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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 13748.24-2025

Methods for chemical analysis of magnesium and magnesium alloysPart 24: Determination of trace impurity elements contentsGlow discharge mass spectrometry

镁及镁合金化学分析方法 第24部分：痕量杂质元素的测定 辉光放电质谱法

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Table of Contents

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 is required. This document is part 24 of GB/T 13748 Chemical analysis methods for magnesium and magnesium alloys. GB/T 13748 has been published for the following part. Part

1.Determination of aluminium content; - Determination of tin content-Catechol violet spectrophotometric method (GB/T 13748.2); Determination of lithium content by flame atomic absorption spectrometry (GB/T 13748.3); Part

4.Determination of manganese content - Periodate spectrophotometric method; Determination of yttrium content-Inductively coupled plasma atomic emission spectrometry (GB/T 13748.5); Determination of silver content-Flame atomic absorption spectrometry (GB/T 13748.6); Part

1 Scope

GB/T 13748.24-2025 is the Chinese national standard on methods for chemical analysis of magnesium and magnesium alloyspart 24: determination of trace impurity elements contentsglow discharge mass spectrometry, in the field of metallurgy. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 24 January 2025 by the State Administration for

Market Regulation; Standardization Administration of China, and has been in force since 1 August 2025. Classification: ICS 77.040.30, CCS H12. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

2.Determination of tin, beryllium, copper, nickel and titanium content by spectrophotometric method; Part

3.Determination of lithium and silver content - Atomic absorption spectrometry; Part

4.Determination of manganese and zirconium content by spectrophotometric method; Part

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document. For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies. in this document.

GB/T 6682 Specifications and test methods for water used in analytical laboratories

GB/T 8170 Rules for rounding off values and expression and determination of limit values

3 Terms and definitions

There are no terms or definitions that require definition in this document.

4 Principle

The sample is used as a cathode for glow discharge. Under inert gas (argon) conditions, the surface atoms are sputtered away from the sample and enter the glow. In the discharge plasma, the elements are ionized in the plasma and then introduced into the mass spectrometer. The mass number of each element isotope is scanned at the preset number of points and The corresponding spectral peak is integrated over the integration time, and the obtained area is the spectral peak intensity, and the content of each element is obtained by calculation.

5 Reagents or materials

Unless otherwise specified, only reagents of confirmed high purity and first-grade water that complies with GB/T 6682 were used in the analysis.

8 Gravimetric method for determination of rare earth content; Part

9.Determination of iron content - o-phenanthroline spectrophotometric method; - Part

10.Determination of silicon content - Molybdenum blue spectrophotometric method; Determination of beryllium content. chromium cyanine blue R spectrophotometric method (GB/T 13748.11); Part

12.Determination of copper content; - Determination of lead content Flame atomic absorption spectrometry (GB/T 13748.13); - Part

14.Determination of nickel content - Dimethylglyoxime spectrophotometric method; Part

15.Determination of zinc content; - Determination of calcium content-Flame atomic absorption spectrometry (GB/T 13748.16); Determination of potassium and sodium content-Flame atomic absorption spectrometry (GB/T 13748.17); Determination of chlorine content-Silver chloride turbidimetric method (GB/T 13748.18); Determination of titanium content-Diantipyrin methane spectrophotometric method (GB/T 13748.19); Part

20.Determination of elemental content - Inductively coupled plasma atomic emission spectrometry; Part

21.Determination of element content by photoelectric direct reading atomic emission spectrometry; Part

22.Determination of thorium content; - Part

23.Determination of elemental content - Wavelength dispersive X-ray fluorescence spectrometry; Part

24.Determination of trace impurities by glow discharge mass spectrometry. - 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/TC 243). This document was drafted by: National Standard (Beijing) Inspection and Certification Co., Ltd., Nonferrous Metals Technology and Economic Research Institute Co., Ltd., Kunming Metallurgical Research Institute Co., Ltd., Jinchuan Group Co., Ltd., Guangdong Pioneer Rare Materials Co., Ltd., Guohe General Testing Evaluation Certification Co., Ltd. subsidiaries, Henan Yuhang Metal Materials Co., Ltd. The main drafters of this document are. Wang Changhua, Hu Fangfei, Zhou Ameng, Liu Yingbo, Yang Hai'an, Li Jidong, Liu Pengyu, Yuan Qiaoli, Tan Xiuzhen, Li Qi, Liu Ruotong, Zhang Xuan.

Magnesium and magnesium alloys are important metal materials. GB/T 13748 "Chemical analysis methods for magnesium and magnesium alloys" is the standard for the chemical

analysis of magnesium and magnesium alloys. In order to better meet the industry's needs for the research and development, production and testing of magnesium and magnesium alloys, it is necessary to form a more complete system Establish a series of analysis method standards to form a unified test evaluation system in the industry and increase the reliability and comparability of test results. GB/T 13748 is widely used in many fields such as magnesium and magnesium alloy product research and development, trade settlement, chemical element comparison, and standard material development. It provides important data support for the research and development, production, and trade of magnesium and magnesium alloy products in my country. GB/T 13748 includes spectrophotometry, gravimetric method, atomic absorption spectrometry, inductively coupled plasma atomic emission spectrometry, A variety of analytical methods such as direct reading atomic emission spectrometry are aimed at standardizing the chemical elements that affect the performance of magnesium and magnesium alloy products, such as aluminum, tin, Detection of trace impurity elements such as lithium, manganese, zinc, zirconium, nickel, copper, beryllium, silicon, iron, lanthanum, cerium, praseodymium, neodymium, gadolinium, yttrium, etc., optimized integration Finally, it is planned to consist of the following parts. Part

9 Determination of iron and silicon content by spectrophotometric method; Part

13.Determination of lead, calcium, potassium and sodium content - Atomic absorption spectrometry; Part

18 Determination of chlorine content - Silver chloride turbidimetric method; Part

20.Determination of elemental content - Inductively coupled plasma atomic emission spectrometry; Part

21.Determination of element content - Photoelectric direct reading atomic emission spectrometry; Part

22.Determination of thorium content; - Part

23.Determination of elemental content - Wavelength dispersive X-ray fluorescence spectrometry; Part

24.Determination of trace impurities by glow discharge mass spectrometry. - Glow discharge mass spectrometry (GDMS) is currently the most effective method for direct trace and ultratrace analysis of solid materials. It has the advantages of excellent detection limit and wide dynamic linear range, simple sample preparation and low matrix effect. Based on the relevant product standards of raw magnesium ingots and the analysis and testing needs in the industry, the content of Na, Al, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Mo, Nb, Zr, Sn, W, Pb,