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Methods for chemical analysis of nickel-platinum target alloys-Part 3: Determination of carbon content-High frequency infrared detection method

镍铂靶材合金化学分析方法 第3部分：碳含量的测定 高频红外检测法

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting.

This document is part 3 of GB/T 43603 "Chemical analysis methods for nickel-platinum target alloys". GB/T 43603 has been published for the following part.

- Part 1: Determination of platinum content by inductively coupled plasma atomic emission spectrometry;

- Part 2: Determination of magnesium, aluminium, titanium, vanadium, chromium, manganese, iron, cobalt, copper, zinc, zirconium, silver, palladium, tin, samarium, lead and silicon content by inductive coupling In-Plasma Mass Spectrometry;

- Part 3: Determination of carbon content-High frequency infrared detection method.

Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents.

This document was proposed by China Nonferrous Metals Industry Association.

This document is under the jurisdiction of the National Technical Committee on Standardization of Nonferrous Metals (SAC/TC243).

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Introduction

Nickel-platinum target alloy is widely used in the semiconductor industry. It is a key material to ensure the performance of semiconductor devices and develop semiconductor technology.

The nickel-platinum target alloy with platinum content has special structure and properties, which plays an important role in the semiconductor manufacturing process.

The impurity composition of the nickel-platinum target alloy is directly related to the sputtering performance. Therefore, the chemical composition analysis of the nickel-platinum target alloy is particularly important;

GB/T 43603 is intended to consist of the following three parts according to the different test objects and test methods.

- Part 1: Determination of platinum content by inductively coupled plasma atomic emission spectrometry. The purpose is to specify nickel-platinum target alloy Inductively coupled plasma atomic emission spectrometry for determination of platinum content in water and its applicable determination range;

- Part 2: Determination of magnesium, aluminium, titanium, vanadium, chromium, manganese, iron, cobalt, copper, zinc, zirconium, silver, palladium, tin, samarium, lead and silicon content by inductive coupling Plasma mass spectrometry. The purpose is to determine the content of magnesium, aluminum, titanium, vanadium, chromium, manganese, iron, cobalt, copper, zinc, zirconium, silver, Inductively coupled plasma mass spectrometry for the determination of palladium, tin, samarium, lead and silicon content and its applicable determination range;

- Part 3: Determination of carbon content by high frequency infrared detection method. The purpose is to specify the high frequency infrared detection method for the determination of

carbon content in nickel platinum target alloys.

Frequency infrared detection method and applicable measurement range.

The above documents clarify the scope of application, standardize reagents, materials, test equipment and procedures, and have been repeatedly tested by multiple laboratories.

The precision data is given through verification and validation, which enhances the consistency and comparability of data between different laboratories and provides a basis for testing the quality of nickel-platinum target alloys.

Establish a rigorous and standardized standardization foundation.

Chemical analysis method of nickel-platinum target alloy Part 3: Determination of carbon content High frequency infrared detection method Warning---People who use this document should have practical experience in formal laboratory work. This document does not address all possible safety issues.

The user is responsible for taking appropriate safety and health measures and ensuring that the conditions stipulated by relevant national laws and regulations are met.

1 Scope

This document describes the method for determining the carbon content in nickel-platinum target alloys.

This document is applicable to the determination of carbon content in nickel-platinum target alloy. Determination range (mass fraction). 0.001%~0.10%.

2 Normative references

GB/T 8170

GB/T 17684

3 Terms and definitions

The terms and definitions defined in GB/T 17684 apply to this document.

4 Principle

In the presence of flux, the sample is heated and burned in the oxygen flow of a high-frequency induction furnace, and carbon and oxygen generate CO2, which enters the infrared detection cell for measurement.

The CO2 absorption peak is determined and the computer automatically calculates the mass fraction of carbon.

5 Reagents and Materials

5.1 Magnesium perchlorate. anhydrous, granular or flake.

5.2 Caustic soda asbestos. granular. 5.3 Quartz wool.

5.4 Sulfur trioxide absorbent. absorbent cotton.

5.5 Acetone (analytical grade).

5.6 Pure iron flux. wFe >= 99.95%, wC <= 0 0005%, particle size <= 1.25 mm.

5.7 Tungsten-tin flux. wC<=0 0005%, particle size<=1.4mm.

5.8 Ceramic crucible. calcine at 1200°C for 2h until the blank value becomes constant. After cooling, store in a desiccator for later use.