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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 32997-2016

**Surface chemical analysis -- General procedures for
quantitative compositional depth profiling by glow discharge
optical emission spectrometry**

表面化学分析 辉光放电发射光谱定量成分深度剖析的通用规程

(English Translation)

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Foreword

This standard is drafted in accordance with the rules given in GB/T 1.1-2009.

This standard uses the translation method equivalent to ISO 11505.:2012 "Surface Chemistry Analysis Glow Discharge Emission Spectroscopy Quantitative Component Depth Profile Analysis of the general rules. " and the normative reference in this standard international documents are consistent with the relationship between China's documents are as follows.

Surface chemical analysis - Glow discharge emission spectrometric method (ISO 14707.:2000, IDT); GB/T 19502-2004.

GB/T 20066-2006 Sampling and sample preparation methods for the determination of chemical constituents of steels and iron (ISO 14284.:1996, IDT).

This standard is proposed by the National Microparraph Analysis Standardization Technical Committee (SAC/TC38).

The drafting of this standard unit. Baoshan Iron and Steel Co., Ltd.

The drafting of this standard. Zhang Yi, Miao Leide, He Xiaolei, Wu Junfei, Chen Yingying.

Surface chemistry analysis glow discharge emission spectroscopy quantitative General rules for component depth analysis

1 Scope

This standard specifies the method of measuring the thickness, mass (unit area) and chemical composition of the surface film of the material by glow discharge emission spectroscopy.

This standard is limited to glow discharge emission spectroscopy depth analysis of the description of quantitative general procedures, and can not be directly applied to a different Thickness and element of the individual materials to be measured quantification.

Note: Any standard for surface analysis of test materials requires clear surface thickness and analytical elements, and provides inter-laboratory test results to the validity of the method.

2 Normative reference documents

The following documents are indispensable for the application of this document. For dated references, only the dated edition applies to this article Pieces. For undated references, the latest edition (including all modifications) applies to this document.

ISO 14707 Surface Chemical Analysis Glow Discharge Emission Spectroscopy General [Surfacechemicalanalysis-Glowdis-chargeopticalemissionspectrometry (GD-OES) -Introductiontouse)] ISO 14284 Sampling and sample preparation of steel and iron chemical composition samples (Steelandiron-Samplingand preparationofsamplesforthedeterminationofchemicalcomposition

3 Principle

The analysis of glow discharge emission spectroscopy includes the following process.

- a) In a DC or RF glow source device, cathode sputtering is generated on the surface of the sample.
- b) glow discharge of the plasma, the measured atoms and ions excited.
- c) Spectral measurements (qualitative depth analysis) of time-dependent changes in emission intensity of atomic and ionic characteristic lines.
- d) Through the work curve, the relationship between the intensity of time in the qualitative depth analysis is transformed into the relationship between the mass fraction and the sputter depth). The system operating curve was established by measuring samples of known chemical composition and sputtering rate.

4.1.1 Overview

The equipment required, as described in ISO 14707, shall include a Grimm type or similar glow discharge (direct current or radio frequency) and a multi-channel the emission spectrometer provides an appropriate spectral line for the analytical element. Sequential spectrometers are not suitable because they must be measured simultaneously at high speed data acquisition Multiple analysis of the intensity of the element wavelength.

Glow discharge light source of the hollow anode diameter size should be 1mm ~ 8mm, thin sample analysis recommended the use of cooling devices, such as with a cycle the metal

blocks of the coolant are not required to be provided in the operation of this method.

Since the principle of sample determination is based on the continuous sputtering of the surface film, the spectrometer should be equipped with a digital readout system to record the time resolution