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PEOPLE'S REPUBLIC OF CHINA**

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**Surface chemical analysis - Glow discharge mass spectrometry
- Operating procedures**

表面化学分析 辉光放电质谱 操作程序

(English Translation)

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents". Drafting.

This document is equivalent to ISO /T S15338.2020 "Surface Chemical Analysis - Glow Discharge Mass Spectrometry Operating Procedures", and the document type is changed from... The ISO technical specifications have been adapted into my country's standardization guidance technical documents.

1 Scope

This document describes the operation and usage procedures for glow discharge mass spectrometry (GD-MS). Several GD-MS systems currently in use come from different... For manufacturers, this document describes the differences in applicable operating procedures.

Note: This document is intended to be used in conjunction with the instrument manufacturer's operating manual and recommendations.

2 Normative references

This document has no normative references.

3 Terms and Definitions

This document contains no terms or definitions.

In a glow discharge power supply, a potential difference is applied between the cathode (sample to be tested) and the anode, and an inert gas (usually argon) is introduced.

Argon gas can be used to form plasma. This potential difference can be direct current (DC) or radio frequency (RF). The advantage of RF is that it can be directly divided.

Electrolytic insulating materials. Inert gas ions and fast neutral particles formed in the plasma are introduced to the sample surface, and their collisions cause... Neutral particles are generated by sputtering onto the sample surface. These neutral particles diffuse into the plasma and subsequently exist within the plasma's isoelectric region.

The electrons are ionized and can then be fed into a mass spectrometer for analysis. Both magnetic mass spectrometry and time-of-flight mass spectrometry can be used for analysis.

5.1 Ion Source

There are two basic types of ion sources used in GD-MS. low-flow-rate or "static" ion sources and high-flow-rate ion sources.

Both types of ion sources can accept needle-shaped or sheet-shaped samples. A typical needle-shaped sample is 20 mm in length and 3 mm in diameter, while... The diameter of the sheet-like specimens ranges from 20 mm to 40 mm. More detailed information regarding specimen size will be provided later.

In low-flow-rate ion sources, the plasma sample cell is actually a sealed unit, fixed within a high-vacuum chamber, and has a slit or The small orifice serves as the exit point, allowing ions to leave the sample cell and enter the mass spectrometer. The sample cell itself maintains the anode potential, i.e., the accelerating current of the mass spectrometer.

The sample is held at the cathode potential, typically 1 kV lower than the anode potential. In this type of ion source, the argon flow rate is usually [missing value].

The flow rate should be 1 sccm (volume flow rate under standard conditions, cm³/min) or less, and the gas used (usually argon) should have very high purity.

99.99995% or higher. Plasma power is relatively low, typically 2W or 3W; the potential difference is usually 1kV, and the current is 2mA. Or 3mA.

Figure 1 is a schematic diagram of the geometry of a needle-shaped sample cell low-flow-rate ion source.

The sample cell forms a metal-to-metal seal. In some systems, polyetheretherketone

(PEEK) tubing is used instead of metal tubing, which has a sealing feature.

The sealing ring is connected to the sample cell. The needle-shaped sample is fixed in a clamp at the cathode potential, while the sample cell is at the anode potential.

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