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LK TECHNOLOGIES TDS1000 System

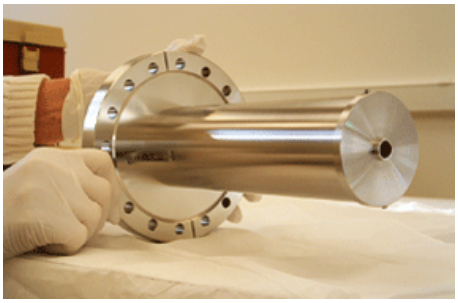
Advancing the Science of Temperature Programmed Desorption Studies

This is a fully integrated surface science system tool that enables the researcher to obtain quantitative information on chemical species which desorb from a sample when heated. Typical temperature ranges are room temperature to 900C. Mass range typically 1-200 AMU.
The key element is a Thermal Desorption Spectroscopy (TDS) probe that detects the desorbing mass signal from the sample and uses a specially shielded mass spectrometer and control software to obtain high sensitivity data of mass signal versus sample temperature.

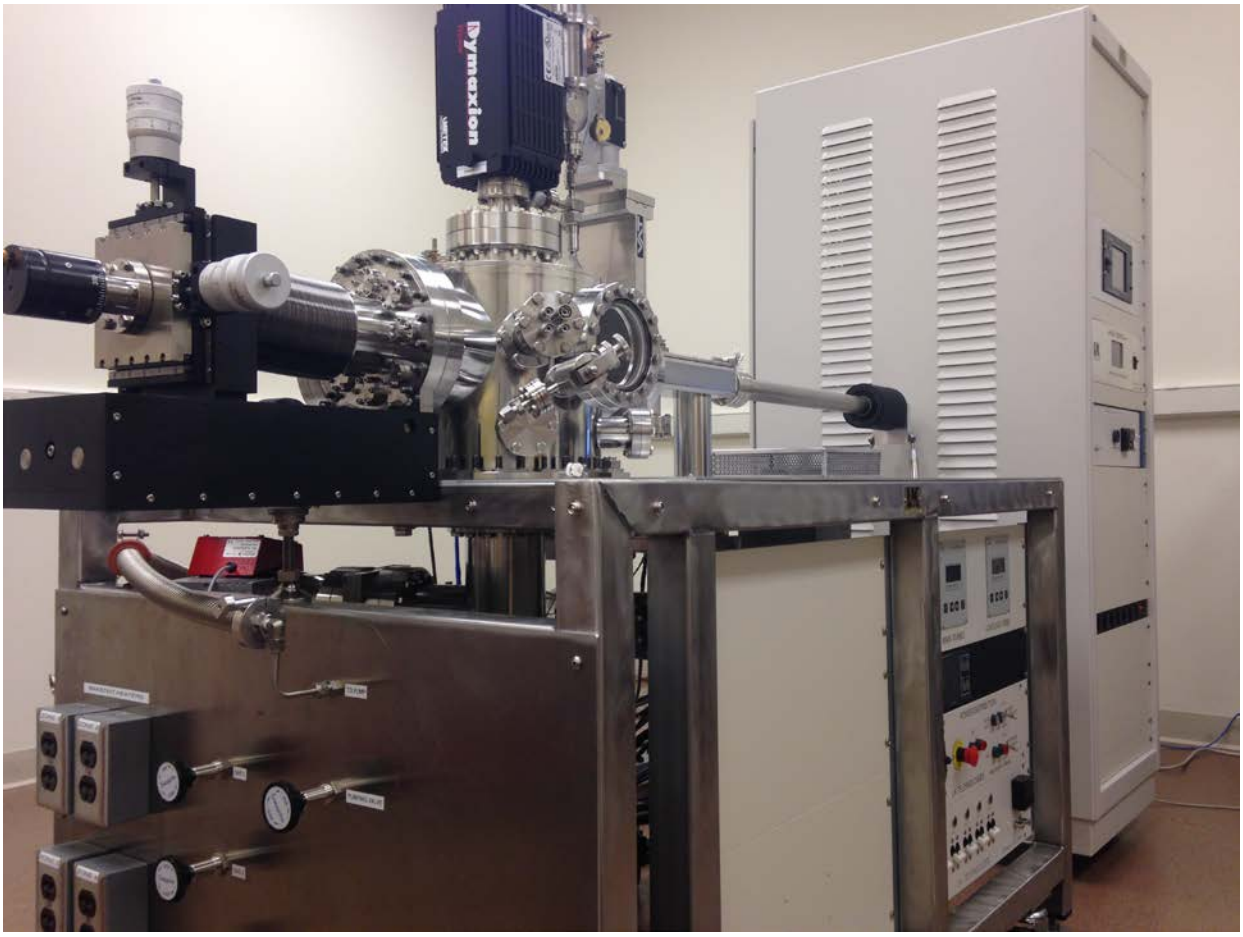
System Components and Specifications

1. Shielded Mass Spectrometer Probe 1- 200 AMU standard
2. Thermal Desorption Chamber with ion gauge
3. 250 L/S turbo pump with dry backing pump
4. Titanium sublimation pump with ambient shield
5. XYZR Precision Sample Manipulator
6. Transferable sample holder and heater for up to 1.00 x 1.00 inch sample size
7. Includes two (2) transferrable thermocouples for accurate sample temperature reading
8. Load lock and specimen transfer system with 70 L/S turbo pump
9. Gas Manifold system for up to 3 gases with mechanical pump, gauge, leak valve
10. Calibration system with controlled leak of up to three (3) gases for calibration
11. System integration includes bake out system, stainless steel support framework, Electronics racks, safety interlocks
12. Temperature control and Data system with integrated mass spectra vs. temperature output, time.

The LK1000 Shielded Mass Spectrometer Probe



The Integrated TDS1000 Vacuum System



Important Features of the LK TDS1000 System

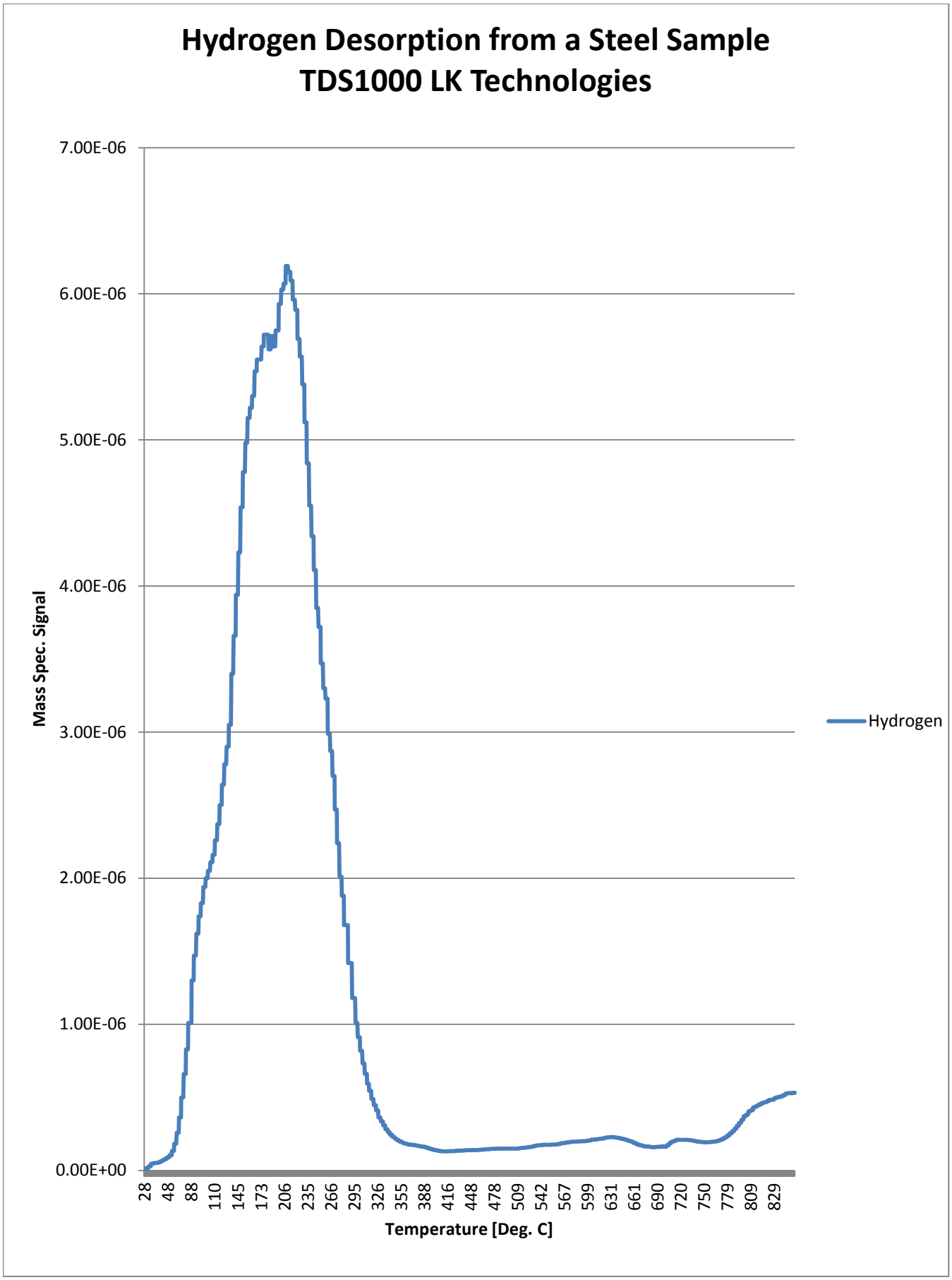
1. The LK system is flexible and can be extended for other surface analysis techniques such as LEED, RHEED, AES, Ion Sputtering, etc. Additional ports for these techniques and even additional chambers can be customized to suit the customer's application.

2. The system features a specially shielded mass spectrometer probe for obtaining high sensitivity mass spectra of those molecules desorbing from the sample surface. A precision XYZR manipulator allows proper positioning of various sample sizes to an optimal distance from the probe. Background effects are therefore greatly minimized.

3. Compact chamber size and pumping design allows very rapid pump down to the E-8 and E-9 Torr range after sample loading.

4. A unique UHV compatible sample holder (shown below) with on-board heating element and up to two thermocouple readouts is loaded from the load lock system to the receiving station through a robust, precision connection. The thermocouples may be directly mounted on the sample surface to provide reliable sample surface temperatures without the need for calibration from a stage temperature. Heating of the sample can be done in any rotational orientation or position in the chamber. It is not restricted by infrared heating optics, etc.

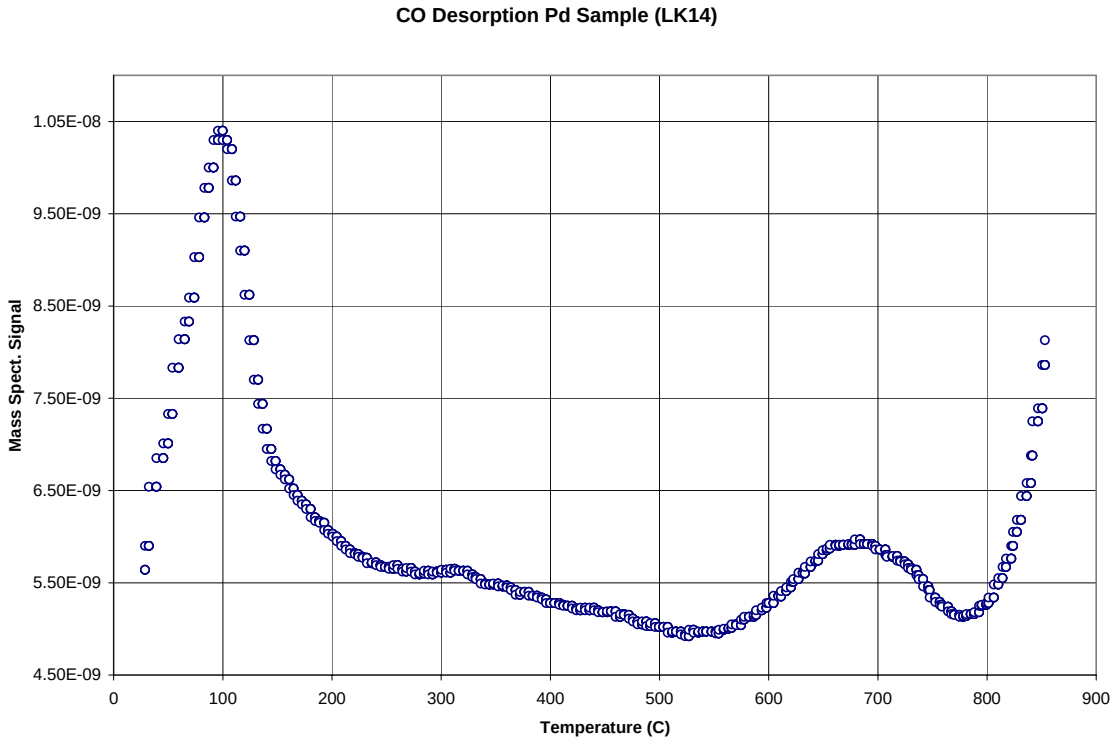
5. The LK1000 system features a convenient gas introduction and calibration system for introducing 3 or more calibration gases of interest to the customer or spanning a desired mass range. A complete gas manifold system is also provided for introducing other gases of interest.

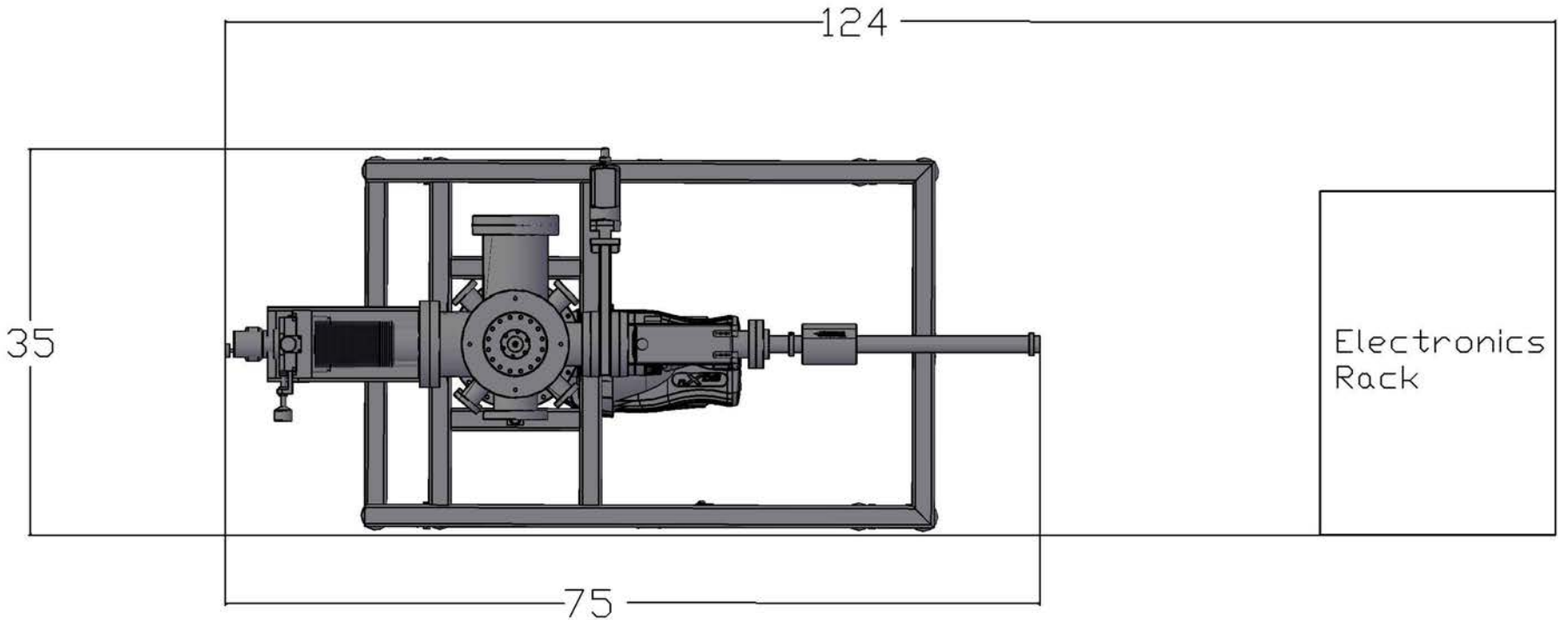

Hydrogen Desorption from a Steel Sample
TDS1000 LK Technologies
7.00E-06
6.00E-06
5.00E-06
4.00E-06
3.00E-06
2.00E-06
1.00E-06
0.00E+00
Mass Spec. Signal
28
48
88
110
145
173
206
235
266
295
326
355
388
416
448
478
509
542
567
599
631
661
690
720
750
779
809
829
Temperature [Deg. C]
Hydrogen

LK TECHNOLOGIES TDS1000 THERMAL DESORPTION SPECTROMETER

TPD Data Palladium (Not cleaned)

Data shows consistent desorption peak for CO around 100 C in agreement with work on polycrystalline Pd. The sample was only heated in vacuum as sputtering was not available. There was likely carbon contamination on sample. Some earlier results indicated H2 evolution at higher temperature likely due to hydrocarbon decomposition.




124
35
Electronics
Rack
75

DIMENSIONS IN INCHES