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

GB/T 8152.17-2023

**Methods for chemical analysis of lead concentrates - Part 17:
Determination of aluminium, magnesium, iron, copper, zinc, cadmium,
arsenic, antimony, bismuth and calcium contents - ICP-AES**

铅精矿化学分析方法 第17部分：铝、镁、铁、铜、锌、镉、砷、锑、铋、钙含量
的测定 电感耦合等离子体原子发射光谱法

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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 17 of GB/T 8152 "Methods for Chemical Analysis of Lead Concentrates": GB/T 8152 has released the following parts:

- Part 1: Determination of lead content acid dissolution-EDTA titration method;
- Part 2: Determination of lead content - lead sulfate precipitation - EDTA back titration method;
- Part 3: Determination of the amount of aluminum oxide - Chromazurin S spectrophotometric method;
- Part 4: Determination of zinc content EDTA titration method;
- Part 5: Determination of the amount of arsenic atomic fluorescence spectrometry;
- Part 6: Determination of bismuth content by polarography;
- Part 7: Determination of copper content by flame atomic absorption spectrometry;
- Part 8: Determination of bismuth content by dithiodiantipyrine methane spectrophotometry;
- Part 9: Determination of magnesium oxide by flame atomic absorption spectrometry;
- Part 10: Determination of silver and gold content lead precipitation or pyrolysis gold and flame atomic absorption spectrometry;
- Part 11: Determination of mercury content atomic fluorescence spectrometry and direct solid injection method;
- Part 12: Determination of the amount of cadmium flame atomic absorption spectrometry;
- Part 13: Determination of the amount of thallium by inductively coupled plasma mass spectrometry and inductively coupled plasma-atomic emission spectrometry;

1 Scope

Part 17 of China's national series on the analysis of lead concentrates, determining ten elements at once by inductively coupled plasma atomic emission spectrometry. A lead concentrate is paid for on its lead content, but what it costs the smelter to treat is decided by everything else in it, and that is what these ten elements represent. Copper, zinc, cadmium and bismuth are recoverable by-products with value; arsenic and antimony are penalties, because they must be removed from the bullion in extra refining steps and they end up in dusts and residues that are themselves a disposal problem; and aluminium, magnesium, iron and calcium are the gangue that determines the slag chemistry and the flux required. So a concentrate's commercial terms turn on this single analysis. Determining all ten in one aspiration is what makes ICP-AES the right instrument. This part applies to lead concentrates, with each element covered over its own range - iron from 2.00 to 10.00 per cent, antimony and zinc to 10.00, and the others as tabulated.

This document describes a method for the determination of aluminum, magnesium, iron, copper, zinc, cadmium, arsenic, antimony, bismuth, and calcium in lead concentrates: This document is applicable to the determination of aluminum, magnesium, iron, copper, zinc, cadmium, arsenic, antimony, bismuth and calcium in lead concentrate: The determination range of each element is shown in Table 1: Table

1 Determination range of each element element Measuring range (mass fraction) element Measuring range (mass fraction) Al 0:050~2:

00 Cd 0:030~0:

00 As 0:020~2:

00 Fe 2:00~10:

00 Sb 0:010~10:

00 Cu 0:50~8:

00 Bi 0:030~5:

00 Zn 0:50~10:

00 Ca 0:50~3:50

2 Normative references

The contents of the following documents constitute the essential provisions of this document through normative references in the text: Among them, dated references For documents, only the version corresponding to the date is applicable to this document; for undated reference documents, the latest version (including all amendments) is applicable to this document:

GB/T 6682 Analytical laboratory water specifications and test methods

3 Terms and Definitions

This document does not have terms and definitions that need to be defined:

4 Principles

The sample is decomposed with nitric acid, hydrochloric acid, hydrofluoric acid, perchloric acid, in the mixed acid medium, with inductively coupled plasma atomic emission spectrometer, in The emission intensity of each element was measured at the selected wavelength, and the mass fraction of each element was calculated according to the standard working curve method: