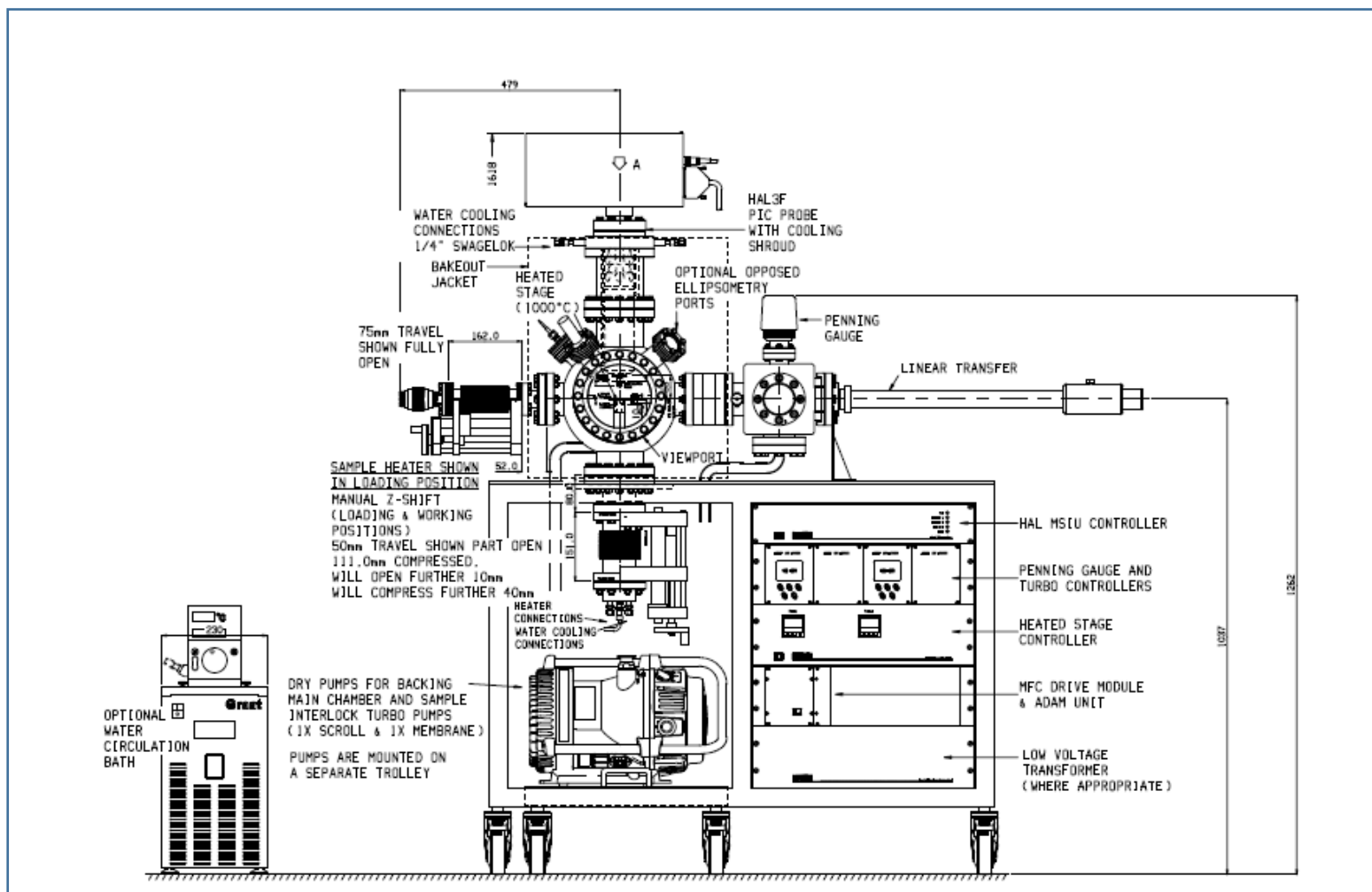


Hidden TPD Workstation

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

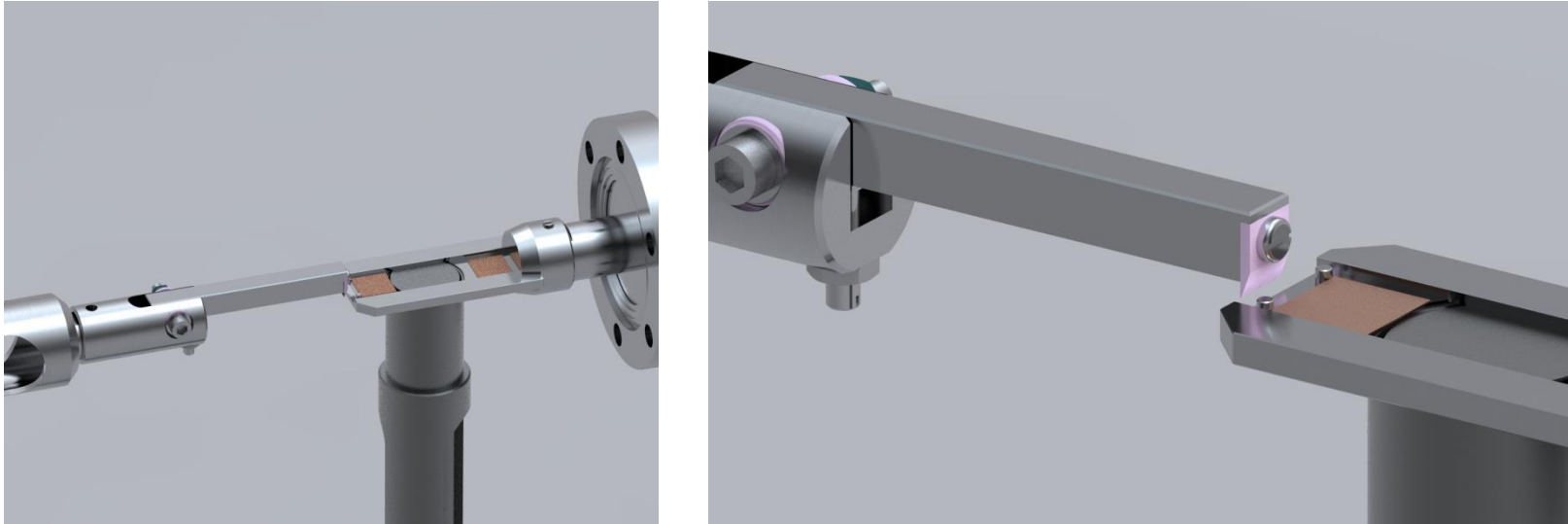
TPD Workstation



TPD Workstation

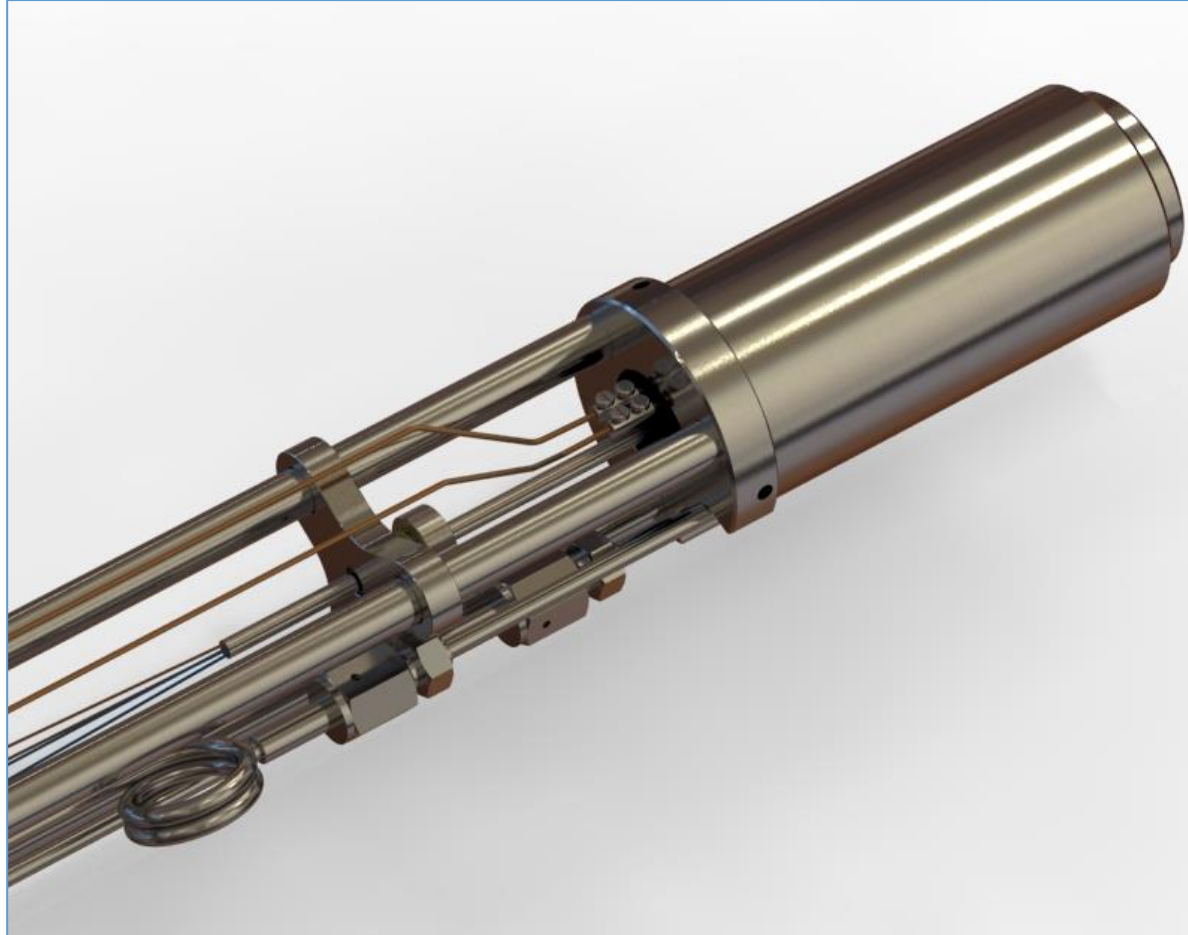


Sample Loading Mechanism

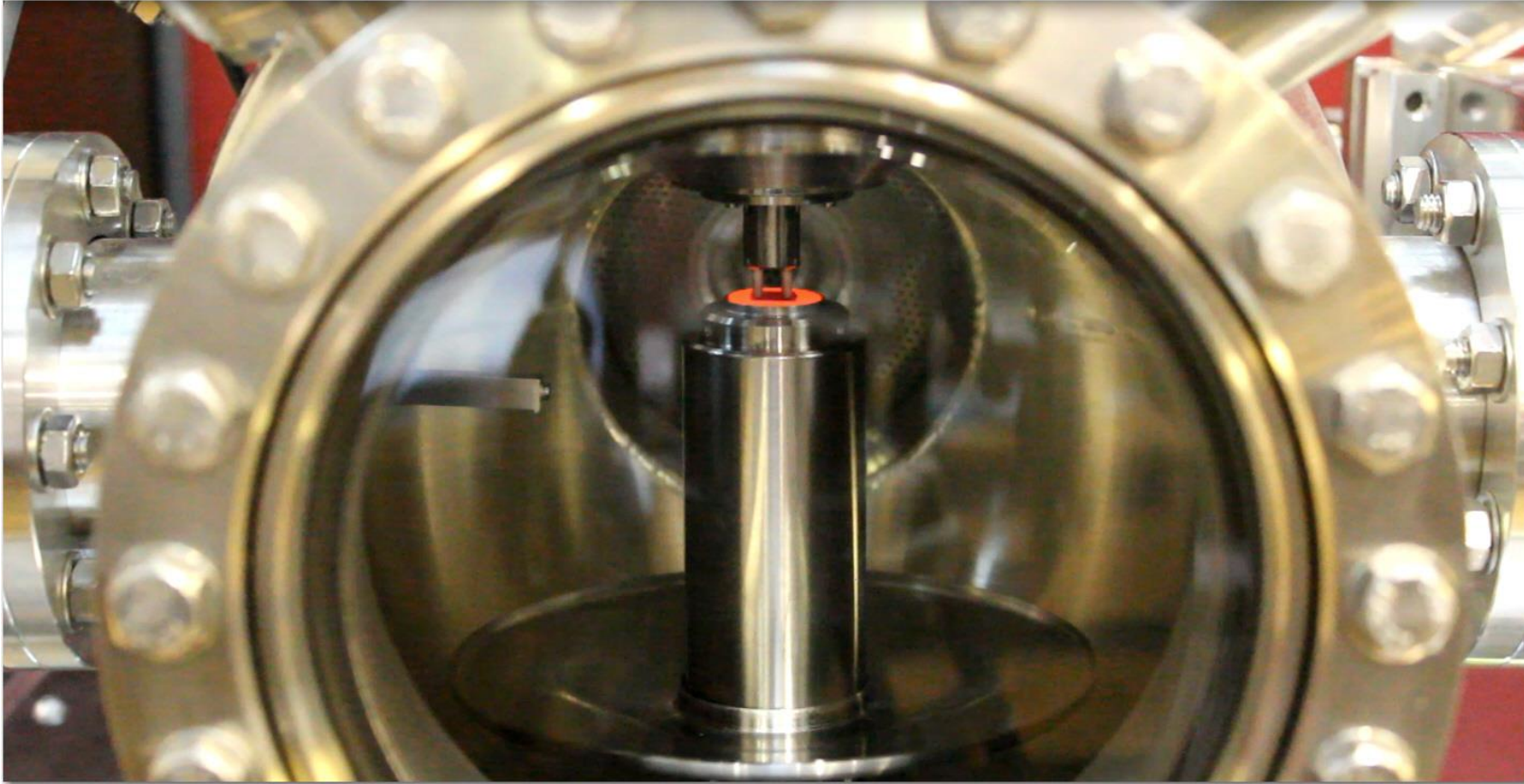


Only the sample is inserted/removed from the UHV analysis chamber to the loadlock, i.e. the heated stage remains at UHV at all times in order to minimise unwanted desorption peaks.

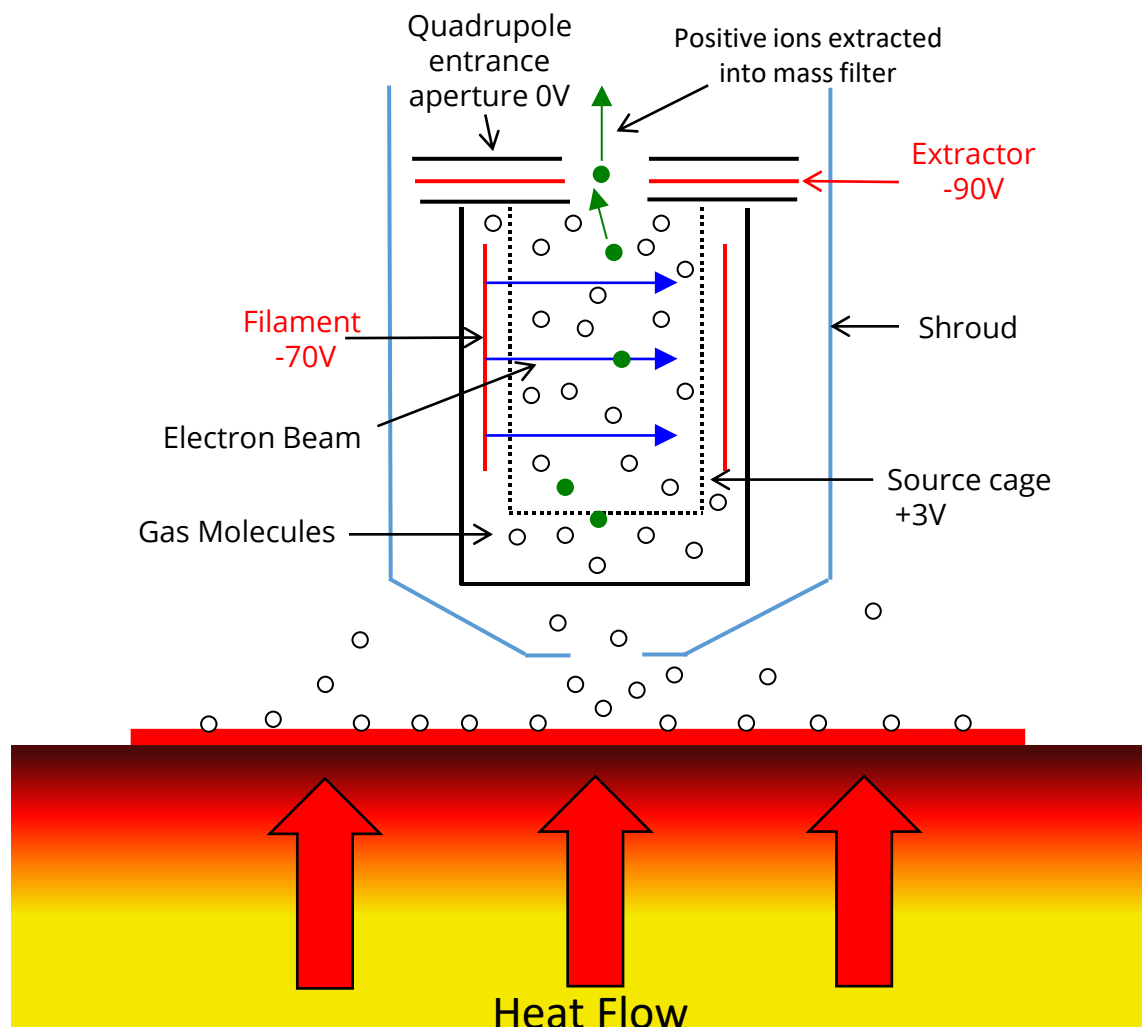
TPD Heater



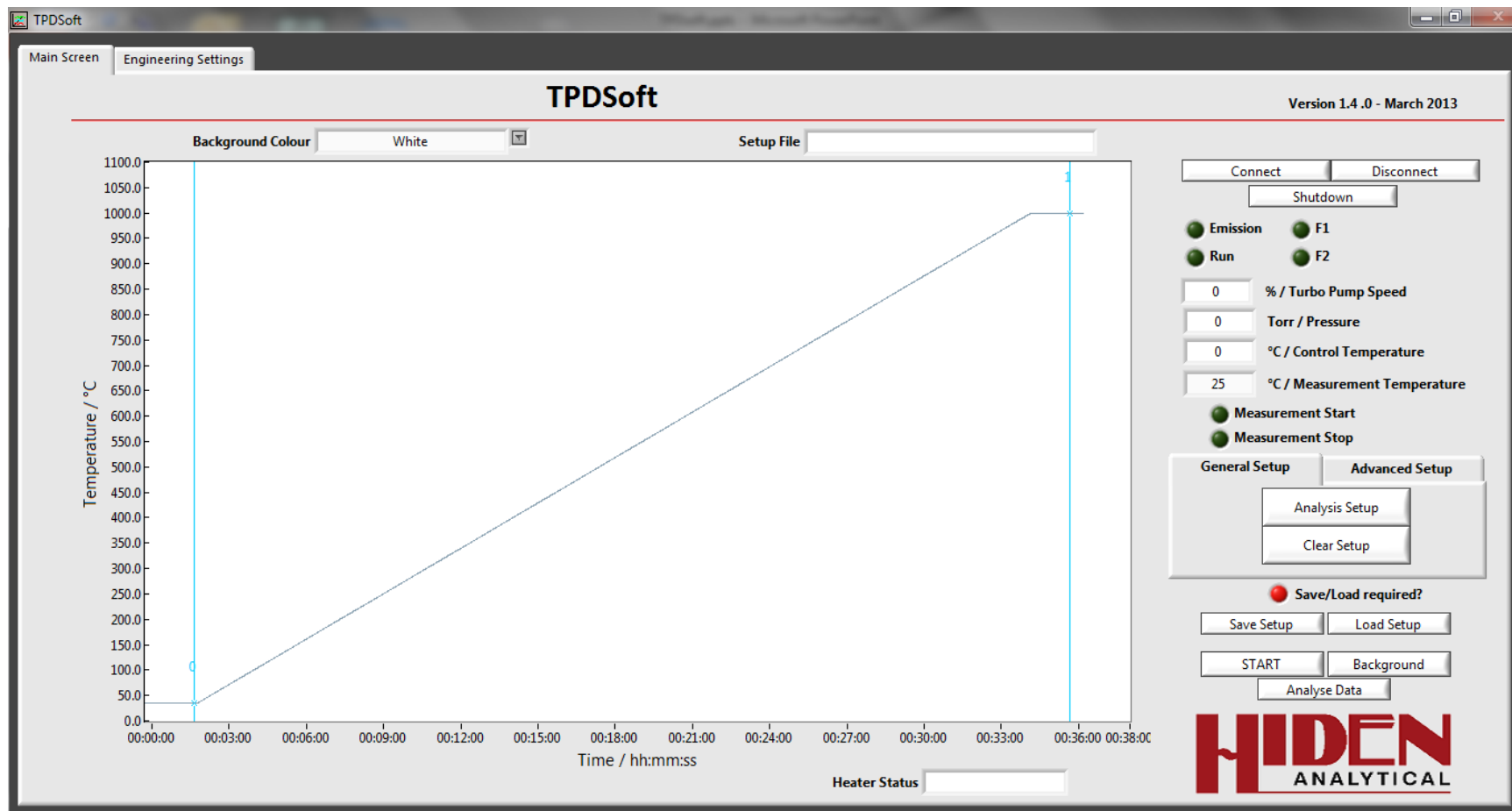
- Resistive Heating element
- Integral water cooled shroud to minimise outgassing



Thermal Desorption and Detection



TPDsoft



- Control of MS and Temperature in one software package.

Hardware Control Parameters

TPDSOft

Main Screen Engineering Settings

Locked

Engineering Settings

MSIU Settings

Multiplier Voltage

Filament

Settle Time Fast %

Settle Time Normal %

Settle Time Slow %

Units ☒ % ☐ ms

Dwell Time Fast %

Dwell Time Normal %

Dwell Time Slow %

PID Settings

Range	Proportional	Integral	Derivative
0.0 < 11.0 C/min	<input type="text" value="120"/>	<input type="text" value="55"/>	<input type="text" value="20"/>
11.0 < 21.0 C/min	<input type="text" value="120"/>	<input type="text" value="52"/>	<input type="text" value="20"/>
21.0 < 31.0 C/min	<input type="text" value="120"/>	<input type="text" value="55"/>	<input type="text" value="20"/>
31.0 < 41.0 C/min	<input type="text" value="120"/>	<input type="text" value="55"/>	<input type="text" value="20"/>

Add Row +

Remove Row -

Thermal Settings

Water Bath Default Temperature Set

IR Thermometer Disabled

Minimum Thermal Value

Measurement Temperature Calibration Value

Heating Power

0 - 100	<input type="text" value="10"/>
101 - 200	<input type="text" value="20"/>
201 - 300	<input type="text" value="30"/>
301 - 400	<input type="text" value="40"/>
401 - 500	<input type="text" value="50"/>
501 - 600	<input type="text" value="60"/>
601 - 700	<input type="text" value="100"/>
701 - 800	<input type="text" value="100"/>
801 - 900	<input type="text" value="100"/>
901 - 1100	<input type="text" value="100"/>

Device Settings Folder Information

Mass Spectrometer

Connection Type

Com Port

WR Number

Socket

Use Hiden.ini ☒

Detector Type

PIC

Note. Selecting the incorrect detector type will cause the system to become unstable and should NOT be done.

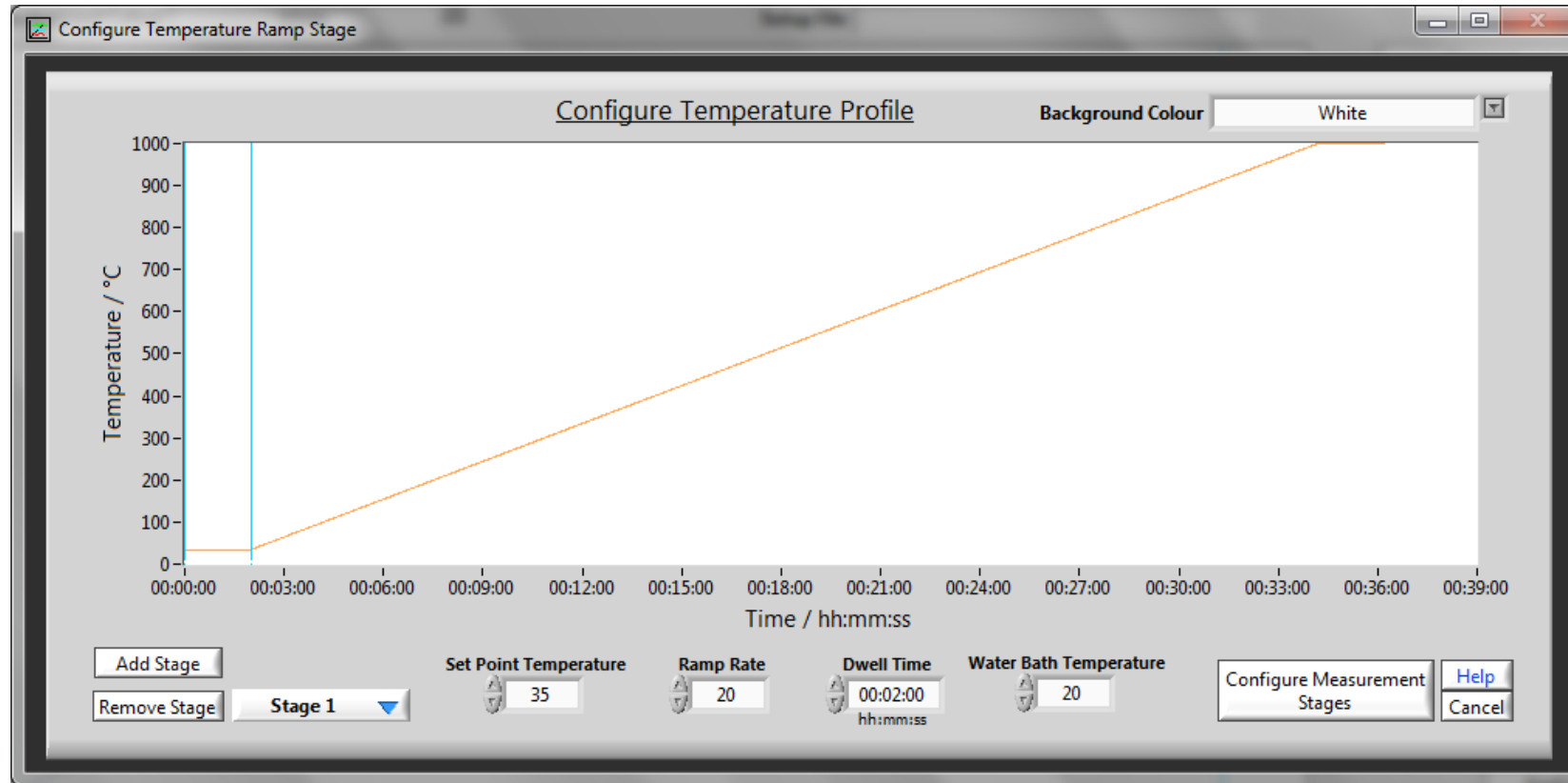
Water Bath

Port

Model

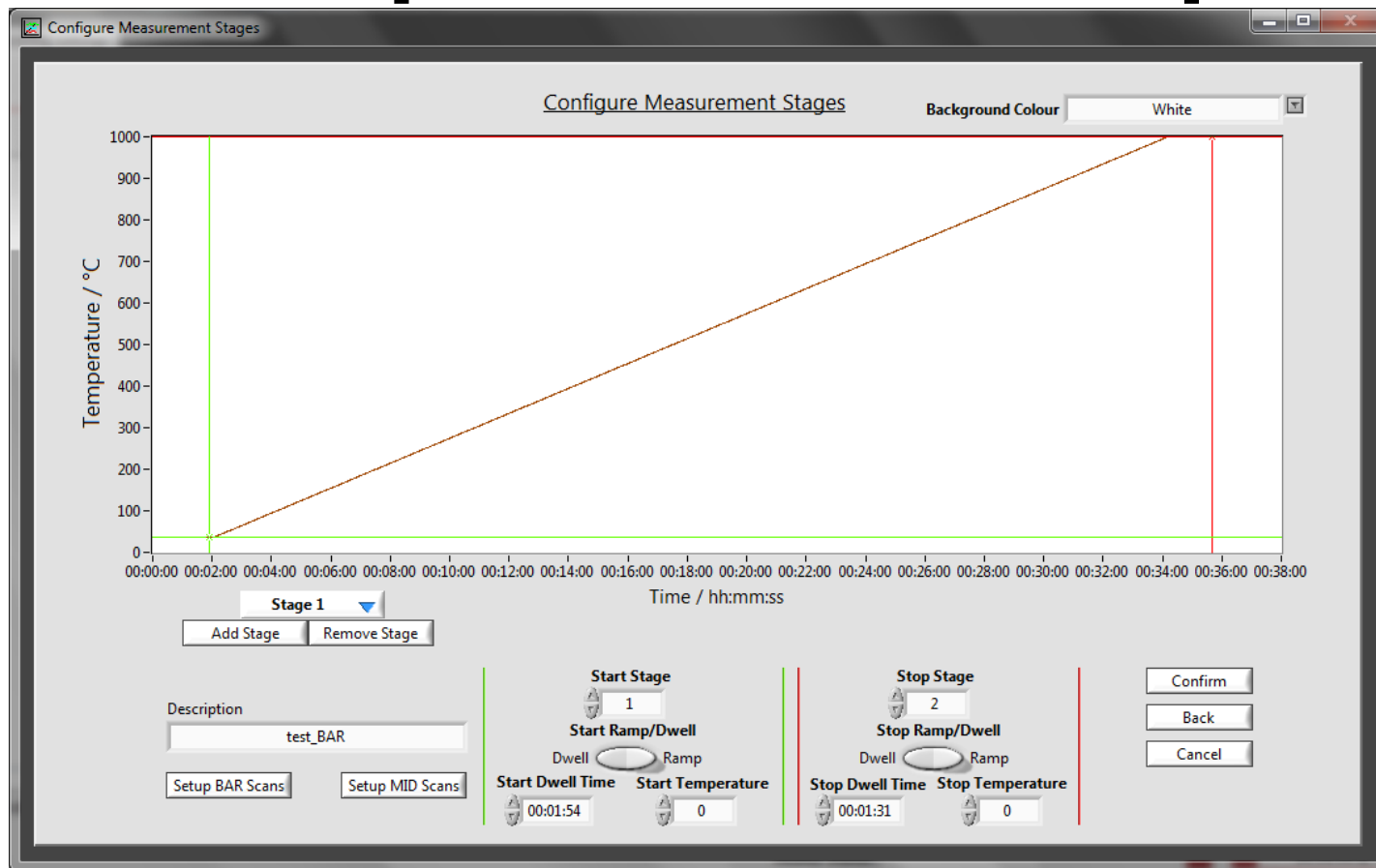
Test

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

The screenshot displays the 'BAR Scan Setup' window, which is titled 'BAR Scan Settings'. It contains three subscan configuration sections: 'Bar Subscan 1', 'Bar Subscan 2', and 'Bar Subscan 3'. Each section has a set of controls for various parameters. The 'Bar Subscan 1' section is currently selected and highlighted. The controls for each subscan are as follows:

Start Mass	Stop Mass	Increment	Detector	Autorange High	Autorange Low	Start Range	AutoZero	Electron Energy	Emission Current	Settle Speeds	Dwell Time	
Enabled	1	30	1	SEM	-7	-11	-8	ON	70	500	Normal	Normal
Enabled	35	50	1	SEM	-7	-11	-8	ON	70	500	Normal	Normal
Enabled	100	200	1	SEM	-7	-11	-8	ON	70	500	Normal	Normal

At the bottom of the window, there are three buttons: 'Save', 'Load', and 'Exit'.

- 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 Setup

Gas	40	20	36	38	0	0	0	0	0	0
Gas 1 Argon	999	107	3	1	0	0	0	0	0	0
Gas 2 Hydrogen	999	100	0	0	0	0	0	0	0	0
Gas 3 Water	999	230	11	7	3	1	0	0	0	0
Gas 4 Oxygen	999	114	4	1	0	0	0	0	0	0
Gas 5	0	0	0	0	0	0	0	0	0	0
Gas 6	0	0	0	0	0	0	0	0	0	0
Gas 7	0	0	0	0	0	0	0	0	0	0
Gas 8	0	0	0	0	0	0	0	0	0	0

Page 2

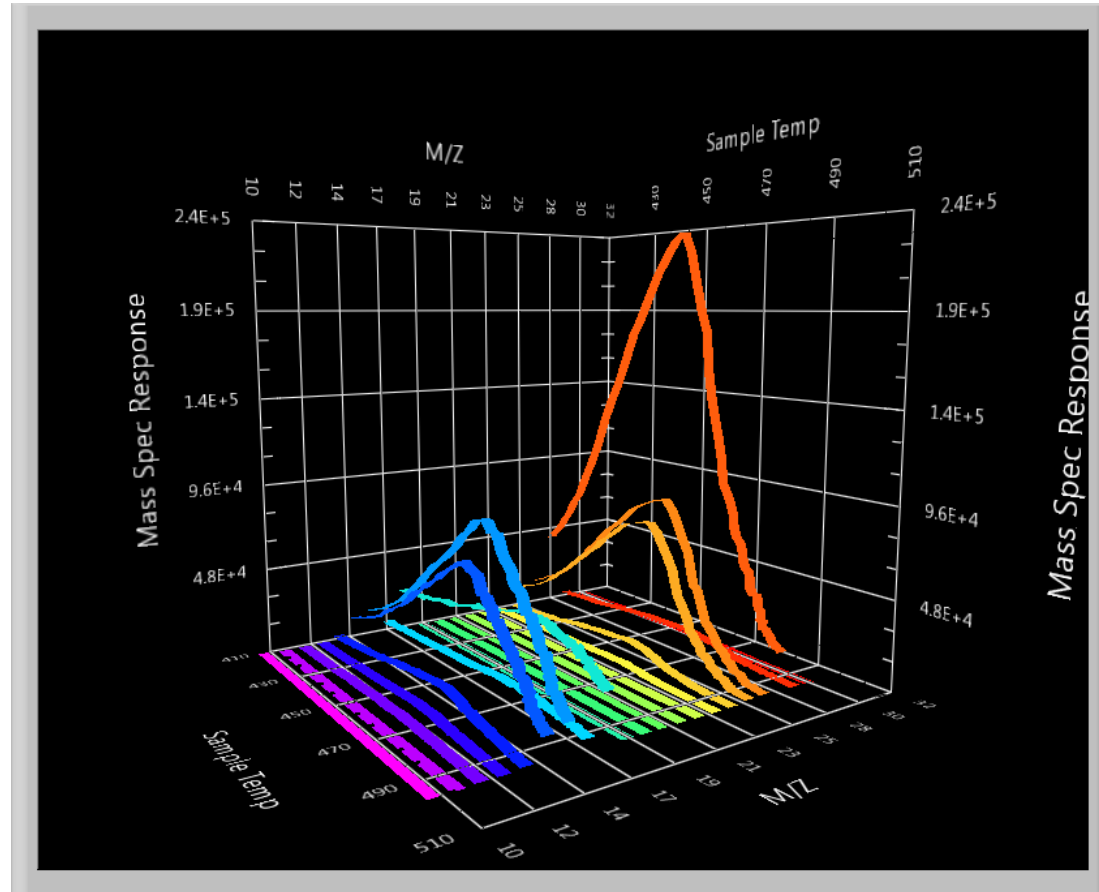
Save Load

Exit

Show Advanced Settings Show Limits

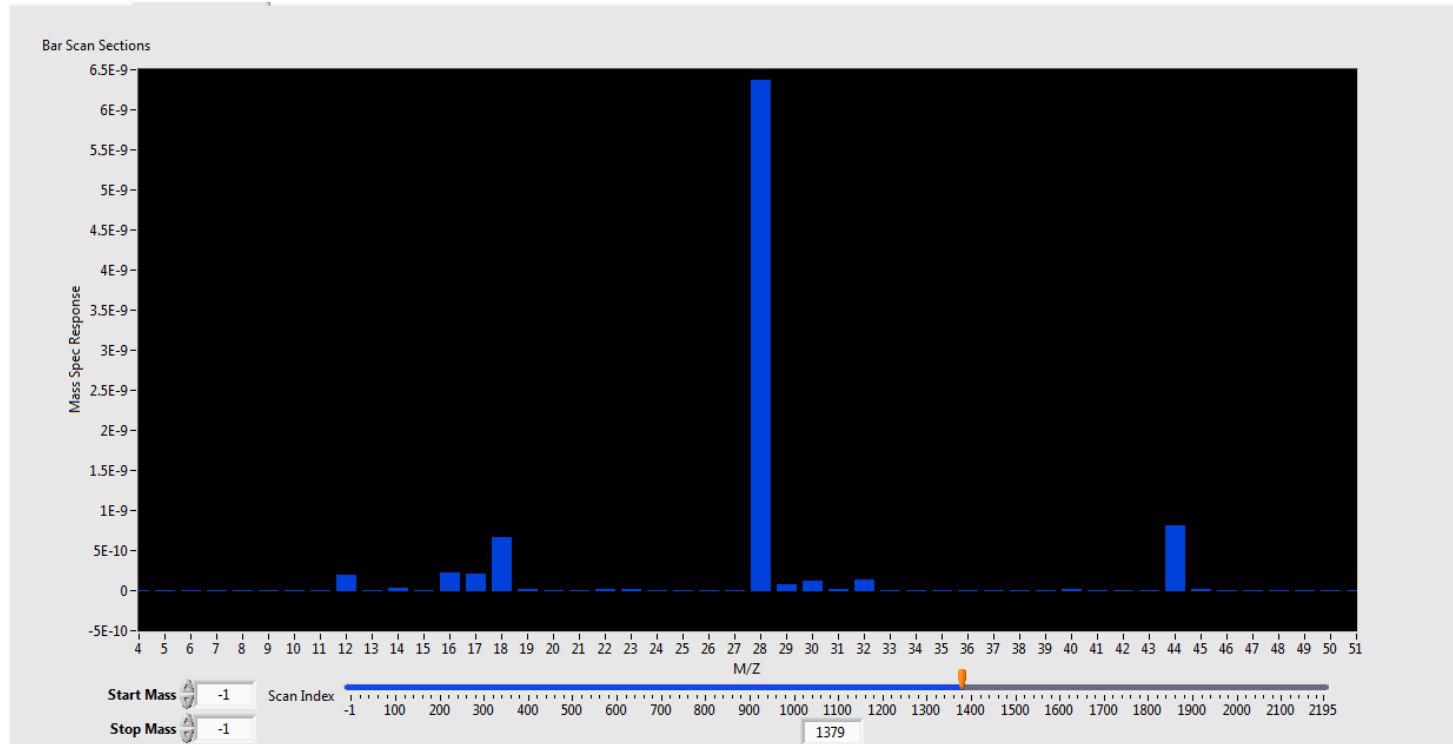
- MID Scan setup for known species.
- Automatic overlap removal.
- Includes library of most common gases.
- Ion source control for each species – preferential ionisation of some overlapping gases.

MS Display – 3D BAR



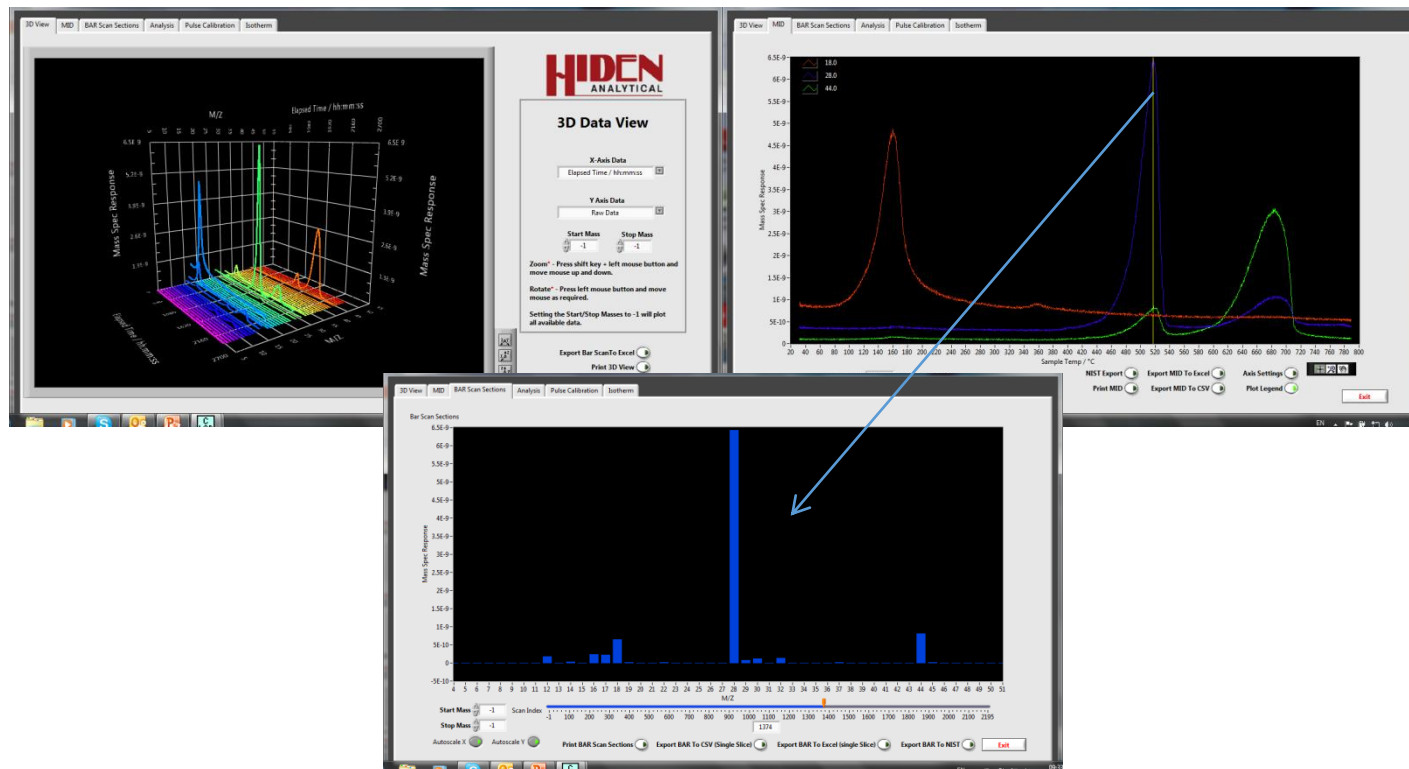
- 3D Bar Graph mode for easy identification of bar mode trends.
- Rotate or zoom in on regions of interest.

MS Display - 2D BAR



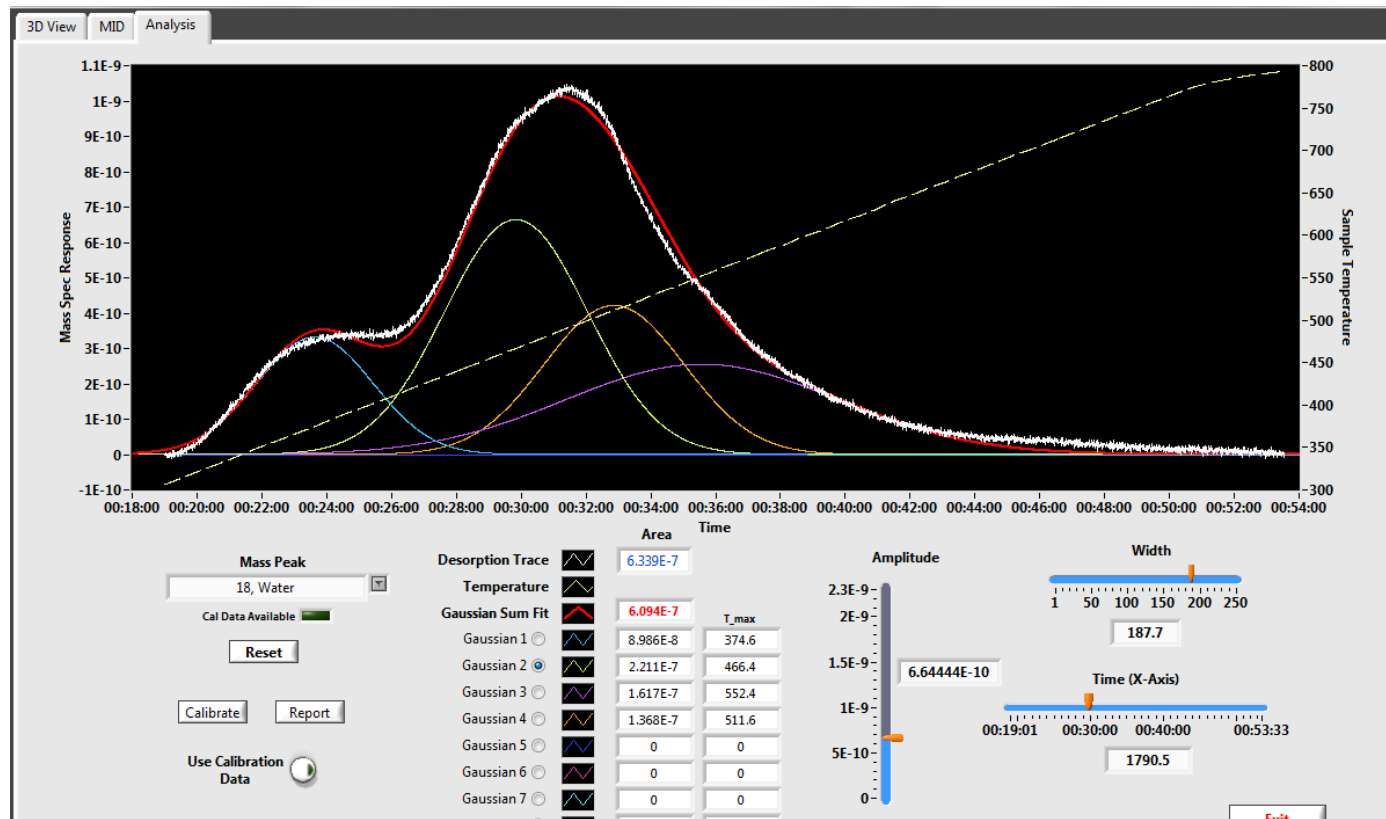
- View single cycle of BAR scan data

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.

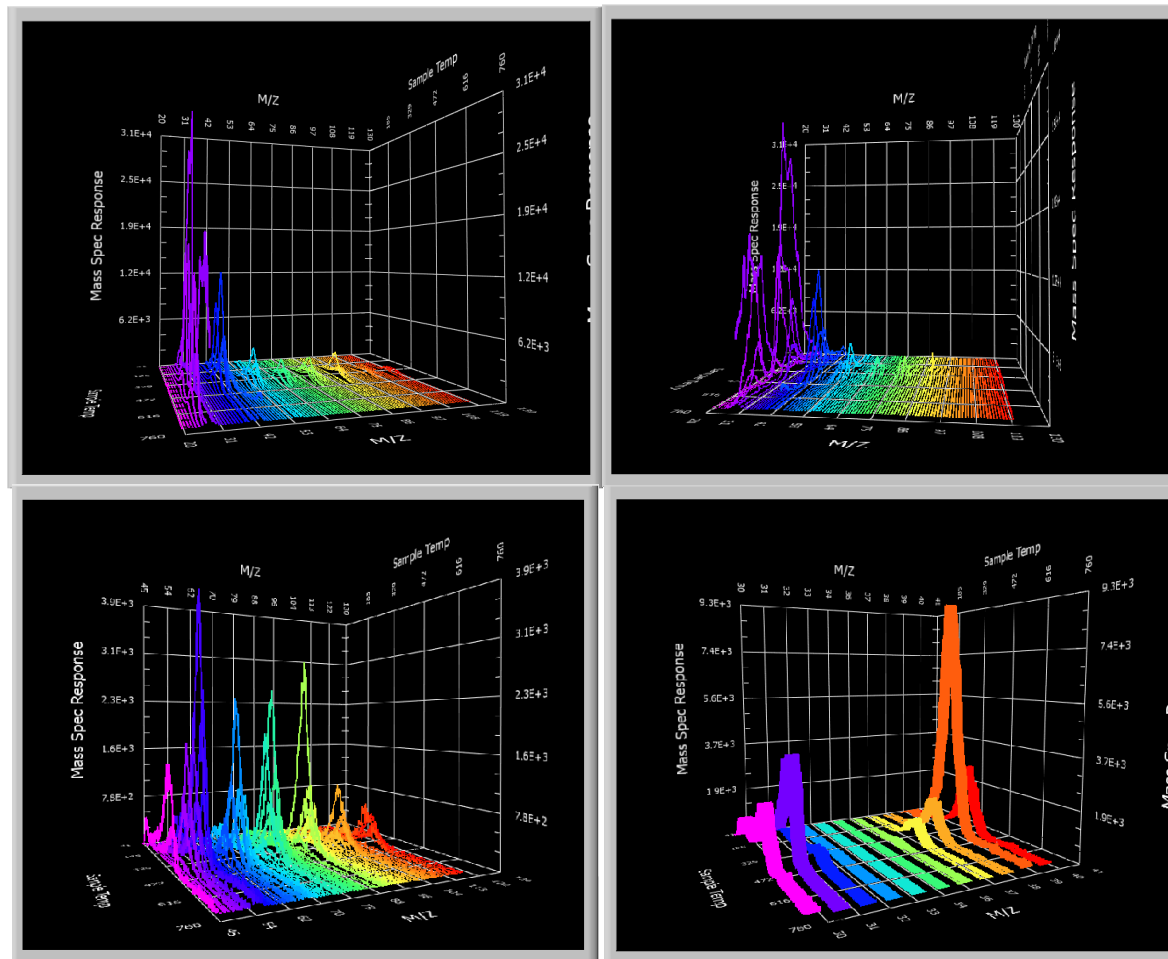
Data Analysis



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

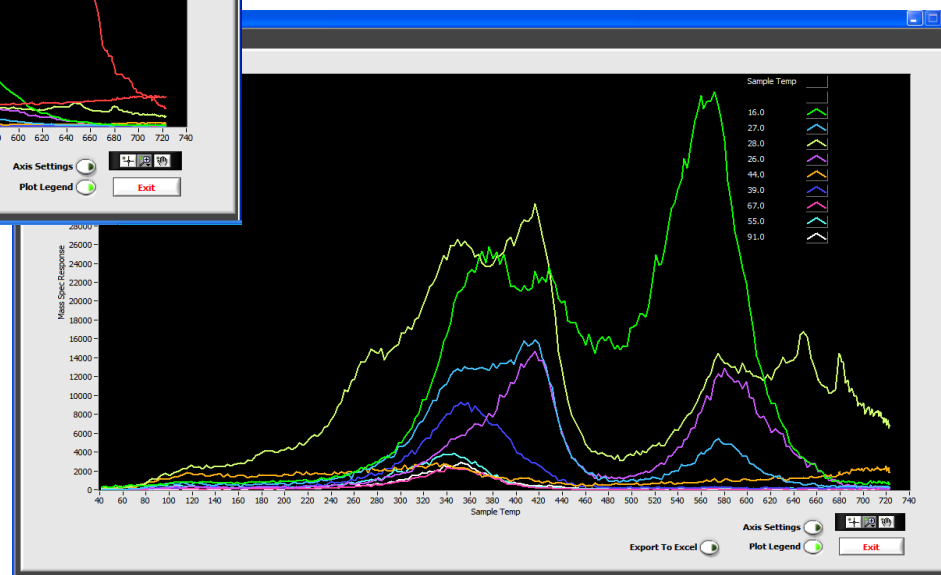
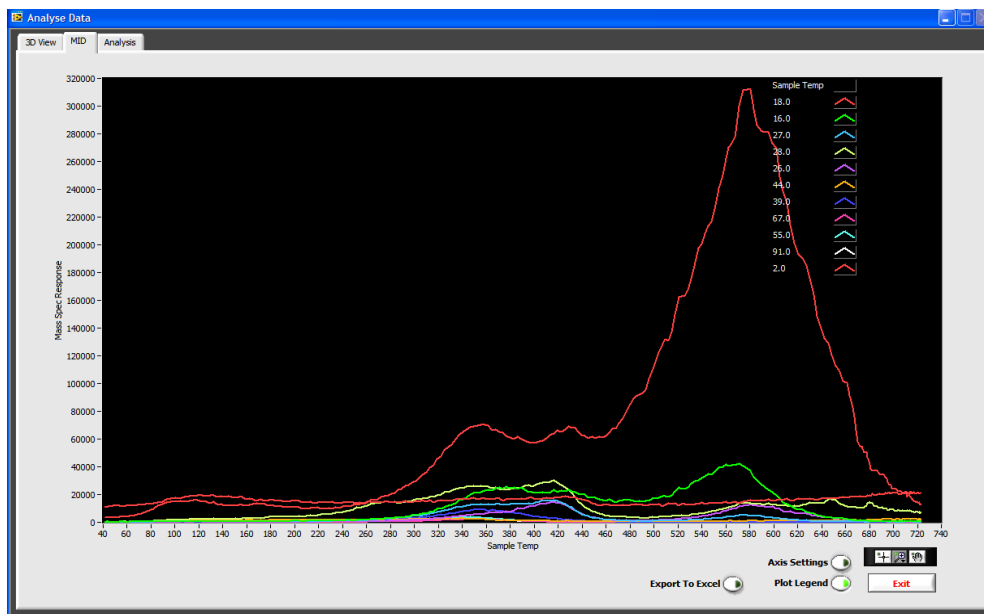
TPDsoft

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

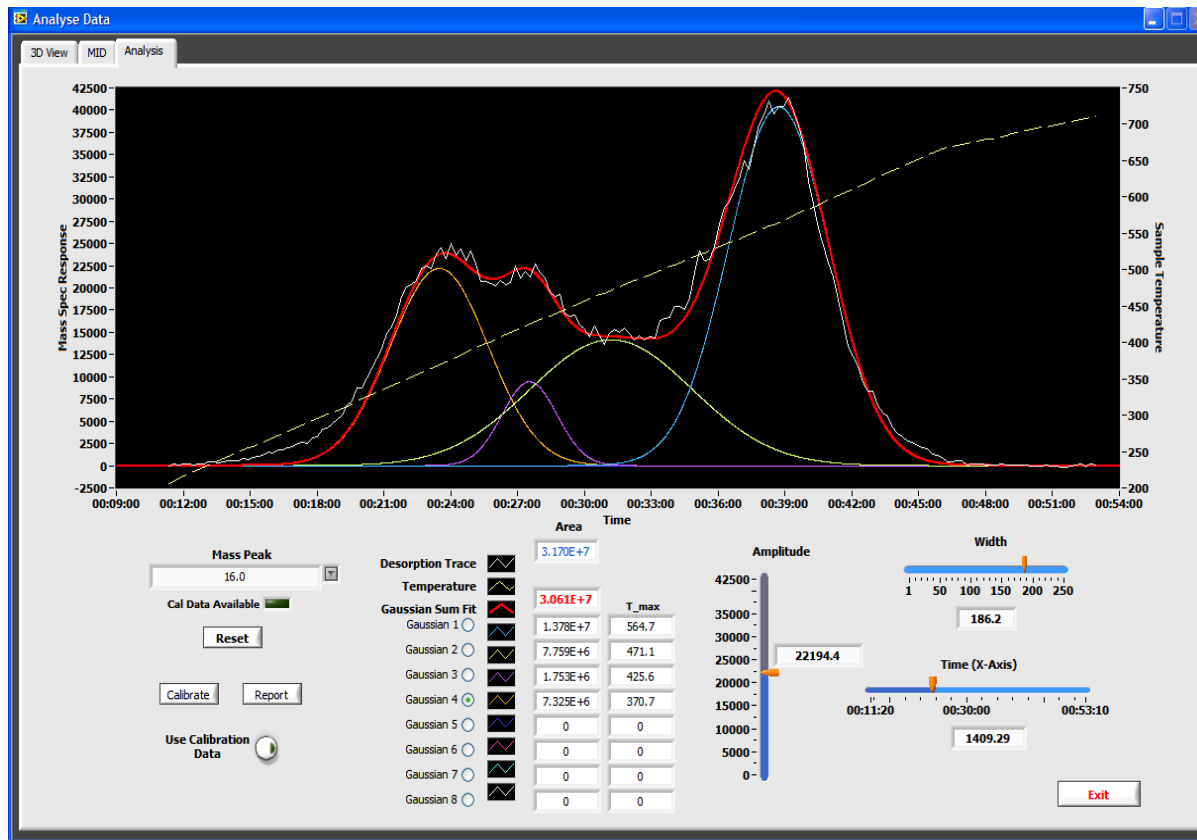


TPDsoft

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



TPDsoft



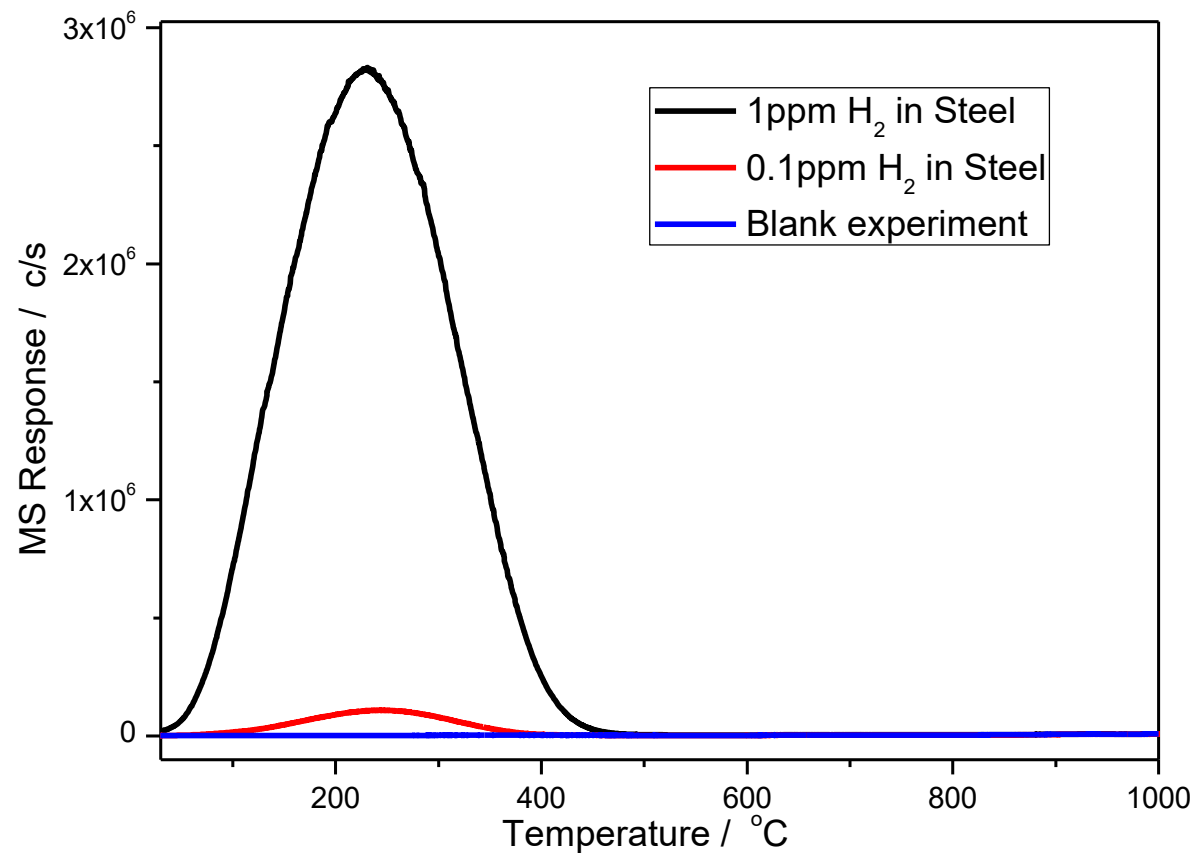
Peak fitting function for deconvolution of overlapping peaks. Output analysis to a test report.

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

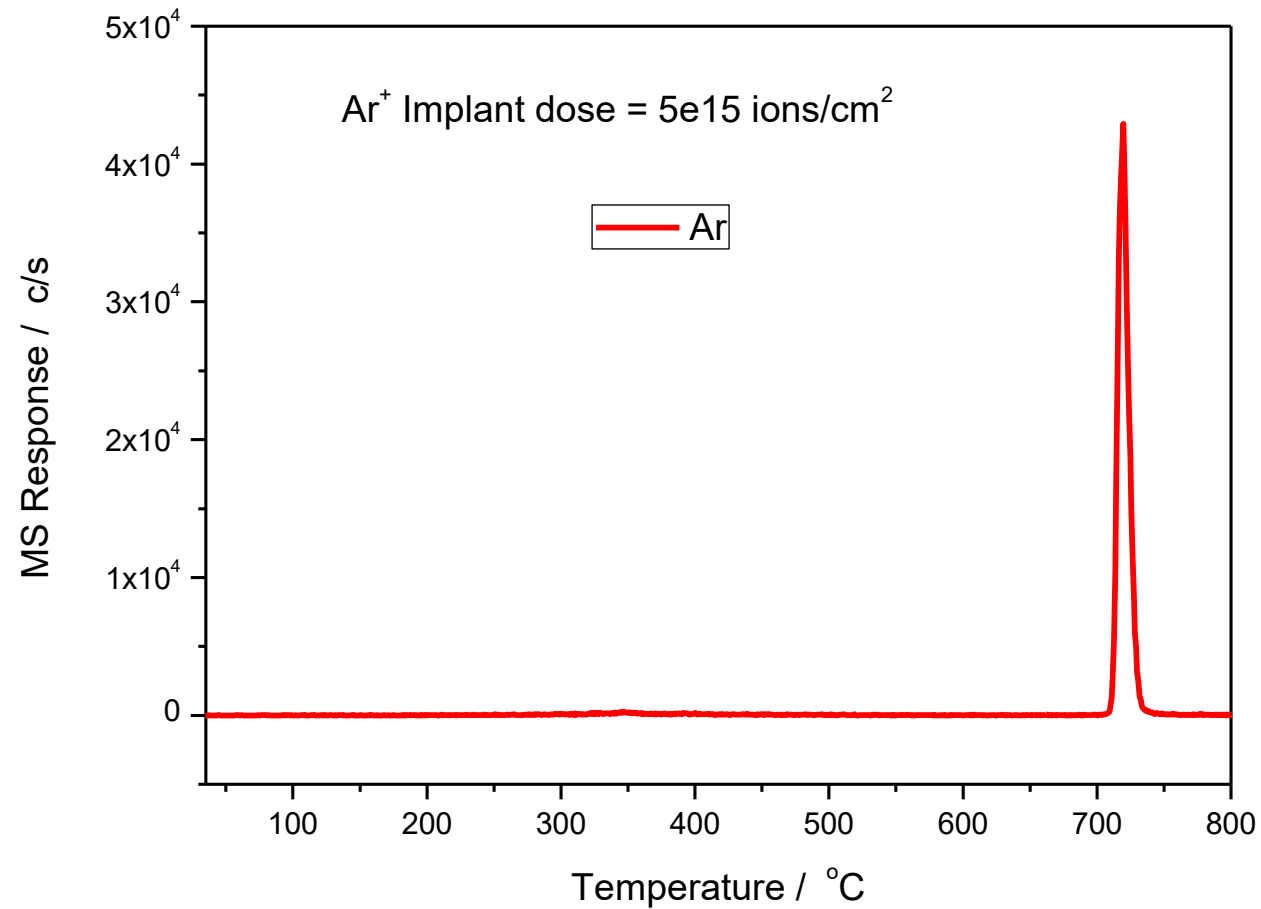
Application Areas

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

H₂ Desorption from Steel Samples



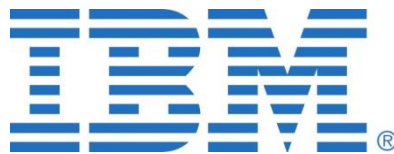
Ar⁺ implanted Si Sample



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
- Optional Liquid N₂ cryotrap
- Optional Bakeout jacket (200 °C max.)

Recent Customers



- 
- 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.