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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 3884.16-2025

Replacing GB/T 3884.16-2014

Methods for chemical analysis of copper concentrates - Part 16: Determination of silicon dioxide content - Potassium fluosilicate titrimetric method and gravimetric method

铜精矿化学分析方法 第16部分：二氧化硅含量的测定 氟硅酸钾滴定法和重量法

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

1.Determination of Copper Content by Iodometric and Electrolytic Methods;

2.Determination of Gold and Silver Content by Flame Atomic Absorption Spectrometry and Fire Assay;

3.Determination of Sulfur Content by Gravimetric and Combustion Titration Methods;

4.Determination of Lead, Zinc, Cadmium, Nickel and Magnesium Oxide Content by Flame Atomic Absorption Spectrometry;

5.Determination of Fluorine Content using Ion-Selective Electrode Method;

7.Determination of Lead and Zinc Content by Na2EDTA Titration;

9.Determination of Arsenic, Antimony and Bismuth Content;

11.Determination of Mercury Content by Cold Atomic Absorption Spectrometry;

12.Determination of Fluorine and Chlorine Content by Ion Chromatography and Potentiometric Titration;

15.Determination of total iron and iron(III) oxide content;

16.Determination of Silica Content by Potassium Fluorosilicate Titration and Gravimetric Method;

17.Determination of Alumina Content by Chromium Azure S Micellar Solubilization Spectrophotometric Method and Precipitation Separation - Fluoride Replacement-Na2EDTA titration method;

1 Scope

GB/T 3884.16-2025 is the Chinese national standard covering silica in copper concentrate by two routes - the potassium fluosilicate titration as the working method and the gravimetric determination as the referee, with the fusion, the interferences and the precision required of each. Silica is a penalty element in a smelter contract. Part 16 of the series. It replaces GB/T 3884.16-2014, in force from 1 May 2026. Issued on 31 October 2025, it has been in force since 1 May 2026, replacing GB/T 3884.16-2014.

4.1 Principle The sample was fused with potassium hydroxide, leached with hot water, and acidified. Then, potassium chloride and hydrofluoric acid were added to a strongly acidic solution to convert the silicic acid into potassium fluorosilicate. The precipitate is formed, filtered, washed to remove free acid, and then dissolved in boiling neutral water. The precipitate hydrolyzes to form hydrofluoric acid, which is then converted to bromothymol. Using blue-phenol red as an indicator, titration is performed with a standard sodium hydroxide solution. The volume of sodium hydroxide solution consumed is used to calculate the carbon dioxide content. Silicon content.

4.2 Reagents Unless otherwise specified, only reagents confirmed to be of analytical grade shall be used in the analysis.

4.2.1 Water, conforming to GB/T 6682, Class II.

4.2.2 Potassium hydroxide.

4.2.3 Sodium peroxide.

4.2.4 Potassium chloride.

4.2.5 Hydrochloric acid (rho=1.19g/mL).

4.2.6 Nitric acid (rho=1.42g/mL).

4.2.7 Hydrofluoric acid (rho=1.14g/mL).

4.2.8 Saturated potassium chloride-ethanol washing solution. Anhydrous ethanol and carbon dioxide-free water are mixed at a ratio of 1.1, and potassium chloride (4.2.4) is added until saturated.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are listed below. 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

3 Terms and Definitions

This document does not contain any terms or definitions that need to be defined.