

ICS 77.120.40

CCS H 13



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

GB/T 42513.10-2025

**Methods for chemical analysis of nickel alloys - Part 10:
Determination of trace elements content - Glow discharge mass
spectrometry**

镍合金化学分析方法 第10部分：痕量元素含量的测定 辉光放电质谱法

Issued on: October 31, 2025

Implemented on: May 1, 2026

**Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC**

Table of Contents

- 1 Scope
- 2 Normative references
- 10 Determination of Trace Element Content Glow discharge mass spectrometry

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 Part 10 of GB/T 42513, "Chemical Analysis Methods for Nickel Alloys". GB/T 42513 has the following parts published.

1. Determination of Chromium Content by Ferrous Ammonium Sulfate Potentiometric Titration;

2. Determination of Phosphorus Content by Molybdenum Blue Spectrophotometry;

3. Determination of Aluminum Content Nitrous oxide-flame atomic absorption spectrometry and inductively coupled plasma atomic emission spectrometry Spectroscopy;

4. Determination of Silicon Content by Nitrous Oxide-Flame Atomic Absorption Spectrometry and Molybdenum Blue Spectrophotometry;

5. Determination of Vanadium Content Nitrous oxide-flame atomic absorption spectrometry and inductively coupled plasma atomic emission spectrometry Spectroscopy;

6. Determination of Molybdenum Content by Inductively Coupled Plasma Atomic Emission Spectrometry;

7. Determination of Cobalt, Chromium, Copper, Iron and Manganese Content by Flame Atomic Absorption Spectrometry;

8. Determination of Niobium Content by Inductively Coupled Plasma Atomic Emission Spectrometry;

9. Determination of Total Boron Content by Curcumin Spectrophotometry;

10. Determination of Trace Element Content by Glow Discharge Mass Spectrometry Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents. This document was proposed by the China Nonferrous Metals Industry Association. This document is under the

jurisdiction of the National Technical Committee on Standardization of Nonferrous Metals (SAC/TC243). This document was drafted by: National Standard (Beijing) Inspection and Certification Co., Ltd., Nonferrous Metals Technology and Economic Research Institute Co., Ltd., and Shenzhen Municipal Bureau of Quality and Technical Supervision. Zhongjin Lingnan Nonferrous Metals Co., Ltd., Zijin Mining Group Co., Ltd., and Shanghai Nonferrous Metals Industry Technology Supervision and Monitoring Center have Limited Liability Company, Guohe General (Qingdao) Testing, Evaluation and Certification Co., Ltd., Kunming Metallurgical Research Institute Co., Ltd., Dongfang Electric (Leshan) Emei Semiconductor High Purity Materials Co., Ltd., Jinchuan Group Co., Ltd., Steel Research Institute Nake Testing Technology Co., Ltd., Guangdong Pioneer Rare Materials Co., Ltd. Ningbo Jiangfeng Electronic Materials Co., Ltd. The main drafters of this document are. Hu Fangfei, Li Jidong, Wu Shuaijin, Liu Liyuan, Yang Fuguang, Wang Changhua, He Jianwen, Xia Xiujian, Zhu Yun, and Wang Xiangde. Yang Hai'an, Li Yawen, Zhang Zhenqing, Shao Qiuwen, Tan Xiuzhen, Yao Lijun, Zuo Hongyi, Wu Weihuang, Wang Zhiqiang, Yang Xueru, Mao Zhihui, Chen Yanjun.

Nickel alloys are widely used in instruments, electronic communications, pressure vessels, corrosion-resistant equipment, and are also extensively used in aerospace and high-end special applications. Machinery and equipment manufacturing and other industries rely heavily on nickel alloys as a crucial metal raw material for industrial development. With my country's industrial progress, the demand for high-end nickel alloys has increased. With increasing demand for production and import/export, converting international standards into national standards will help upgrade the non-ferrous metals industry and boost domestic manufacturing. This development is of great significance. GB/T 42513, "Chemical Analysis Methods for Nickel Alloys," aims to establish a complete and practical set of methods for detecting nickel alloys. Standard methods for elements such as chromium, phosphorus, niobium, molybdenum, aluminum, vanadium, silicon, cobalt, copper, and boron are converted into the following international standards.

---ISO 7592.2017 Determination of Chromium Content in Nickel Alloys by Ferrous Ammonium Sulfate Potentiometric Titration;

1 Scope

GB/T 42513.10-2025 is the Chinese national standard covering trace elements in a nickel alloy by glow discharge mass spectrometry - a solid sample sputtered directly with no dissolution, which is what makes parts-per-billion determination possible on a matrix that is difficult to digest cleanly. Part 10 of the series, first edition, under the China Nonferrous Metals Industry Association. In force from 1 May 2026. It was issued on 31 October 2025 and has been in force since 1 May 2026, as a first edition. The document is under the responsibility of the China Nonferrous Metals Industry Association. This page is published from the official record of the 2025 edition; the clause text of a standard this recent is not

yet in circulation, and the figures, limits and tables it contains are those of the document itself, delivered in full with the English translation.

This document describes a method for determining the content of trace elements in nickel alloys using glow discharge mass spectrometry. This document applies to the semi-quantitative and quantitative determination of trace element content in nickel alloys. Elements and their determination ranges are shown in Table 1. Table

1 Elements and Measurement Range	element	Measurement range $\mu\text{g/g}$	element	Measurement range $\mu\text{g/g}$	
B	0.010~100	Nb	0.010~100	Mg	0.010~100
Mo	0.010~100	Al	0.010~100	Ag	0.010~100
Si	0.010~100	Cd	0.10~100	P	0.010~100
Sn	0.010~100	Ca	0.010~100	Sb	0.010~100
Ti	0.010~100	Te	0.010~100	V	0.010~100
La	0.010~100	Mn	0.010~100	Ce	0.010~100
Cu	0.010~100	Yb	0.010~100	Zn	0.010~100
Hf	0.010~100	Ga	0.010~100	Ta	0.010~100
As	0.010~100	W	0.010~100	Se	0.50~100
Tl	0.010~100	Y	0.010~100	Pb	0.010~100
Zr	0.010~100	Bi	0.010~100		

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included. For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies. This document.

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

GB/T 8170 Rules for rounding off numerical values and the representation and determination of limiting values