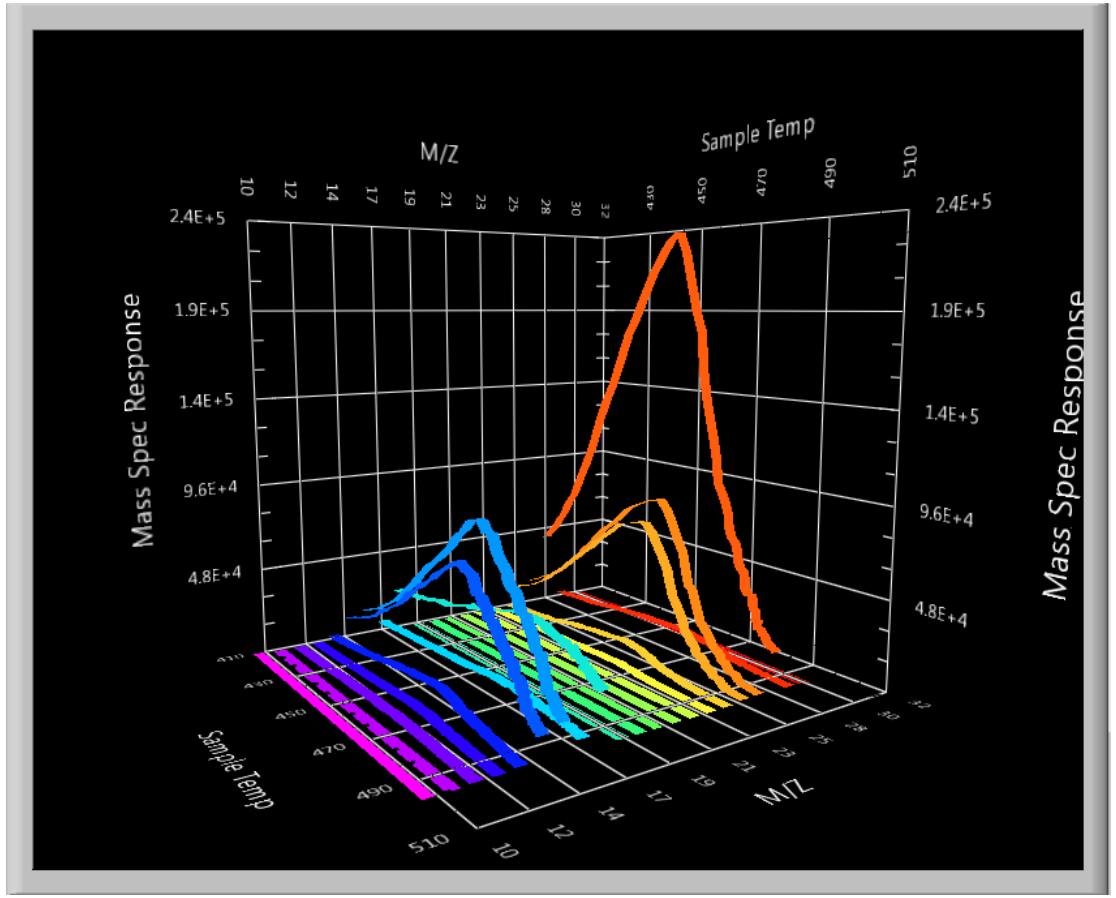
- Multiple Bar scans can be configured in 3 subscan sections for optimised sampling of unknowns.
- Ion source control for each subscan.

MS Control – MID Mode



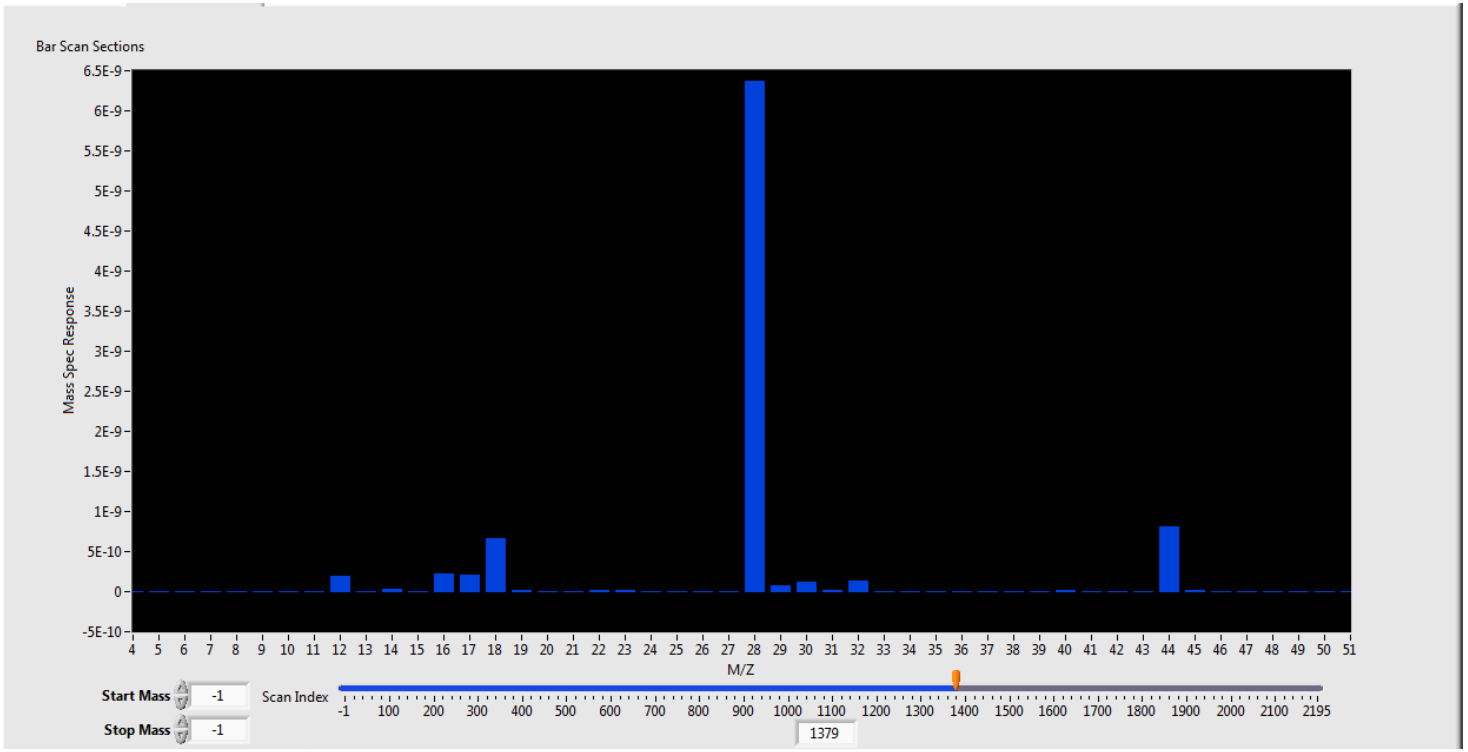
- MID Scan setup for known species.
- Automatic overlap removal.
- Includes library of most common gases.
- Ion source control for each species – preferential ionisation of some overlapping gases.

MS Display – 3D BAR



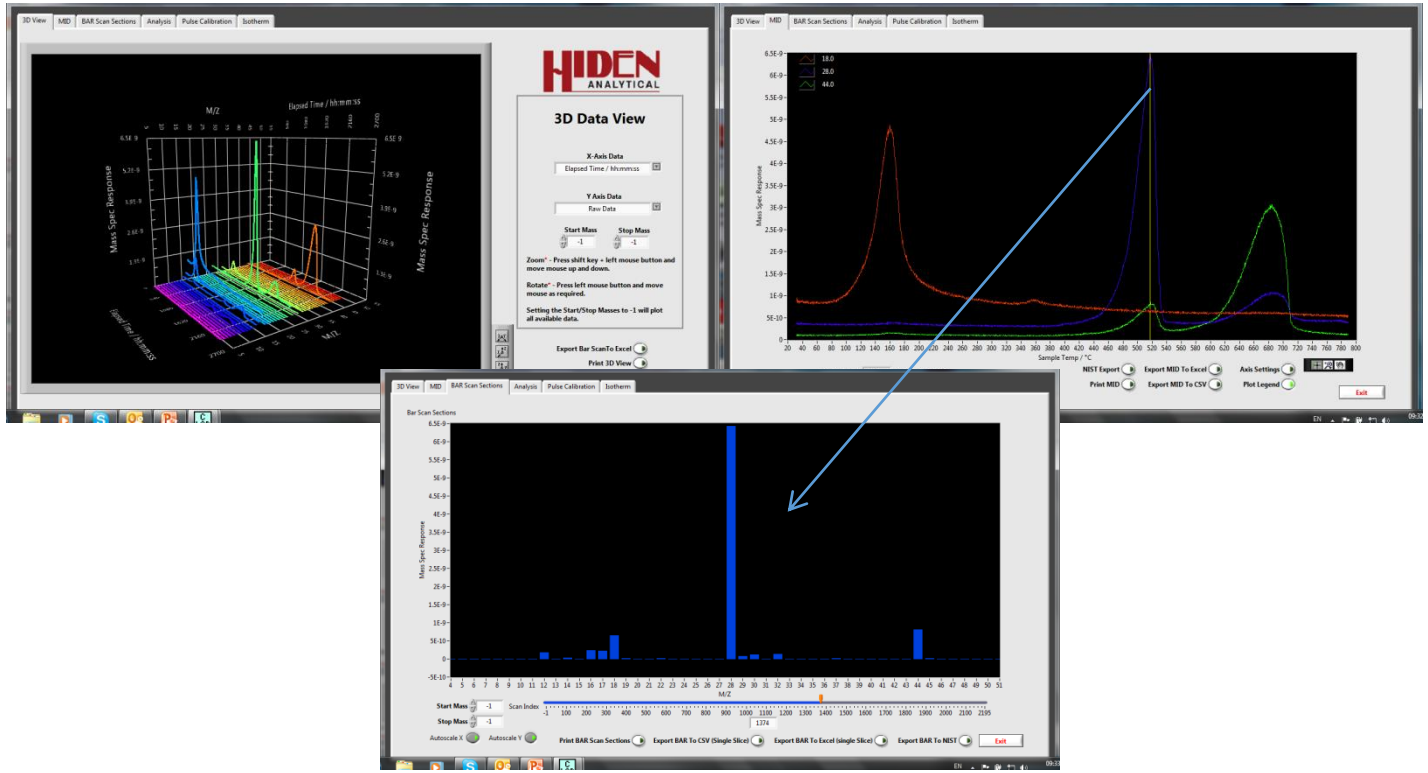
- 3D Bar Graph mode for easy identification of bar mode trends.
- Rotate or zoom in on regions of interest.

MS Display – 2D BAR



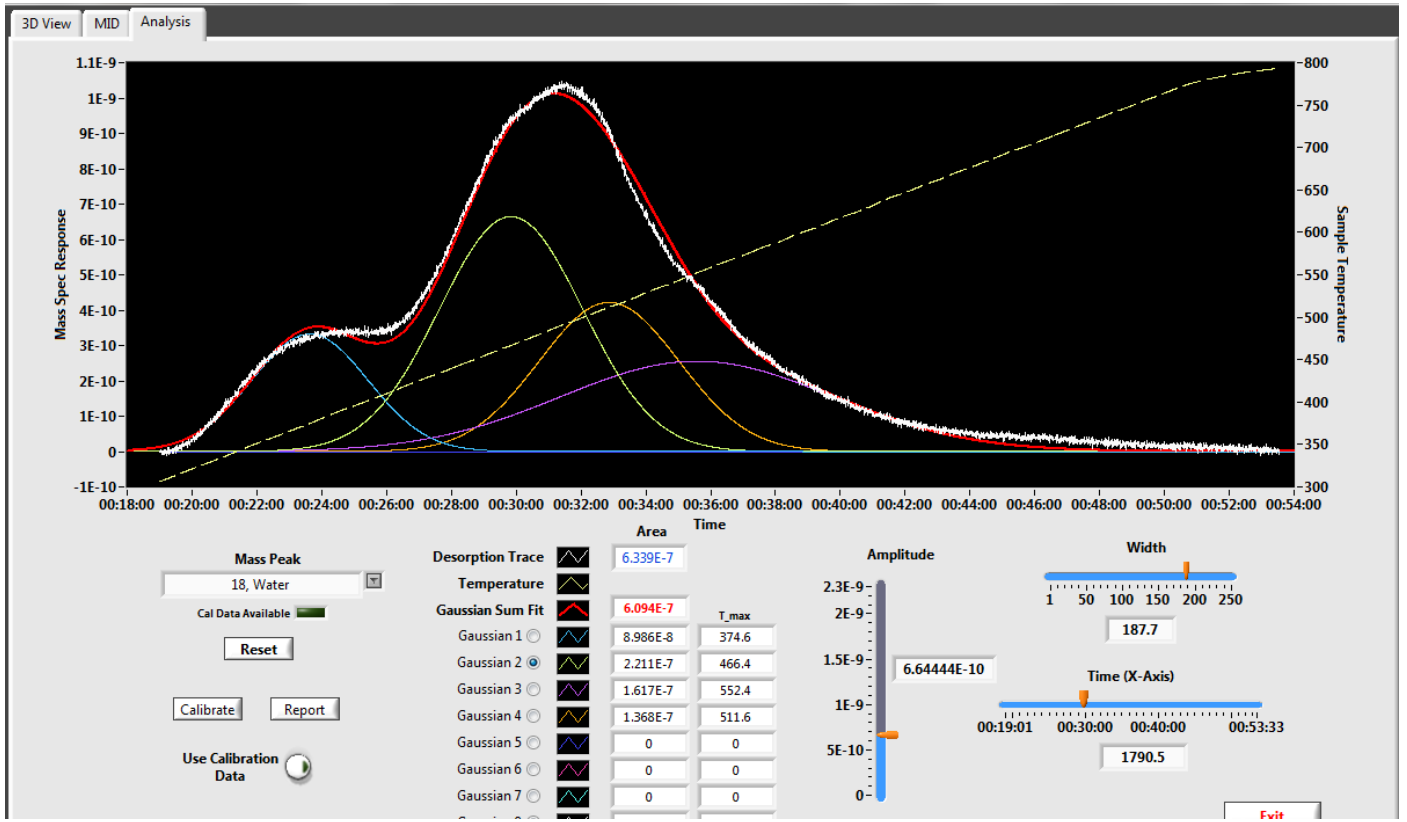
- View single cycle of BAR scan data

Data Analysis



- 3D Bar, 2D Bar and MID modes all available in data analysis mode.
- Multiple export/print options.
- Export selectable masses or whole scan to NIST database for identification of unknowns.
- 2D Bar and MID view linked to enable viewing of Bar scan at any point in the MID trace and vice versa.

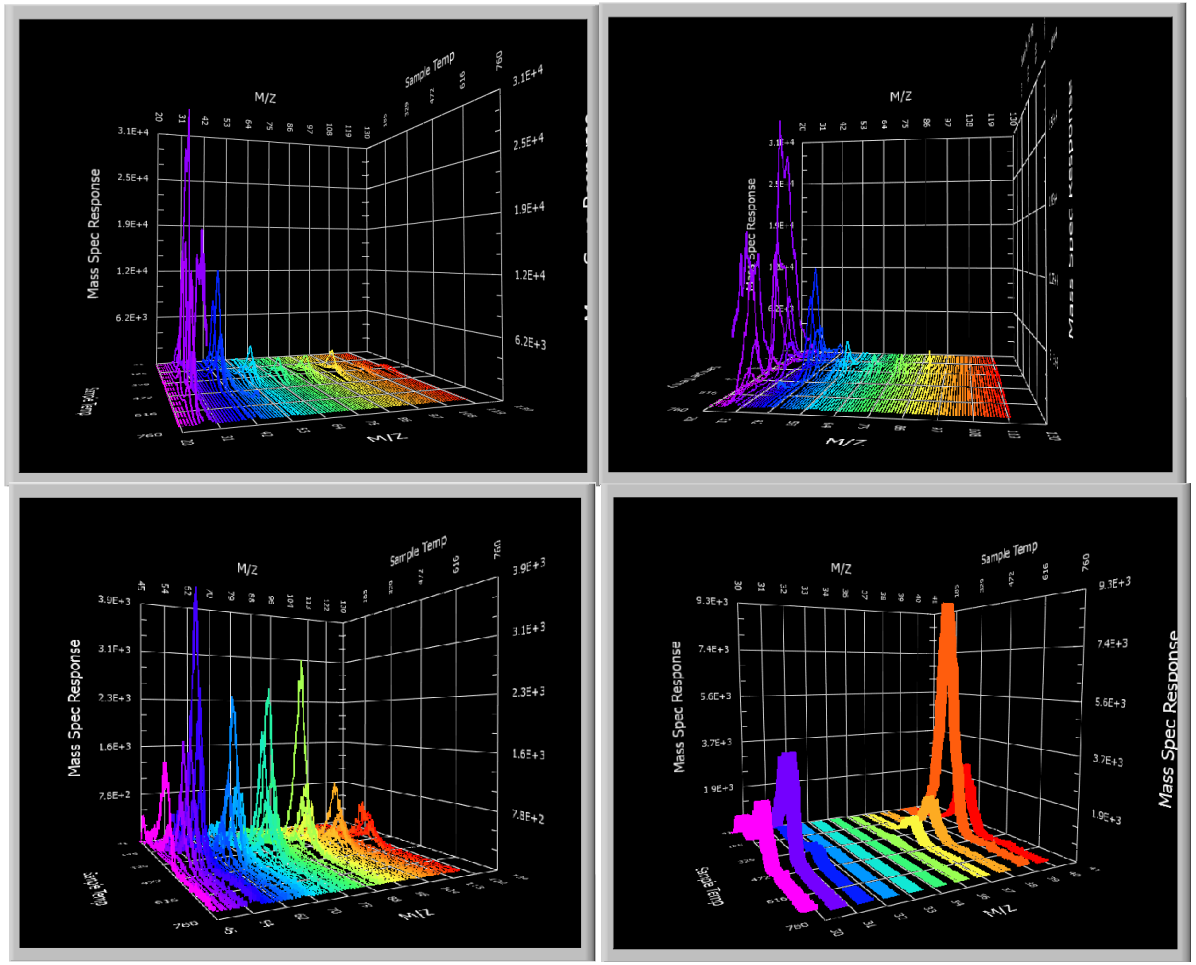
Data Analysis



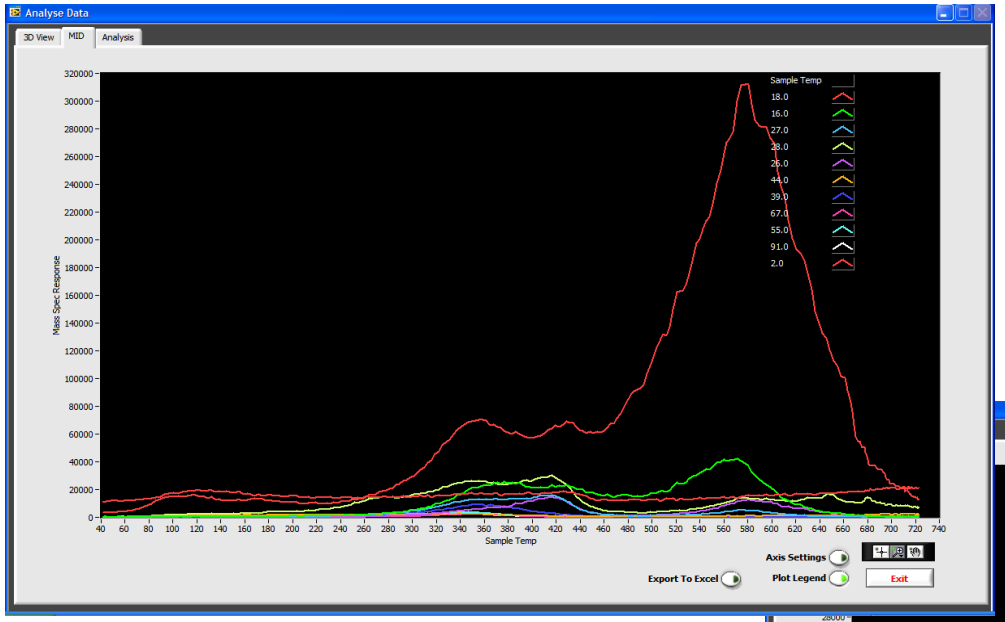
- Peak fitting analysis routines.
- Integrated area.
- Baseline subtraction.

TPDsoft

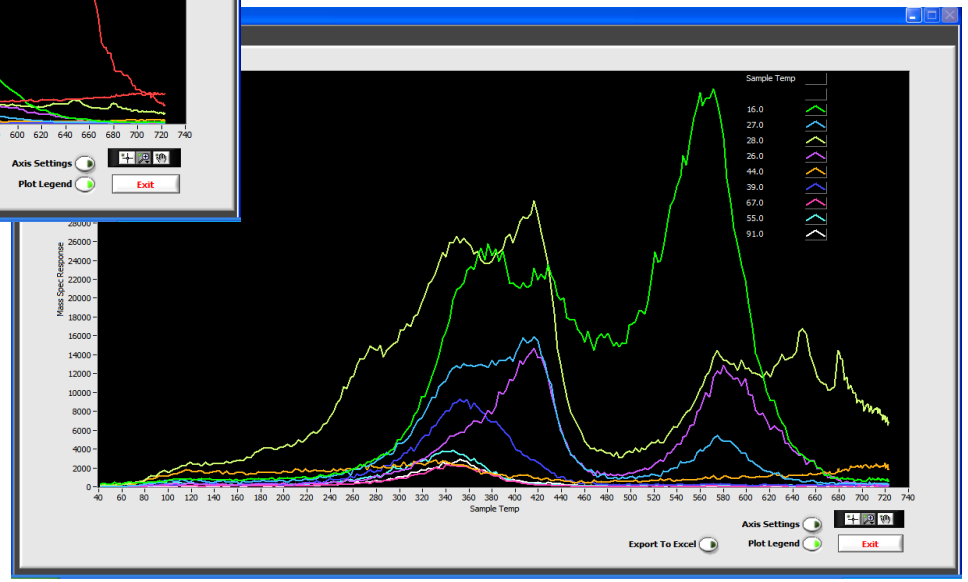
3D Bar view is fully rotatable and expandable in real time allowing easier viewing of trends in mass data.



TPDsoft



Trends can be extracted from Bar scan to give MS response vs temperature (or time) plot. Data output direct to Excel.



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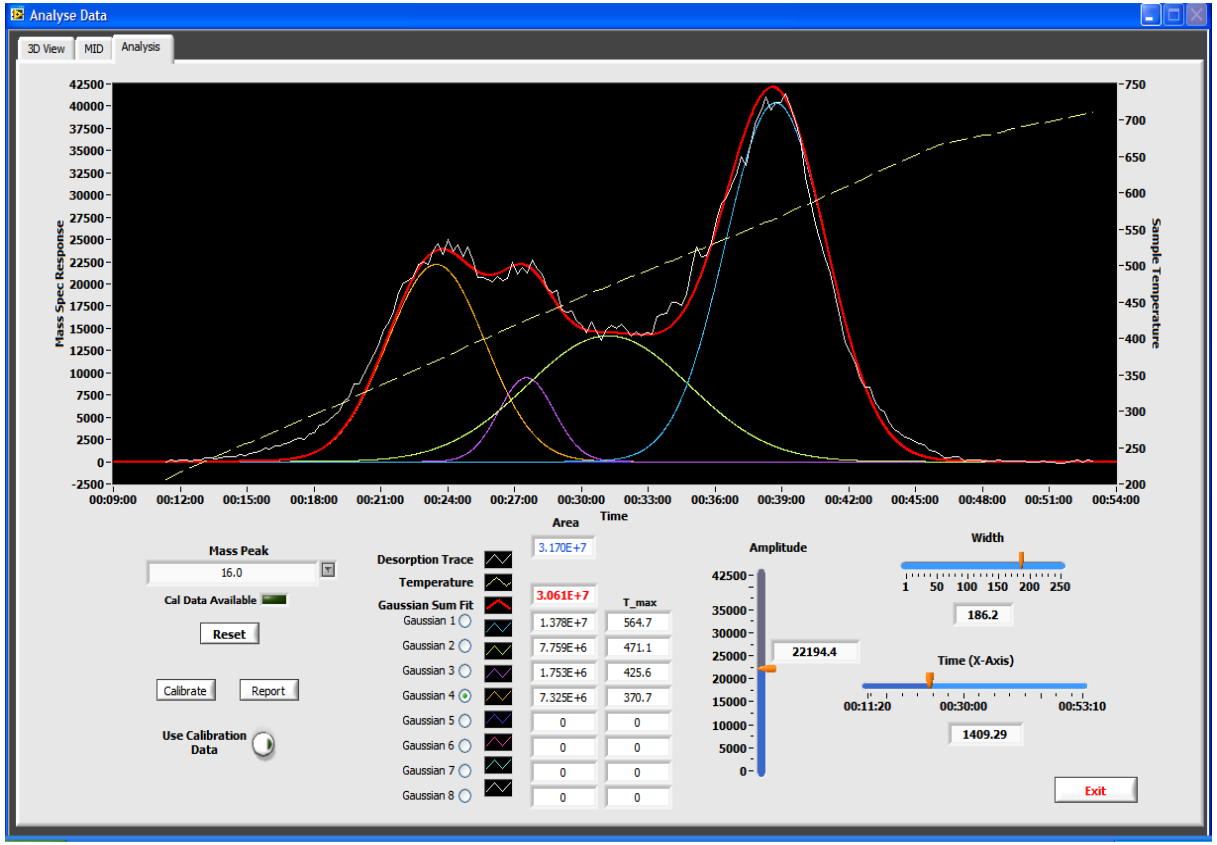


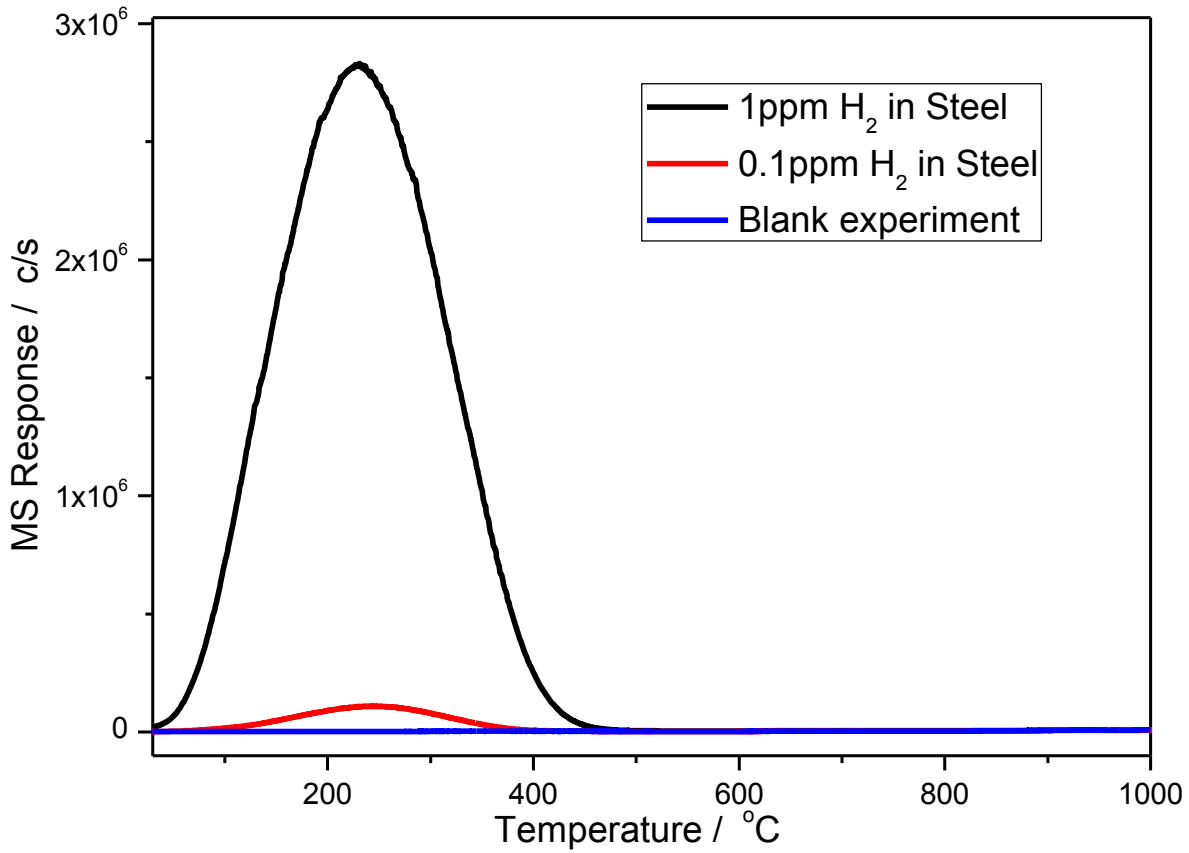
Peak fitting function for deconvolution of overlapping peaks. Output analysis to a test report.

(Note: example shown here is for illustrative purposes only)

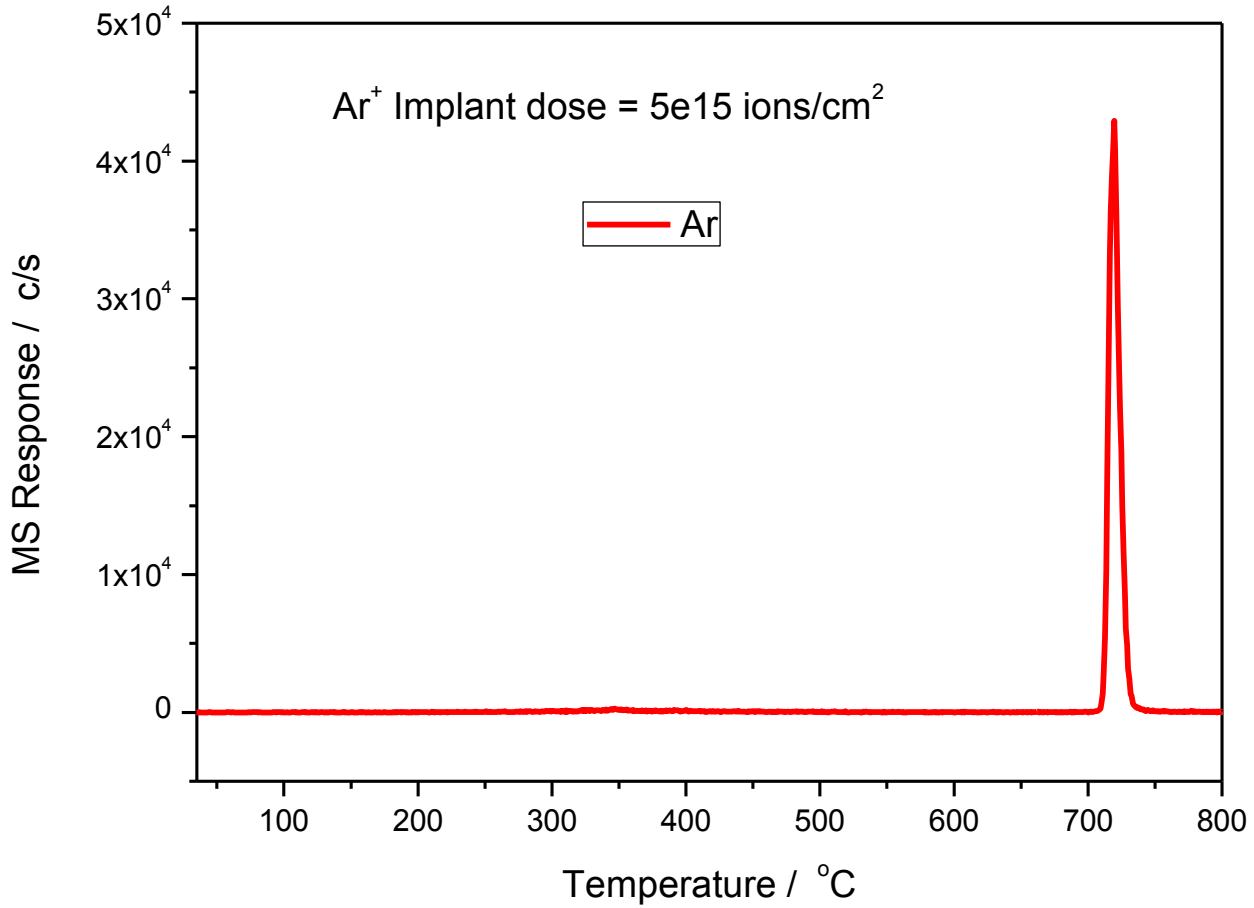
Application Areas

- Thin Films
- Photovoltaics
- Semiconductors
- Solid Oxide Fuel Cells
- Measuring contamination levels in metals (nuclear industry)

H_2 Desorption from Steel Samples



Ar^+ implanted Si Sample



Key features

- Triple filter high performance mass spectrometer with pulse ion counting detector (Hiden 3F PIC series)
- Multiport UHV chamber
- Heated sample stage to 1000 °C (maximum sample temperature is sample dependent)
- Integrated cooling of mass spectrometer shroud and heater assembly
- Sample transfer mechanism and loadlock plus Z-drive for optimum detector positioning
- TPDsoft thermal analysis software including analysis routines
- Bakeout jacket (200 °C max.)

Recent Hiden Customers

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