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

GB/T 7739.1-2019

**Methods for chemical analysis of gold concentrates - Part 1:
Determination of gold and silver contents**

金精矿化学分析方法 第1部分：金量和银量的测定

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Table of Contents

1 Scope

2 Method 1. Determination of the amount of gold and silver

Foreword

GB/T 7739 ``Chemical Analysis Methods for Gold Concentrates '' is divided into the following sections.

- Part 1. Determination of the amount of gold and silver;
- Part 2. Determination of silver content by flame atomic absorption spectrometry;
- Part 3. Determination of arsenic content;
- Part 4. Determination of copper content;
- Part 5. Determination of lead content;
- Part 6. Determination of zinc content;
- Part 7. Determination of iron content;
- Part 8. Determination of sulfur content;
- Part 9. Determination of carbon content;
- Part 10. Determination of the amount of antimony;
- Part 12. Determination of arsenic, mercury, cadmium, lead and bismuth by atomic fluorescence spectrometry;
- Part 13. Determination of lead, zinc, bismuth, cadmium, chromium, arsenic and mercury content by inductively coupled plasma atomic emission spectrometry;
- Part 14. Determination of plutonium by inductively coupled plasma atomic emission spectrometry and inductively coupled plasma mass spectrometry. This part is the first part of GB/T 7739. This section is drafted in accordance with the rules given in GB/T 1.1-2009. This section replaces GB/T 7739.1-2007 "Chemical analysis methods for gold concentrates-Part 1. Determination of gold and silver content". Compared with GB/T 7739.1-2007, the main technical changes in this section are as follows:

1 Scope

Part 1 of China's national series on the chemical analysis of gold concentrates, determining

gold and silver. This is the assay on which the gold trade rests, and the reference method in it is fire assay - a technique some three thousand years old that no instrumental method has displaced, because it is the only one that takes the whole sample rather than a solution of part of it. The concentrate is fused with lead oxide and fluxes to collect all the precious metal into a lead button, the slag is refused to recover what it retained, and the lead is then oxidised away in a porous cupel, leaving a bead of gold and silver that is weighed and parted. Its strength is that gold occurs unevenly, and a method that consumes tens of grams tolerates that where an aliquot of solution does not. This part specifies three methods: Method 1 determines both gold from 10.0 to 550.0 g/t and silver from 200.0 to 12000.0 g/t, while Methods 2 and 3 determine gold from 10.0 to 150.0 g/t.

This part of GB/T 7739 specifies the determination method of gold and silver in gold concentrate. Method 1 of this section is applicable to the determination of gold and silver in gold concentrates, and method 2 and method 3 are applicable to the determination of gold in gold concentrates. method

2 Method 1. Determination of the amount of gold and silver

2.1 Principle The sample was compounded and melted to obtain lead of precious metal with appropriate quality and fragile slag. In order to recover the gold remaining in the slag, Silver, again test the slag. Gold, silver and lead buckle are separated by ash blowing to obtain gold-silver composite grains. The amount of gold and silver was measured.

2.2 Reagents and materials Unless otherwise stated, only reagents and distilled water of equivalent analytical purity and water of comparable purity were used in the analysis.

2.2.1 Sodium carbonate. industrially pure, powdery.

2.2.2 Lead oxide. industrially pure, powdery. The amount of gold is $< 0.02\text{g/t}$, and the amount of silver is $< 0.5\text{g/t}$.

2.2.3 Borax. industrially pure, powdery.

2.2.4 Glass powder. particle size $\leq 0.18\text{mm}$.

2.2.5 silicon dioxide. industrially pure, powdery.

2.2.6 Potassium nitrate. industrially pure, powdery.

2.2.7 Pure silver (mass fraction $\geq 99.99\%$).

2.2.8 Covering agent (2 1). Mix two parts of sodium carbonate with one part of borax.

2.2.10 Lead foil (mass fraction $\geq 99.99\%$). thickness is about 0.1mm , the amount of gold is $< 0.02\text{g/t}$, and the amount of silver is $< 0.5\text{g/t}$.

2.2.11 Nitric acid ($\rho = 1.42\text{g/mL}$).

2.2.12 Glacial acetic acid ($\rho = 1.05\text{g/mL}$).

2.2.13 Nitric acid (1 7).

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