BS ISO 15247:2015

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Zinc sulfide concentrates — Determination of silver content — Acid dissolution and flame atomic absorption spectrometric method

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National foreword

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INTERNATIONAL STANDARD

ISO 15247

Second edition
2015-07-01

Zinc sulfide concentrates — Determination of silver content — Acid dissolution and flame atomic absorption spectrometric method

Concentrés sulfurés de zinc — Dosage de l'argent — Méthode par dissolution acide et spectrométrie d'absorption atomique dans la flamme

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Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
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Foreword

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The committee responsible for this document is ISO/TC 183, *Copper, lead, zinc and nickel ores and concentrates*.

This second edition cancels and replaces the first edition (ISO 15247:1999), of which the warning in A.3.1 in Annex A has been revised.

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INTERNATIONAL STANDARD ISO 15247:2015(E)

Zinc sulfide concentrates — Determination of silver content — Acid dissolution and flame atomic absorption spectrometric method

1 Scope

This International Standard specifies an acid dissolution and flame atomic absorption spectrometric method for the determination of silver content of zinc sulfide concentrates.

The method is applicable to the determination of silver in zinc sulfide concentrates containing up to 60 % (*m*/*m*) zinc in the form of zinc blende and related materials.

The method is applicable to silver contents from 10 g/t to 500 g/t.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 385, *Laboratory glassware — Burettes*

ISO 648, *Laboratory glassware — Single-volume pipettes*

ISO 1042, *Laboratory glassware — One-mark volumetric flasks*

ISO 3696, *Water for analytical laboratory use — Specification and test methods*.

ISO 4787, *Laboratory glassware — Volumetric instruments — Methods for testing of capacity and for use*

ISO 9599, *Copper, lead, zinc and nickel sulfide concentrates — Determination of hygroscopic moisture content of the analysis sample — Gravimetric method*

3 Principle

Decomposition of the concentrate in hydrochloric and nitric acids. Dissolution of the digestion residue in hydrochloric acid and measurement by flame atomic absorption at 328,1 nm.

4 Reagents

During the analysis, use only reagents of recognized analytical grade and water that complies with grade 2 of ISO 3696.

4.1 Silver metal, minimum 99,99 % purity.

4.2 Nitric acid, (ρ_{20} 1,42 g/ml), chloride content < 0,5 mg/ml.

4.3 Nitric acid, (500 ml/l).

To 250 ml of water carefully add, with stirring, 250 ml of nitric acid (4.2).

4.4 Hydrofluoric acid, (ρ_{20} 1,16 g/ml to 1,19 g/ml).

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4.5 Hydrochloric acid, (200 ml/l).

To 800 ml of water carefully add, with stirring, 200 ml of hydrochloric acid (4.4).

4.6 Ammonia solution, (ρ_{20} 0,89 g/ml).

4.7 Ammonia solution, (250 ml/l).

To 750 ml of water add, with stirring, 250 ml of ammonia solution (4.6).

4.8 Silver standard solutions

4.8.1 Silver standard solution, (1 000 µg/ml).

Weigh 0,500 0 g of silver metal (4.1) into a 250 ml conical beaker, add 50 ml of nitric acid (4.3), cover, and heat gently until the metal dissolves. Remove the cover and evaporate gently to near dryness. Add 250 ml of hydrochloric acid (4.4) and warm until the solution clears. Cool, and transfer to a 500 ml volumetric flask. Dilute to volume with water and mix thoroughly.

This solution should be freshly prepared, unless it is being used on a regular basis.

4.8.2 Silver standard solution, (100 µg/ml).

Pipette 10 ml of silver standard solution (4.8.1) into a 100 ml volumetric flask containing 45 ml of hydrochloric acid (4.4). Dilute to volume with water and mix thoroughly.

Standard solutions should be prepared at the same ambient temperature as that at which the determinations will be conducted.

Silver standard solutions should be stored in brown glass bottles.

4.9 Calibration solutions

To six 100 ml volumetric flasks, each containing 20 ml of hydrochloric acid (4.4), add from a burette (5.2) 0 ml, 1 ml, 2 ml, 3 ml, 4 ml, and 5 ml of silver standard solution (4.8.2). Dilute to volume with water and mix thoroughly.

These standards contain 0 µg, 1 µg, 2 µg, 3 µg, 4 µg, and 5 µg of silver per ml and shall be freshly prepared.

Calibration solutions should be prepared at the same ambient temperature as that at which the determinations will be conducted.

5 Apparatus

Ordinary laboratory apparatus and the following.

5.1 Volumetric glassware, of class A complying with ISO 385, ISO 648, and ISO 1042 and used in accordance with ISO 4787.

5.2 Burette, grade A 10 ml capacity, capable of being read to 0,02 ml.

5.3 Atomic absorption spectrometer (AAS), equipped with a glass bead in the spray chamber rather than a flow spoiler.

5.4 Balance, precision analytical, capable of being read to 0,1 mg.

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