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

GB/T 3884.4-2025

Replacing GB/T 3884.4-2012

**Methods for chemical analysis of copper concentrates - Part 4:
Determination of lead, zinc, cadmium, nickel and magnesium
oxide contents - Flame atomic absorption spectrometry method**

铜精矿化学分析方法 第4部分：铅、锌、镉、镍和氧化镁含量的测定 火焰原子吸收光谱法

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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 Part 4 of GB/T 3884, "Chemical Analysis Methods for Copper Concentrates". GB/T 3384 has already published the following parts.

- Part 1: Determination of Copper Content by Iodometric and Electrolytic Methods;
- Part 2: Determination of Gold and Silver Content by Flame Atomic Absorption Spectrometry and Fire Assay;
- Part 3: Determination of Sulfur Content by Gravimetric and Combustion Titration Methods;
- Part 4: Determination of Lead, Zinc, Cadmium, Nickel and Magnesium Oxide Content by Flame Atomic Absorption Spectrometry;
- Part 5: Determination of Fluorine Content using Ion-Selective Electrode Method;
- Part 7: Determination of Lead and Zinc Content by Na₂EDTA Titration;
- Part 9: Determination of Arsenic, Antimony and Bismuth Content;
- Part 11. Determination of Mercury Content by Cold Atomic Absorption Spectrometry;
- Part 12. Determination of Fluorine and Chlorine Content by Ion Chromatography and Potentiometric Titration;
- Part 15. Determination of total iron and iron(III) oxide content;
- Part 16. Determination of Silica Content by Potassium Fluorosilicate Titration and Gravimetric Method;
- Part 17. Determination of Alumina Content by Chromium Azure S Micellar Solubilization

Spectrophotometric Method and Precipitation Separation - Fluoride Replacement-Na₂EDTA titration method;

- Part 18.Determination of the content of arsenic, antimony, bismuth, lead, zinc, nickel, cadmium, cobalt, chromium, aluminum oxide, magnesium oxide, and calcium oxide, including inductive coupling, etc.

Particle atomic emission spectrometry;

- Part 19.Determination of Thallium Content by Inductively Coupled Plasma Mass Spectrometry;

- Part 20.Determination of Mercury Content - Direct Method with Solid Injection;

- Part 21.Determination of the amounts of copper, sulfur, lead, zinc, iron, aluminum, calcium, magnesium and manganese by wavelength dispersive X-ray fluorescence spectrometry.

This document replaces GB/T 3884.4-2012 "Chemical Analysis Methods for Copper Concentrates - Part 4: Determination of Magnesium Oxide Content - Flame Atomic Absorption Spectrometry".

The methods used are. "Spectroscopic Method for Copper Concentrates - Part 6: Determination of Lead, Zinc, Cadmium and Nickel Contents" and GB/T 3884.6-2012 "Chemical Analysis Methods for Copper Concentrates - Part 6: Determination of Lead, Zinc and Cadmium Contents - Flame Spectroscopy".

Compared with GB/T 3884.4-2012 and GB/T 3884.6-2012, the main changes in the "Sub-absorption spectroscopy" standard, apart from structural adjustments and editorial modifications, are as follows.

The technological changes are as follows.

a) The scope of application has been changed. from "copper concentrate" to "copper concentrate and copper slag concentrate," and the determination ranges for zinc, cadmium, and magnesium oxide have been changed accordingly.

The percentages are 0.020%~2.50%, 0.0020%~0.50%, and 0.050%~6.50% (see Chapter 1, GB/T 3884.4-2012).

Chapter 1 (GB/T 3884.6-2012, Chapter 1)

b) The principle has been changed (see Chapter 4, Chapter 2 of GB/T 3884.4-2012, and Chapter 2 of GB/T 3884.6-2012);

c) The requirements for reagents have been changed (see Chapter 5, Chapter 3 of GB/T 3884.4-2012, and Chapter 3 of GB/T 3884.6-2012);

d) The relevant requirements for the instrument have been changed (see Chapter 6,

Chapter 4 of GB/T 3884.4-2012, and Chapter 4 of GB/T 3884.6-2012);

e) The relevant requirements for the determination of lead, zinc, cadmium, nickel, and magnesium oxide content have been revised (see 8.4, 6.4 of GB/T 3884.4-2012).

GB/T 3884.6-2012, sections 6.4 and 6.5);

f) The requirements for drawing standard working curves have been changed, and the separate preparation of each single-element series standard has been modified to allow for preparation based on actual conditions.

Prepare single-element series standards or mixed series standards (see 8.5, 6.5 of GB/T 3884.4-2012 and 6.5 of GB/T 3884.6-). (June 6, 2012)

g) The requirements for test data processing have been changed (see Chapter 9, Chapter 7 of GB/T 3884.4-2012, and GB/T 3884.6-2012). Chapter 7);

h) The precision data has been changed (see Chapter 10, Chapter 10 of GB/T 3884.4-2012, and Chapter 10 of GB/T 3884.6-2012).

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.

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The release history of this document and the document it replaces is as follows.

- First published in 1983 as GB/T 3884.5-1983, first revised in 2000 as GB/T 3884.4-2000, and in 2012...

The second revision is GB/T 3884.4-2012;

- This is the third revision, and it has been incorporated into GB/T 3884.6-2012 "Chemical Analysis Methods for Copper Concentrates - Part 6: Lead, Zinc, Cadmium and Nickel Content".

The content of "Determination of Flame Atomic Absorption Spectrometry" (GB/T 3884.6-2012) is as follows. [List of documents replaced and previous versions follows].

GB/T 3884.7-1983 "Chemical Analysis Methods for Copper Concentrate. Determination of Lead Content by Atomic Absorption Spectrophotometry", GB/T 3884.11- 1983 "Chemical Analysis Methods for Copper Concentrate. Determination of Cadmium Content by Atomic Absorption Spectrophotometry", GB/T 3884.12-1983 "Chemical Analysis Methods for Copper Concentrate". Determination of Cadmium Content by Atomic Absorption Spectrophotometry Analytical Methods. Determination of Zinc Content by Atomic Absorption Spectrophotometry; GB/T 3884.6-2000 Chemical Analysis Methods for Copper Concentrate, Lead, Zinc, (Determination of Cadmium and Nickel Content).

Introduction

Copper concentrate and copper slag concentrate are raw materials for copper smelting. Standards for chemical composition analysis methods of copper concentrate play a crucial role in the non-ferrous metals industry's standard system.

This series of methods plays a vital role in the production, trade, and application of copper concentrate, providing technical support for the high-quality development of China's non-ferrous metals industry.

The purpose of GB/T 3884, "Chemical Analysis Methods for Copper Concentrates," is to describe the composition of different chemical elements such as copper, gold, silver, lead, and zinc in copper concentrates.