NanoSORD
BET·TPR-TPD-TPO

A Nano-catalyst characterization Laboratory in a compact package.

NanoSORD is an automated chemisorptions analysis instrument offered by SENSIRAN. It is a fully automated system capable of performing all the major dynamic techniques required for fully characterizing a catalyst.

The NanoSORD utilize the proven technology for performing the following dynamic procedures:

B.E.T. Surface Area
TPD: Temperature Programmed Desorption
TPR: Temperature Programmed Reduction
TPO: Temperature Programmed Oxidation
Pulse Chemisorption (Pulse Titration)

Straight forward operation, PC interface and accessibility of controls makes it an ideal choice for routine metal area/dispersion measurements in industry, universities and colleges.

This device is one of the most commonly used ones for the determination of nanostructured materials properties such as metallic nanoparticles, metallic oxides, sulphurous oxides, nanotubes, and other nanostructures.

The most important characteristics of the materials which can be measured by this device are BET surface, distribution and density of the active sites, adsorptive properties of nanoparticles, reduction properties of metallic nano oxides, and reaction parameters such as activation energy.

One of the important features of this device is its ability to be connected to other detectors, which provides the use of complementary and precise spectroscopic methods.

SPECIFICATIONS

Capability	B.E.T. Specific Surface Area – Temperature Programmed Techniques,TPR ,TPO and TPD- Pulse Chemisorption (Pulse Titration)
Performance	Specific Surface Area: min 0.001 m^2/g Accuracy, Volume: ± 1% Reproducibility: 0.5%
Gases	Compatibility: H_2 , O_2 , CO, CO_2 , NO, N_2O,NO_2 , SO_2 , NH_3 , N_2 ,Ar , Kr , He Gas flow rate: 0-20 sccm Input Pressure (gauge): Up to 3 bar Gas Lines: 1/8" s.s.
Power	Voltage: 115 - 230 V Frequency: 50/60 Hz Power: 1800 W
Heating system	Mantle, Max temp : 450 ^oC - Furnace, Max temp: 1100 ^oC Mantle Power: 500 W- Furnace Power: 800 W Controller Type : PID via PC Program Steps : Multiple Ramp, hold (soak) Furnace heating rate: 1-20 ^oC/min
Environmental	Ambient Temperature: 15-50 ^oC Relative Humidity: 20-80%
Hardware	Micro Thermal Conductivity detector: Dual-filament TCD Filament Material: Oxidation and ammonia resistant Filament Type: Nickel-Iron Gas Input Ports: 5 ports Loop Volume: 500 µL Mass Flow Controller : Two MFCs

" Applications

- Catalysts

Chemisorption, TPR, TPD, BET surface area and active surface area are necessary information for selection of a proper catalyst for a specific process. These characterization techniques also are of great significance on deactivation studies of a catalyst used in a process.

- Fuel Cells

Pt-based catalysts are often characterized by temperature-programmed reduction to determine Metal surface area and Metal dispersion.

- Partial Oxidation

Manganese, cobalt, bismuth, iron, copper and silver catalysts used for the gas-phase oxidation of ammonia, methane, ethylene and propylene are characterized using Temperature-Programmed Oxidation and Temperature-Programmed Desorption.

- Catalytic Cracking

The characterization of these catalysts includes:
- AmmoniaTemperature-Programmed Desorption
- Temperature-Programmed Decomposition of alkyl amines
- Temperature-Programmed Desorption of aromatic amines

- Hydrocracking, Hydrodesulfurization, and Hydrodenitrogenation Catalysts

The characterization of these catalysts includes Temperature-Programmed Reduction and Oxygen Pulse Chemisorption.

- Fischer-Tropsch Synthesis

The characterization of these catalysts includes Temperature-Programmed Desorption and Pulse Chemisorption.

- Isomerization

Catalysts such as Pt-zeolite are used to convert linear paraffins to branched paraffins. The characterization of these materials includes Temperature-Programmed Reduction and Pulse chemisorptions.

- Catalytic Reforming

These catalysts are commonly characterized to determine Metal surface area and Metal dispersion.

Catalysts


Catalysts

SEM of Zeolites

Active Carbon + Zeloites

FEATURES

- High-presision electronic mass flow controllers provide extremely accurate, programmable gas control. This assures a stable baseline and accurate determination of gas volumes.
- A highly sensitive linear thermal conductivity detector(TCD) assure the calibration volume remains constant over the full range of peak amplitudes so the area under the peak is directly proportional to the volume of gas reacted.
- Clamshell furnace can heat the quartz sample reactor to 1100℃. Any number of ramp rates and sequences facilitate customized experiments.
- Six gas inlet each for the preparation, carrier, and loop gases permit sequential experiments, such as TPR/TPO cycles.
- Low internal plumbing volume assures high resolution ,fast detector response, and reduces error when calculating gas volumes.
- Mass spectrometer port and software integration allows virtually simultaneous detection on both the thermal conductivity detector and mass spectrometer.
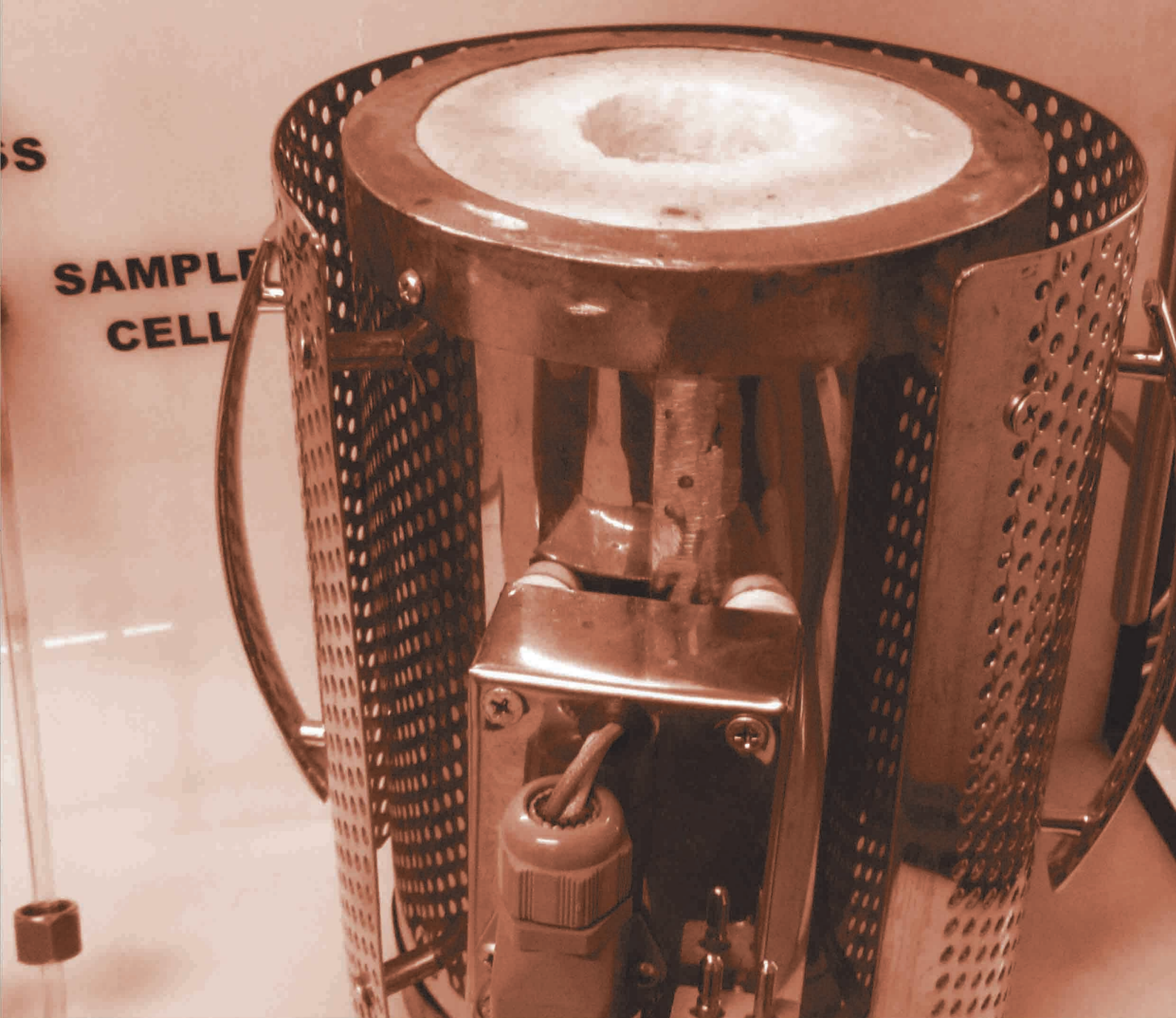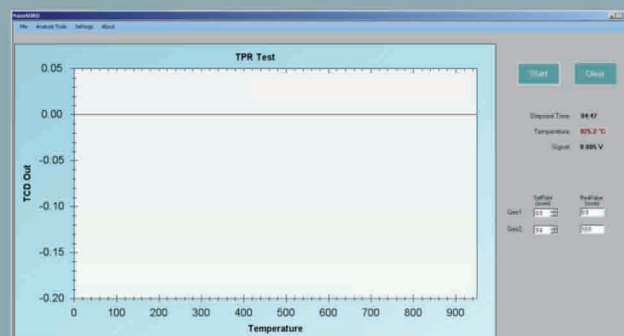
,, Software

Software includes
- On-screen TC and MFCs controller
- Real-time signal and temperature display
- Deconvolution of overlapping peaks
- Peak area integration
- Single and Multi-point BET calculation
- Customizable and automatic naming of data files
- Customizable report font selections
- Data import into popular external
- Spreadsheet and plotting programs
- For Windows XP, Vista

TRP test window

Software
and operating data

NH$_3$-Temperature Programmed Desorption

TPR and TPD profiles can be presented as signal and temperature versus time, or signal versus temperature according to the user preference.

Overlapping peaks can be deconvoluted, with or without baseline subtraction.

B.E.T. profiles can be presented as signal versus time.
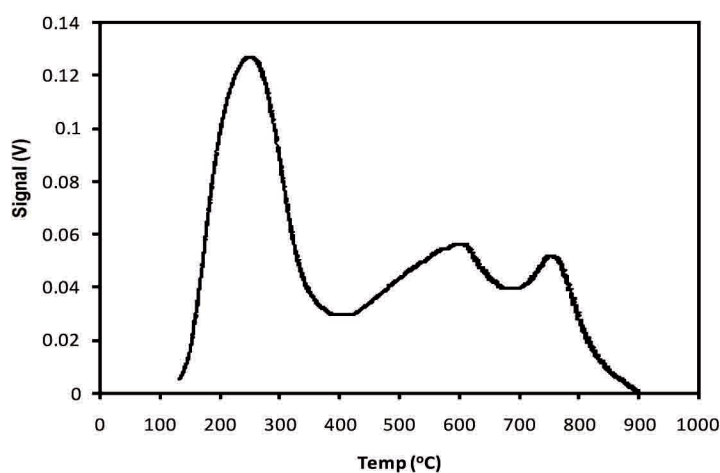
H$_2$-Temperature Programmed Reduction

All of the software reports feature a detailed header and analysis data which can be customized with the name of the user's company or institution. Data and results can be copied and pasted into other Windows-compatible programs for presentations and publications. Detailed reports may be archived in pdf format using appropriate document software.

Toseye Hesgarsazan Asia Co.
Tel: +98 2176250163-4
Fax: +98 2166967793
website: www.hesgarsazan.com
e-mail: hesgarsazan@gmail.com