Surface Science
CATLAB Tech Info Sheet 161

CATLAB Software

Automated Experimental Control

CATLAB Software Overview

The Hiden CATLAB microreactor - mass spectrometer is a catalyst characterisation and evaluation system designed for catalysis studies using temperature programmed and pulse chemisorption techniques as well as isothermal studies.

The CATLAB microreactor module is provided with seamless on-line real-time mass spectrometric analysis and data acquisition via PC under the CATLAB integrated windows software suite. Unlike other commercial catalyst characterisation systems the CATLAB includes a fully integrated mass spectrometer as standard.

CATLAB software allows complete, automatic, control of flow rate and composition, temperature ramp and set-point as well as full mass spectrometer parameter controls. In the CATLAB – PCS version, the software also controls the actuated valve for pulsing known quantities of reactant gas over the catalyst

The CATLAB also comes as standard with the Hiden TPD Analysis Software. Data can be exported to this software package for quantification and evaluation of catalyst properties.

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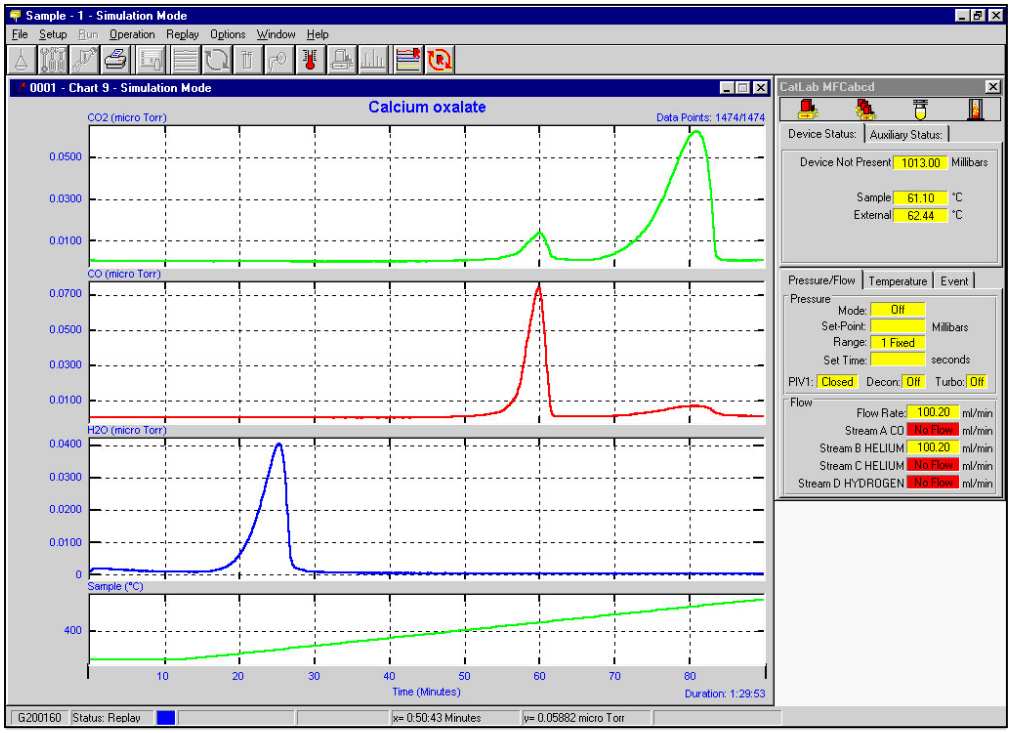

Figure 1 CATLAB Software Screen

Flow Control

The Hiden CATLAB microreactor flow control module comprises of a standard gas manifold with 4 gas streams controlled via mass flow controllers.

- Flow range: 3-100 ml/min MFCs (independently user-specified).
- Automated control allowing unsupervised operation.

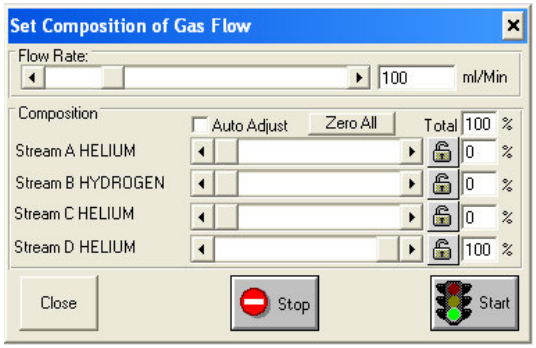

Figure 2 Manual Flow Control

Temperature Control

Manual temperature control allows control of ramp rate set point and set point dwell time.

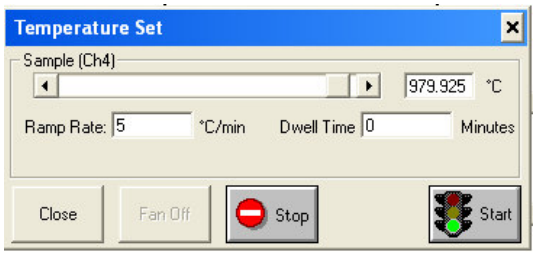

Figure 3 Manual Temperature Control

Automated Control

The Hiden CATLAB offers fully automated control of experimental procedure using user definable sequences, allowing a range of experiments to be performed in one sequence. *e.g.* Pt/SiO_2 Catalyst activation, CO chemisorption and CO

TPD. The sequences allow the continuous unsupervised operation of CATLAB during experiments. The sequence control screen is shown below:

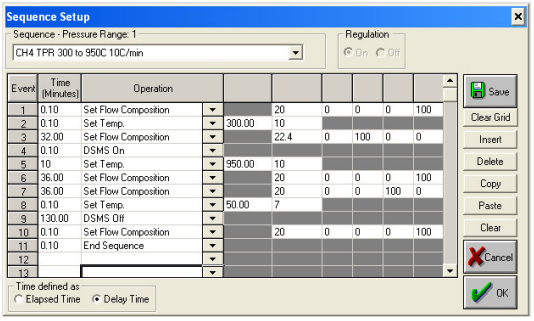

Figure 4 Automatic Sequence Control

Mass Spectrometer Control

The mass spectrometer (Hiden *QIC* – 20) is also controlled through the same software package. The mass spectrometer can operate in either Bar or MID (Multiple Ion Detection) mode.

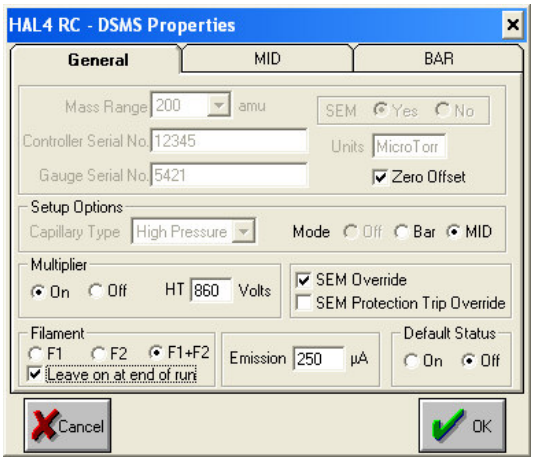

Figure 5 Mass Spec Control

Peak Integration

Quantification of TPD spectra is often required to provide meaningful results to experiments. CATLAB Software allows the integration of selected peaks, allowing quantification of desorbing molecules. Integration can be performed using either a linear or offset baseline.

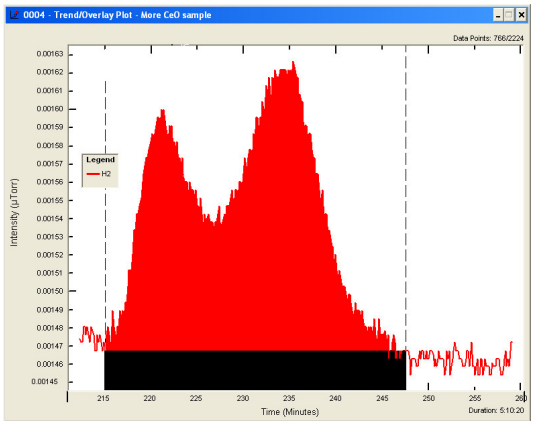

Figure 6 Peak Integration

Data Export

Data can be exported from the CATLAB for use in the Hiden TPD Analysis software.

Data can also be exported directly to Microsoft Excel or as an ASCII file for use in other data analysis packages.

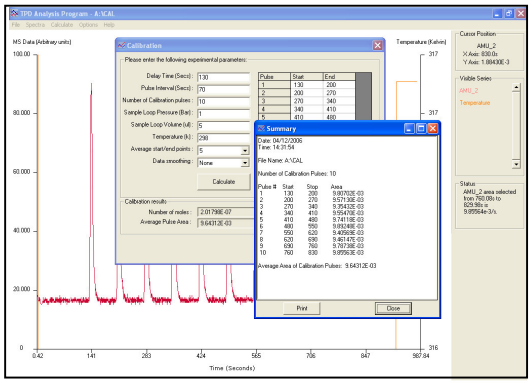

Figure 7 TPD Analysis Software Screen