AS 2917.3—2008

Australian Standard®

Copper sulfide concentrates

Part 3: Determination of copper—Electrogravimetric method

This Australian Standard® was prepared by Committee MN-005, Copper, Lead, Zinc and Nickel Ores and Concentrates. It was approved on behalf of the Council of Standards Australia on 24 January 2008.
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The following are represented on Committee MN-005:

- CSIRO Minerals
- Minerals Council of Australia

Additional Interests:

- Minerals industry analytical laboratories

This Standard was issued in draft form for comment as DR 07041.

Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through the public comment period.

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PREFACE

This Standard was prepared by the Standards Australia Committee MN-005, Copper, Lead, Zinc and Nickel Ores and Concentrates, to supersede AS 2917.3—1994, *Copper sulfide concentrates*, Part 3: *Determination of copper content—Electrogravimetric method*.

The objective of this Standard is to provide those involved in the analysis of copper concentrates with a standardized method for determining copper, supported by precision data obtained from an interlaboratory test program.

The objective of this revision is to adopt the latest edition of the corresponding International Standard.

This Standard is identical with, and has been reproduced from ISO 10469:2006, *Copper,sulfide concentrates—Determination of copper—Electrogravimetric method*.

As this Standard is reproduced from an International Standard, the following applies:

(a) Its number appears on the cover and title page while the International Standard number appears only on the cover.

(b) In the source text 'this International Standard' should read 'this Australian Standard'.

(c) A full point substitutes for a comma when referring to a decimal marker.

(d) Substitute 'L' for 'l' as the unit for litres.

References to International Standards should be replaced by references to Australian Standards, as follows:

Reference to International Standard		*Australian Standard*	
AS		ISO	
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

Only international references that have been adopted as Australian Standards have been listed.

The terms 'normative' and 'informative' have been used in this Standard to define the application of the annex to which they apply. A 'normative' annex is an integral part of a Standard, whereas an 'informative' annex is only for information and guidance.

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INTRODUCTION

ISO 10469:1994 underwent periodical review in 1999. Although the decision was made to confirm the International Standard at that time, significant comments were submitted by Japan. These comments were considered at a meeting of ISO/TC 183 in 2000, where it was agreed that Japan would re-draft ISO 10469 to indicate the proposed changes.

The most significant change was the elimination of the correction for impurities.

ISO/TC 183 agreed that the changes made do not warrant a new interlaboratory test programme. Details of the changes are as follows:

a) Deletion of the determination of impurities in the deposited copper (7.9 in ISO 10469:1994).

b) Adjustment of the expression of dissolution of the test portion according to ISO 10258:1994, *Copper sulfide concentrates — Determination of copper content — Titrimetric methods.*

c) Adjustment of the expression of the sulfide separation method according to ISO 10258:1994.

d) In the case of contained bismuth or tellurium, modification of the sulfide separation procedure. The method described in ISO 10469:1994 included a lot of copper in the iron hydroxide precipitation, which will lead to incorrect results. The method described in ISO 13658:2000, *Zinc sulfide concentrates — Determination of zinc content — Hydroxide precipitation and EDTA titrimetric method* has less copper in the iron hydroxide precipitation than the method described in ISO 10469:1994, so the method described in ISO 10469:1994 has now been modified with reference to ISO 13658.

e) The procedure of treatment of the iron hydroxide precipitation (contained copper) is not given in ISO 10469:1994. The procedure of treatment has been added to the revised Standard.

Calibration solution A (4.34.1 in ISO 10469:1994) will be used in 7.7.1 (FAAS determination of copper in the filtrate of the sulfide precipitation*).* This filtrate contains iron ion, so calibration solution A should contain iron to achieve matrix matching. The preparation method of calibration solution A has been revised to include iron ion in the revised Standard.

AUSTRALIAN STANDARD

Copper sulfide concentrates

Part 3:
Determination of copper—Electrogravimetric method

WARNING — This International Standard may involve hazardous materials, operations and equipment. It is the responsibility of the user of this International Standard to establish appropriate health and safety practices and determine the applicability of regulatory limitations prior to use.

1 Scope

This International Standard specifies an electrogravimetric method for the determination of the mass fraction of copper in copper sulfide concentrates in the range 15 % to 50 %.

2 Normative references

The following referenced documents are indispensable for the application of this document. 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 — One-mark pipettes*

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

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

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

3 Principle

The test portion is decomposed in nitric and sulfuric acids, and copper is separated from interfering elements:

— from silver by precipitation of silver chloride;

— from arsenic, antimony, selenium and tin by fuming with hydrobromic acid;

— from iron by precipitation of copper sulfide with sodium thiosulfate or by precipitation of iron(III) oxide hydrate (bismuth and tellurium are also separated in this way).

Electrogravimetric deposition of copper occurs in the presence of nitric acid, sulfuric acid and traces of chloride. Under these conditions, coprecipitation of molybdenum does not occur.

Traces of copper in the electrolyte, the filtrate of the copper sulfide precipitation, all precipitates and residues are determined by flame atomic absorption spectrometry (FAAS) or inductively coupled plasma atomic emission spectrometry.