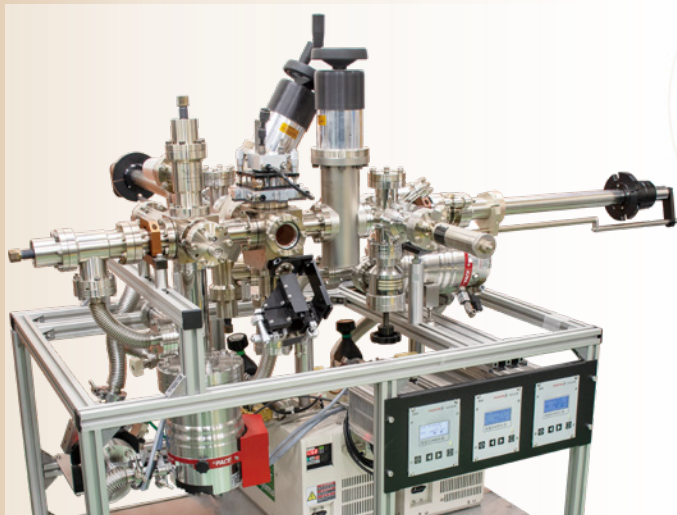


# HEMTO-TDS

## Hydrogen-Sensitive Thermal Desorption Spectroscopy System



HEMTO-TDS is a thermal desorption spectroscopy (TDS) system designed to detect trace amounts of hydrogen from small-volume samples such as thin films. The highly hydrogen-sensitive detection is achieved by combining the efficient sample heating by infrared laser with the extremely low hydrogen background level maintained by a BeCu chamber. Equipped with a quadrupole mass spectrometer (QMS), the HEMTO-TDS is the ideal instrument for analyzing hydrogen with other desorbed gases.

- ✓ Extremely high sensitivity to hydrogen
- ✓ Non-contact temperature control by laser heating
- ✓ Productization of the Hosono laboratory TDS system (Tokyo Institute of Technology)

## Specifications

Hydrogen ion current	Detection limit $\sim 1 \times 10^{-13}$ A
	Can detect $H_2^+$ from $H^+$ -implanted Si at $1 \times 10^{15}$ ion/cm <sup>2</sup>
	Can detect $H_2^+$ from samples containing $5 \times 10^{16}$ /cm <sup>3</sup> (1 ppm) H-impurities
Heating method	Non-contact heating by infrared laser (983 nm)
Temperature control	PID control by pyrometer (sample-emissivity calibration required)
	Temperature range: 150 ~1000 °C
	Heating rate: arbitrary rate between 10-100 °C/min
Sample size	10mm × 10mm
Mass analysis range	1-100 amu

## Applications

- Hydrogen-impurity detection in semiconductor substrates
- Hydrogen-impurity detection in thin films
- TDS detection of impurities in small-volume samples
- Investigation of absorption/adsorption bonding states

The development of this system was financially supported by the Ichimura Foundation for New Technology. This system is a product from the industry-academia collaborative with the Hosono Laboratory of the Tokyo Institute of Technology.

<Distributor>

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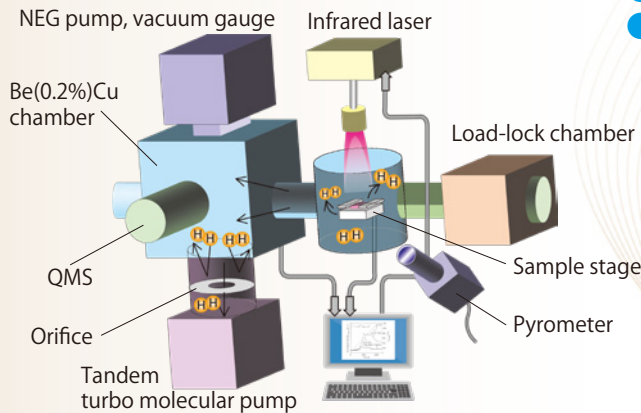
<Manufacturer>

**UNISOKU**  
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E-mail: [info@unisoku.co.jp](mailto:info@unisoku.co.jp) Web site: <http://www.unisoku.co.jp/>

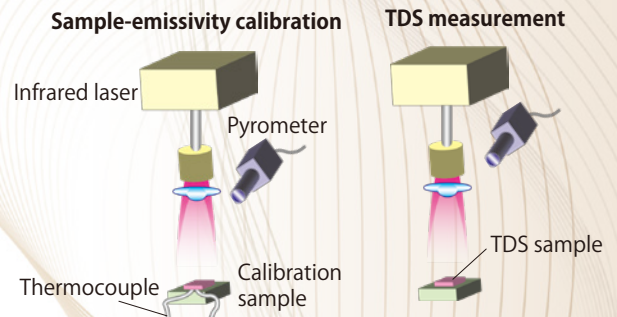
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# Working principle



High H-sensitivity achieved by combining the following:

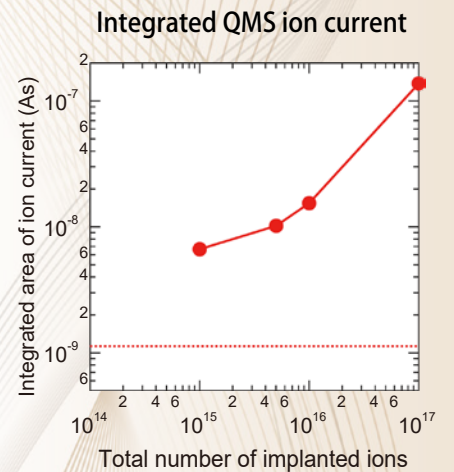
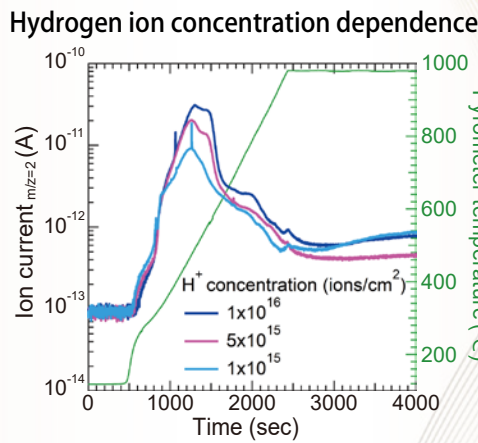
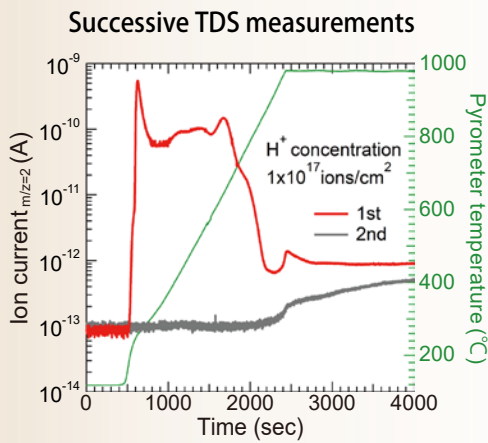
- Local heating by infrared laser
- Temperature monitor/control by pyrometer
- Low hydrogen background level by BeCu chamber
- Orifice-suppressed H counterflow from the tandem turbo molecular pumps



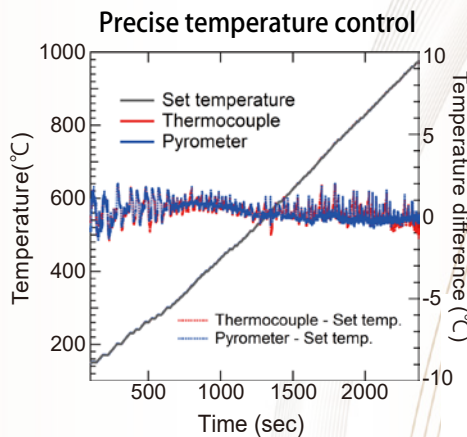
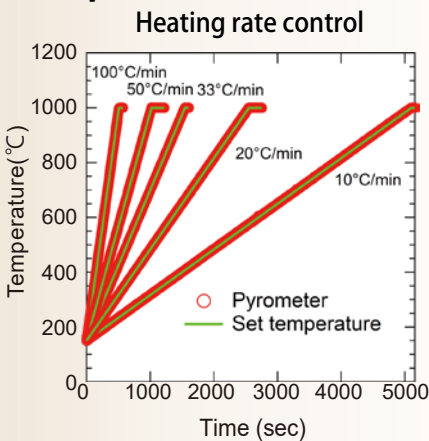
The calibration and the TDS samples should be identical in terms of size, doping level, and surface conditions.

# Example TDS data

## TDS measurements of a H<sup>+</sup>-implanted Si substrate



## Temperature control data



## Custom demo measurements

We organize demonstration measurements of your samples using the HEMTO-TDS at our facility (see right figure). Contact us to discuss the details of the samples you are interested in!

Contact us : UNISOKU Co., Ltd.

Tokyo Instruments, Inc.

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