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Oxygen Nitrogen Hydrogen Analyzer ONH6800

Instrument introduction

The oxygen nitrogen hydrogen analyzer is a new generation of elemental analysis instruments, with a desktop integrated design, beautiful and elegant appearance, and easy operation. The oxygen nitrogen hydrogen analyzer is an intelligent analytical instrument composed of a pulsed furnace and a computer, with pyroelectric sensors and high-precision thermal conductivity detectors as its core. The instrument is mainly used for the analysis of oxygen, nitrogen and hydrogen content in ferrous metals, non-ferrous metals, rare earth metals, inorganic substances, ores, ceramics and other substances in industries such as metallurgical machinery, commodity inspection, scientific research and chemical engineering.



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Instrument principle

Oxygen, ammonia and hydrogen in metallic and non-metallic solid materials are detected by the principle of inert gas melting. In the determination of oxygen, nitrogen and hydrogen, the weighed sample is placed in a graphite crucible and melted by high-temperature heating in a helium gas flow (argon gas can be used for single oxygen measurement). The oxygen in the sample reacts with the carbon in the graphite crucible to form carbon monoxide (CO), and the nitrogen in the sample escapes in the form of nitrogen gas. These mixed gases are sent to the conversion furnace by helium gas, where carbon monoxide (CO) is converted into carbon dioxide (CO2), while nitrogen gas does not react. The mixed gas after passing through the conversion furnace is sent to the infrared detection cell, where carbon dioxide (CO2)(H2O) is detected. Then, the carbon dioxide (CO2) and water in the mixed gas after infrared detection are adsorbed, and the remaining mixed gas of nitrogen and helium is detected through the thermal conductivity detection cell. Rapid and accurate determination of oxygen, nitrogen and hydrogen content in steel, cast iron, alloys, copper, zirconium, titanium, rare earth materials and other inorganic substances.

Specifications

Model	ONH6800 can choose one element O/N/H, or two elements ON/OH/HN, or three elements ONH
Measuring range	Oxygen:0.00001%-5%(expandable to 100%) Nitrogen: 0.00001%-20%(expandable to 100%) Hydrogen: 0.00001%~0.15%(expandable to 100%)

Instrument precision	Oxygen: 1.0ppm or RSD ≤ 1.0% Nitrogen: 1.0ppm or RSD ≤ 1.0% Hydrogen: 0.2ppm or RSD < 2.0% (Based on solid standard samples, both meet one of them)
Analysis Time	120-240 seconds (can be set arbitrarily based on the analysis material)
Analysis error	Oxygen is better than GB/T 11261-2006, nitrogen is better than GB/T 20124-2006, hydrogen is better than GB/T 223.82-2007
Carrier gas	High purity helium or argon (99.999%, 0.3-0.5Mpa)
Power gas	Ordinary nitrogen (or purified compressed air 0.3~0.5Mpa)
External dimensions	W700mm x D655mm x H860mm
Weight	150 kg
Electronic balance weighing accuracy	0.0001g
Sample weighing	0.2~1.0g





Infrared detection system

• Standard configuration: The oxygen and hydrogen analyzer is equipped with an independent infrared absorption cell. According to user requirements, the length of the absorption cell and the number of channels can be flexibly configured (dual infrared absorption cells can be equipped).

• Detector: It adopts A pyroelectric solid-state infrared detector and a high-precision A/D sampling card, which endows the entire machine with extremely high detection sensitivity and enables effective detection of oxygen content at the ppm level.

• Motor: The modulation system adopts a high-precision stepping motor controlled by a single-chip microcomputer, achieving long-term stability of the modulation frequency

• Light source: The infrared light source selects high-efficiency and long-life precious metal micro-infrared luminous bodies and gold-plated metal reflectors.

• Constant temperature: The entire gas chamber is subject to constant temperature control to ensure a constant temperature during analysis and guarantee measurement accuracy. A temperature-compensated semiconductor detector is adopted to ensure that the instrument is minimally affected by external factors and the baseline is very stable.

High-precision detection system

The adoption of high-sensitivity thermal conductivity detection cells, continuously adjustable cell current, high-precision amplifiers, and 24-bit AD sampling cards and other hardware ensures the determination of nitrogen content from ultra-low content to large range. It adopts a low-drift, high-precision, wide-range and high-sensitivity thermal conductivity detector with a low failure rate, strong reliability and good stability. It adopts an imported high-precision constant temperature control system, with the temperature controlled within 0.1°C. The reference gas path adopts a micro-flow control with good stability.







Pulse furnace

The pulse electrode furnace has a high heating temperature and adopts programmed power control. It can provide various
programmed heating methods such as constant power heating, slope heating, and segmented heating to improve the analysis accuracy.
 It is suitable for rapid analysis of materials ranging from low-melting-point materials such as aluminum alloys to high-melting-point
materials such as tungsten alloys. The electrode is suitable for various models. According to the release conditions of different samples,
multiple types of crucibles, including sleeve crucibles and high-temperature crucibles, can be selected, effectively reducing the user's
usage cost. The electrode cooling system adopts a single-cycle independent cooling system, which can be directly connected to an
external circulating water or external water cooling device. It features excellent cooling effect and high reliability. The temperature of
the cooling circulating water is detected in real time online.

3. Current: 0-1500A, power :10KVA, maximum temperature above 3500°C.

4. The furnace chamber can be automatically purging, and in combination with manual brushing and dust removal devices, it ensures the convenience, completeness and efficiency of the cleaning work.

5. The electrode pulse furnace bracket is integrally cast. The lightweight design enhances the mechanical strength, and the concentricity of the upper and lower electrodes is guaranteed.

6. The dual-axis guided integrated cylinder ensures the smooth lifting and lowering of the electrode, guarantees good contact between the graphite crucible and the upper electrode, and at the same time ensures uniform force on the graphite crucible, which is conducive to long-term high-temperature heating.

<u>Gas path</u>

◆ It adopts an integrated whole machine design, with a spacious interior. The connection routes of the pneumatic system are greatly reduced, making the pneumatic system of the whole machine more simple and reliable. The pneumatic components include solenoid valves, cylinders, pneumatic pipes and pneumatic joints. The service life of the solenoid valve is over one million times. The unique lifting system with a double-axis guided cylinder ensures the smooth lifting of the electrode, guaranteeing good contact between the graphite crucible and the upper electrode. At the same time, it ensures uniform force on the graphite crucible, which is conducive to long-term high-temperature heating. The automatic blanking furnace head with air curtain protection and the automatic air purging mechanism effectively ensure the analysis accuracy of oxygen and nitrogen elements. The burner head is of a split structure, making it very easy to disassemble and replace the upper and lower electrodes. Moreover, the lower electrode is made of high-temperature alloy material, which has a long service life and low usage cost.

◆ The design of the injection system adopts an open design. Its advantage is that contaminants are discharged from the top of the furnace without entering the system, which is convenient to operate and has low requirements for system sealing. High-precision flow control is achieved by using micro-flow sensors, minimizing the impact of changes in the analysis airflow on the analysis. This sample injection device is simple and can inject samples automatically. In case the sample gets stuck, it is easy to remove



All the analytical gas pipelines are made of corrosion-resistant materials.
 Each branch gas line is controlled by an independent

solenoid valve, and the valve body of the solenoid valve must be corrosion-resistant.

◆ The equipment can automatically conduct multi-stage leak detection,

provide real-time flow alarm and alarm content, and monitor the status of the instrument's solenoid valve, temperature, detection system signal voltage, etc. in real time.

◆ Nitrogen or water-free and oil-free compressed air.







<u>Software</u>

- 1. Provide software for the Windows environment to quickly display the analysis results and analysis curves;
- 2. The analysis results are automatically stored;
- 3. The sample weight is automatically input into the software.
- 4. Channel Settings are optional; Automatic switching between high and low contents;
- 5. Drawing and storage of dynamic release curves, unloading;
- 6. The analysis results have multiple correction modes, which can be manually corrected or corrected based on the analysis results.
- It can be corrected at a single point or at multiple points.
- 7. Screen the data, calculate the average value, standard deviation, relative deviation, etc.
- 8. The new software can design several calibration lines by itself according to the user's requirements, which greatly facilitates the user's use.
- 9. The host can be connected to computers, printers, electronic balances, etc. to achieve data transmission.
- 10. The analysis time and blank value can be adjusted, and the blank value of the flux is automatically removed.
- 11.Users can store several analytical methods for different analytical samples:
- 12. It can store massive sample weights (the quantity is only limited by the capacity of the computer hard disk);
- 13. The result report in template format can be output;
- 14. It can be connected to the user database to achieve remote transmission of analysis results and is easy to realize networked management of analysis results.
- 15. It can quickly conduct blank determination of the instrument.
- 16. Sample numbers can be stored and edited.
- 17. It can be applied to automatic sample injection to achieve the automatic operation of the instrument.
- 18. There are 16 high and low analysis channels for oxygen, nitrogen and hydrogen respectively, meeting the analysis requirements of different contents and materials. Users can freely combine and use them as needed. The software is easy and intuitive to operate, featuring qualitative, semi-quantitative and quantitative analysis functions, as well as instrument diagnosis and optimization capabilities. It is available in both full Chinese and full English versions, and can be switched as needed. The output format of the report is pdf, excel, electronic file or direct printing, and can be in Chinese or English templates.
- The control software can run under the Chinese version of Windows.
- 19. Correction. Single-point correction: Correct with a single analysis result; Multi-point correction: Correction with multiple analysis results, blank correction.

Environmental requirements

- Do not install the instrument directly by the window or door to avoid convection, dust, corrosive gases and vibration.
- Please stay away from strong electromagnetic field interference
- Ambient temperature :20-25°C
- Working humidity :≤70%
- The instrument should be placed on a stable workbench without vibration. There should be no direct strong light or strong electromagnetic field interference near the instrument, and there should be no strongly corrosive gases in the environment.
- Pulse furnace power supply :220V 10%, 50Hz, maximum current 50A.
- Other power supply for the instrument :220V 10%, 50Hz, maximum current 10A.
- Circulating water power supply :220V 10%, 50Hz, maximum current 16A.

