

ICS 73.060.99

CCS D 46



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

GB/T 29509.1-2025

Replacing GB/T 29509.1-2013

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

Issued on: June 30, 2025

Implemented on: January 1, 2026

**Issued by: State Administration for Market Regulation, China National
Standardization Administration**

Table of Contents

Preface	III
Introduction	IV
1 Scope	1
2 Normative references	1
3 Terms and Definitions	1
4 Method 1.Determination of gold and silver content - Fire assay gravimetric method (arbitration method)	1
4.1 Principle	1
4.2 Reagents or Materials	1
4.3 Instruments and Equipment	2
4.4 Preparation of samples and test materials	2
4.5 Test Step	3
4.6 Experimental data processing	4
4.7 Precision	5
4.8 Test Report	6
5 Method 2.Determination of gold content --- flame atomic absorption spectrometry	6
5.1 Principle	6
5.2 Reagents or materials	6
5.3 Instruments and Equipment	7
5.4 Preparation of samples and test materials	7
5.5 Test Step	7
5.6 Experimental data processing	8
5.7 Precision	8
5.8 Test report	9

Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting.

This document is Part 1 of GB/T 29509 "Chemical analysis methods of gold-loaded carbon". GB/T 29509 has been published in the following two parts. part.

- Part 1: Determination of gold and silver content;
- Part 2: Determination of silver content - Flame atomic absorption spectrometry.

This document replaces GB/T 29509.1-2013 "Chemical analysis methods of gold-loaded carbon Part 1: Determination of gold content" and GB/T 29509.1- Compared with 2013, in addition to structural adjustments and editorial changes, the main technical changes are as follows.

- a) The determination range of silver content has been increased (see Chapter 1);
- b) Added the sample weight table for silver content (see 4.4.2);
- c) Added the step of determining the amount of silver (see 4.5);
- d) Added the calculation formula for silver content (see 4.6);
- e) Increased the precision of silver content (see 4.7).

Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents.

This document is proposed and coordinated by the National Gold Standardization Technical Committee (SAC/TC379).

This document was drafted by: Changchun Gold Research Institute Co., Ltd., Zijin Mining Group Co., Ltd., and SDIC Jincheng Metallurgical Co., Ltd.

Company, Inner Mongolia Taiping Mining Co., Ltd., Jiangxi Sanhe Gold Industry Co., Ltd., Shandong Gold Mining Technology Co., Ltd. Metallurgical Laboratory Branch Hunan Mineral Resources Group Co., Ltd., Shandong Gold Geology and Mineral Exploration Co., Ltd., Songxian Jinniu Co., Ltd., Yantai Jinan Environmental Protection Technology Co., Ltd. and Yunnan Gold Mining Group Precious Metals Testing Co., Ltd.

The main drafters of this document are: Lu Xingen, Ma Lijun, Liu Shuo, Chen Zhuhai, Liu Hui, Li Qiang, Zhao Kai, Zhang Guangsheng, Li Zhengxu, Zhu Xingfu, Long Xiujia, Liu Juan, Wang Ju, Yang Zhifeng, Zhang Jinlei, Qiao Xiaohu, Wang Zhiqiang, Lü Hui, Fan Ruhong, Wang Jidong, Chen Xiaoke, Lü Shunyi, Meng Xianwei, Du Xiaowang.

The previous versions of this document and the documents it replaces are as follows.

- GB/T 29509.1-2013;
- This is the first revision.

Introduction

Gold-loaded carbon is defined as activated carbon after gold adsorption, which is an intermediate product in the gold extraction process.

Establish a unified testing and evaluation method for the production and trade of gold-loaded carbon, providing accurate and reliable technology for the efficient recovery of gold resources and fair trade support.

GB/T 29509 is intended to consist of two parts.

- Part 1: Determination of gold and silver content. The purpose is to specify the fire assay gravimetric method, gold gravimetric method, and The flame atomic absorption spectrometry method used for determination and the applicable measurement range of each method.
- Part 2: Determination of silver content flame atomic absorption spectrometry. The purpose is to specify the flame atomic absorption spectrometry method for the determination of silver content in gold-loaded carbon.

Absorption spectroscopy and applicable measurement range.

Chemical analysis method of gold-loaded carbon Part 1: Determination of gold and silver content

1 Scope

This document describes a method for the determination of gold and silver in gold-loaded carbon.

This document is applicable to the determination of gold and silver content in gold-loaded carbon. Method 1 Fire Assay Gravimetric Method Gold Content Determination Range. 100.0 g/t~ 10000.0g/t, silver content determination range. 500.0g/t~20000.0g/t; Method 2 Flame Atomic Absorption Spectrometry Gold Content Determination Range. 100.0g/t~10000.0g/t.

2 Normative references

GB/T 17433

3 Terms and Definitions

The terms and definitions defined in GB/T 17433 apply to this document.

4 Method 1.Determination of gold and silver content - Fire assay gravimetric method (arbitration method)

4.1 Principle

The sample is roasted, mixed and melted to obtain lead buckles of appropriate quality containing precious metals. The gold and silver are separated from the lead buckles by ash blowing.

The gold and silver particles are processed and weighed, and then the gold is separated by nitric acid, and the gold and silver contents are determined by weight.

4.2 Reagents or materials

Unless otherwise stated, only reagents of confirmed analytical grade and distilled or deionized water or water of equivalent purity were used in the tests.

4.2.1 Metallic silver. $w_{\text{Ag}} \geq 99.99\%$.

4.2.2 Lead foil. $w_{\text{Pb}} \geq 99.99\%$, thickness approximately 0.1 mm, gold content < 0.02 g/t, silver content < 0.5 g/t.

4.2.3 Sodium carbonate. industrial pure, powdered.

4.2.4 Lead oxide. technically pure, powdered, gold content < 0.02 g/t, silver content < 0.5 g/t.

4.2.5 Borax. industrial pure, powdered.

4.2.6 Silicon dioxide. industrial pure, powdered. 4.2.7 Flour.

4.2.8 Glacial acetic acid. $\rho = 1.05$ g/mL.

4.2.9 Nitric acid. $\rho = 1.42$ g/mL.