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

GB/T 15249.3-2009

Replacing GB/T 15249.3-1994

**Methods for chemical analysis of crude gold - Part 3:
Determination of copper content - Iodometric method**

合质金化学分析方法 第3部分：铜量的测定 碘量法

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Foreword

GB/T 15249 "Crude Gold analysis method" is divided into the following five sections.

- Part 1. Determination of the amount of gold fire assay gravimetric method;
- Part 2. Determination of the amount of silver fire assay gravimetric and EDTA titration;
- Part 3. Determination of copper content iodometry;
- Part 4. Determination of lead content EDTA titration;
- Part 5. Determination of mercury content - Cold atomic absorption spectrometry. This section GB/T 15249 Part 3. This Part replaces GB/T 15249.3-1994 "Crude Gold - Determination of copper content Methods for chemical analysis Iodometry." This portion of the GB/T 15249.3-1994 compared to the main changes are as follows:

- Text format has been modified;
- Remove the "allowable difference" clause;
- Added "precision" clause (repeatability and reproducibility);
- Increased quality assurance and control provisions. This section proposed by the People's Bank of China. This part of the National Standardization Technical Committee on Finance (SAC/TC180) centralized. This section is responsible for drafting unit. Beijing General Research Institute of Mining and Metallurgy. Participated in the drafting of this section. Chengdu Banknote Printing Company, Changchun Gold Research Institute, Shenyang Mint, Shanghai and Nanjing Mint. The main drafters of this section. Tangshu Fang, Yu Li, Zhou Hua, Deng Haihong. This part of the standard replaces the previous editions are.
- GB/T 15249.3-1994. Crude Gold Analysis Part 3. Determination of copper content Iodometry

1 Scope

GB/T 15249.3-2009 is the Chinese national standard on methods for chemical analysis of

crude gold - part 3: determination of copper content - iodometric method, in the field of metallurgy. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 6 May 2009 by the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China; Standardization Administration of China, and has been in force since 1 October 2009. Classification: ICS 77.120.70, CCS H15. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

--- sodium thiosulfate standard titration solution of copper titration factor, in milligrams per milliliter (mg/mL); M1

--- Pipette copper standard solution of copper mass, in milligrams (mg);

2 Principle of the method

Dilute nitric acid, hydrochloric acid decomposition test material, precipitation of silver chloride, silver sulfite reduction of Au (III) to elemental gold, separating gold, silver after adding Sulfuric trioxide smoke take in order to get rid of nitrogen oxides, adjusting acidity, hydrogen fluoride, ammonium iron mask with dilute aqueous ammonia, in the slightly acidic pH3.0 ~

4.0 Solution of copper (II) with potassium iodide free from iodine, using starch as indicator, titrated with sodium thiosulfate standard titration solution.

3 Reagents

Unless otherwise indicated in the analysis using only recognized as analytical grade reagents and distilled or deionized water or equivalent purity.

3.1 potassium iodide.

3.2 ammonium hydrogen fluoride.

3.3 potassium thiocyanate.

3.4 hydrochloride (rho1.19g/mL). Nitrate 3.5 (rho1.42g/mL).

3.6 nitric acid (1 + 1).

3.7 sulfate (1 + 1), the preparation of sulfuric acid (rho1.84g/mL).

3.8 sulfite (rho1.03g/mL). Ammonia 3.9 (1 + 1).

3.10 starch solution (5g/L).

3.11 Copper Standard solution. Weigh 1.0000g copper (mass fraction of not less than 99.99%) were placed in 300mL beaker was slowly added 40mL Nitric acid (3.6), covered with a watch glass and heated to dissolve completely, removed, washed with water and dish cup wall surface, cooled to room temperature, transferred to 1000mL container Volumetric flask, dilute with water to volume, and mix. 1mL solution containing 1mg of copper.

3.12 sodium thiosulfate standard titration solution [Ba ($\text{Na}_2\text{S}_2\text{O}_3$) $\sim 0.016\text{mol/L}$]. Weigh 4g sodium thiosulfate ($\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$ under) in 300mL beaker, add cold boiled distilled water, was added 0.1g of sodium carbonate, dissolved moved 1000mL capacity Bottle, diluted with water to volume, and mix. 7d in the dark place after calibration.

Calibration. Pipette three 25.00mL copper standard solution (3.11), were placed in 250mL beaker, add 5mL of sulfuric acid (3.7), heating Evaporation to take sulfur trioxide concentration of white smoke, remove the cooling. Beibi water purge, continue to take the best heating evaporation trioxide smoke, add 6 drops of cooling Sulfuric acid (3.7), the purge cup wall, add water to approximately 30mL, was heated to completely dissolve the salt, cooled to room temperature.

4.3.8 The following press operations. Calculation. according to equation (1) calculate the standard volumetric sodium thiosulfate solution for copper titration factor. $F = m$