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GB/T 43753.1-2024

Methods for chemical analysis of precious metals alloys electroplating wastewater - Part 1: Determination of gold, silver, platinum, palladium and iridium contents - Inductively coupled plasma-atomic emission spectrometry

贵金属合金电镀废水化学分析方法 第1部分：金、银、铂、钯、铱含量的测定 电感耦合等离子体原子发射光谱法

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Standardization Administration of the PRC

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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 43753 Chemical analysis methods for precious metal alloy electroplating wastewater. GB/T 43753 has been published The following parts.

1.Determination of gold, silver, platinum, palladium and iridium content by inductively coupled plasma atomic emission spectrometry;

2.Determination of zinc, manganese, chromium, cadmium, lead, iron, aluminium, nickel, copper and beryllium content by inductively coupled plasma atomic emission spectrometry Spectrum;

3.Determination of sulfate content - Barium sulfate gravimetric method;

4.Determination of chloride ion content-Silver chloride turbidimetric method. 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 was proposed by China Nonferrous Metals Industry Association. This document is under the jurisdiction of the National Technical Committee on Standardization of Nonferrous Metals (SAC/TC243). This document was drafted by: Shandong Chenyuan Testing Service Co., Ltd., Shandong Mengjinyuan Jewelry Co., Ltd., Shandong Zhaojin Gold and Silver Refining Co., Ltd. Co., Ltd., Zhongbao Zhengxin Gold and Silver Jewelry Testing Co., Ltd., Shenzhen Zhongjin Lingnan Nonferrous Metals Co., Ltd., Nonferrous Metals Technology Technology and Economics Research Institute Co., Ltd., Beijing University of Science and Technology, Jiangxi Junxin Precious Metals Technology Materials Co., Ltd., Jiangsu Beikuang Metal Recycling Co., Ltd. Liyong Technology Co., Ltd., Zhejiang Weitong Catalytic New Materials Co., Ltd., Henan Provincial Geological Bureau Geological Disaster Prevention Center, Zijin Mining Group Co., Ltd. Co., Ltd., China Certification & Inspection

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Precious metal alloy electroplating (electroforming) processing enterprises generate a large amount of wastewater during the production process, such as plated parts rinsing water, waste tank liquid, equipment cooling water, etc. Mixed water such as water, flushing water, and ground water, after the initial extraction of precious metals, also contains high-value recoverable precious metal elements. It is urgent to develop a fast, advanced and efficient analytical method to guide the recycling of precious metal elements. GB/T 43753 "Precious Metal Alloy Electroplating "Methods for Chemical Analysis of Wastewater" is planned to consist of four parts.

1.Determination of gold, silver, platinum, palladium and iridium content by inductively coupled plasma atomic emission spectrometry. The purpose is to establish Detection method for the content of precious metals such as gold, silver, platinum, palladium and iridium in precious metal alloy electroplating and electroforming wastewater.

2.Determination of zinc, manganese, chromium, cadmium, lead, iron, aluminium, nickel, copper and beryllium content - Inductively coupled plasma atomic emission spectrometry The purpose is to establish the technical solution for the treatment of precious metal electroplating and electroforming wastewater, the water treatment operation process and the water quality monitoring of zinc, manganese, Detection methods for chromium, cadmium, lead, iron, aluminum, nickel, copper and beryllium content.

3.Determination of sulfate content by barium sulfate gravimetric method. The purpose is to establish the content of sulfuric acid in precious metal electroplating and electroforming wastewater Method for detecting salt content.

4.Determination of chloride ion content Silver chloride turbidimetric method. The purpose is to establish the determination of chloride ion content in precious metal electroplating and

electroforming wastewater. Method for detecting the content of ions. This document is part 1 of GB/T 43753.After digesting organic matter with perchloric acid, dissolving it with mixed acid, and using it in a mixed acid medium, The content of gold, silver, platinum, palladium and iridium in precious metal alloy electroplating and electroforming wastewater can be fully determined by inductively coupled plasma atomic emission spectrometry. Meet the testing needs of precious metal electroplating companies and electroforming processing companies, accurately, directly and effectively detect precious metal alloy electroplating and electroforming wastewater Content of gold, silver, platinum, palladium and iridium. Chemical Analysis Methods for Precious Metal Alloy Electroplating Wastewater Part

1.Determination of gold, silver, platinum, palladium and iridium content Inductively coupled plasma atomic emission spectrometry Warning

---People who use this document need to have practical experience in formal laboratory work. This document does not address all possible safety issues. The user is responsible for taking appropriate safety and health measures and ensuring that the conditions stipulated by relevant national laws and regulations are met.

1 Scope

GB/T 43753.1-2024 gives the Chinese ICP-AES method for determining gold, silver, platinum, palladium and iridium in precious metal electroplating wastewater. The analysis is done for two reasons at once, and the standard serves both: the wastewater is a discharge that has to meet an environmental limit, and it is also a valuable stream from which the metals are recovered, so the number decides both compliance and money. The matrix is difficult, being strongly acidic or cyanide-bearing, high in dissolved salts and complexing agents, which is what makes a specified method necessary rather than a generic one. The standard sets the principle, the reagents and apparatus, the sample collection and preservation, the digestion and preparation of the test solution, the selection of the analytical lines and the correction of the spectral and matrix interferences, the calibration with matrix-matched standards, the measurement, the calculation, the precision established by interlaboratory trial, and the test report. It takes effect on 1 October 2024.

This document describes the determination of gold, silver, platinum, palladium, Iridium content method. This document is applicable to the determination of gold, silver, platinum, palladium and iridium content in precious metal alloy electroplating and electroforming wastewater. The range is 0.0001mg/mL~0.1000mg/mL.

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document. For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced

documents without a date, the latest version (including all amendments) applies to This document.

GB/T 6682 Specifications and test methods for water used in analytical laboratories

3 Terms and definitions

There are no terms or definitions that require definition in this document.

4 Principle

After the sample was digested with perchloric acid to remove organic matter, it was dissolved with mixed acid and in the mixed acid medium, inductively coupled plasma atomic emission light was used to The spectrometer is used to determine the contents of gold, silver, platinum, palladium and iridium in precious metal alloy electroplating and electroforming wastewater.

5 Reagents and Materials

Unless otherwise stated, only reagents of confirmed analytical grade were used in the analyses.

5.1 Water, GB/T 6682, Grade 2.

5.2 Perchloric acid (rho=1.76g/mL).

5.3 Nitric acid (rho=1.42g/mL).

5.4 Hydrochloric acid (rho=

5.5 Nitric acid (1 2).

5.6 Hydrochloric acid (1 9).

5.7 Mixed acid (1 3 4). Mix 1 volume of nitric acid (5.3), 3 volumes of hydrochloric acid (5.4) and 4 volumes of water (5.1) and prepare before use.