

Australian Standard™

Zinc sulfide concentrates—Chemical analysis

Part 4: Determination of silver content—Acid dissolution and flame atomic absorption spectrometric method

[ISO title: Zinc sulfide concentrates—Determination of silver content—Acid dissolution and flame atomic absorption spectrometric method]



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PREFACE

This Standard was prepared by the Standards Australia Committee MN-005, Copper, Lead, Zinc, Gold and Silver Ores and Concentrates as part of a programme of standardizing methods for the determination of elements of commercial interest in such materials.

The objective of this Standard is to provide those involved in the analysis of zinc sulfide concentrates with a standardized method of determining silver content supported by precision data obtained from an inter-laboratory test programme.

This Standard is identical with and has been reproduced from ISO 15247:1999, *Zinc sulfide concentrates—Determination of silver content—Acid dissolution and flame atomic absorption spectrometric method*, which has been prepared by ISO/TC 183 Copper, Lead and Zinc Ores and Concentrates. Australia holds the Chairmanship and Secretariat of ISO/TC 183 and has made a significant contribution to the preparation of ISO 15247.

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<i>Reference to International Standard</i>		<i>Australian/New Zealand Standard</i>	
ISO		AS	
9599	Copper, lead and zinc sulfide concentrates—Determination of hygroscopic moisture in the analysis sample—Gravimetric method	2816	Copper, lead and zinc sulfide concentrates—Determination of hygroscopic moisture in the analysis sample—Gravimetric method
385	Laboratory glassware—Burettes	—	
385-1	Part 1: General requirements	—	
648	Laboratory glassware—One-mark pipettes	—	
1042	Laboratory glassware—One-mark volumetric flasks	—	
3696	Water for analytical laboratory use—specification and test methods	—	
4787	Laboratory glassware—Volumetric glassware—Methods for use and testing of capacity	—	

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NOTES

AUSTRALIAN STANDARD

Zinc sulfide concentrates—Chemical analysis**Part 4: 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 standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 385-1:1984, *Laboratory glassware — Burettes — Part 1: General requirements*.

ISO 648:1977, *Laboratory glassware — One mark pipettes*.

ISO 1042:1998, *Laboratory glassware — One-mark volumetric flasks*.

ISO 3696:1987, *Water for analytical laboratory use — Specification and test methods*.

ISO 4787:1984, *Laboratory glassware — Volumetric glassware — Methods for use and testing of capacity*.

ISO 9599:1991, *Copper, lead and zinc sulfide concentrates — Determination of hygroscopic moisture in 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 µg/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 Hydrochloric acid, (ρ_{20} 1,16 g/ml to 1,19 g/ml).

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.

NOTE 1 Standard solutions should be prepared at the same ambient temperature as that at which the determinations will be conducted.

NOTE 2 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.

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