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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 43970-2024

General rules for chemical vapor generation-atomic fluorescence spectrometry

化学蒸气发生-原子荧光光谱分析方法通则

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Table of Contents

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: 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 the Ministry of Science and Technology of the People's Republic of China: This document is under the jurisdiction of the National Technical Committee for Standardization of Instrumental Analysis and Testing (SAC/TC481): This document was drafted by: Tsinghua University, Beijing Qingzhi Analysis Technology Co:, Ltd:, China University of Geosciences (Wuhan), Sichuan University, Beijing Haibo University Optical Instrument Co:, Ltd:, Beijing Electronic Science and Technology Vocational College, Beijing Ruiguang Instrument Co:, Ltd:, Beijing Jitian Instrument Co:, Ltd:, Beijing Puxitong Instrument Co:, Ltd:, Enik Instrument (Beijing) Co:, Ltd:, Shanghai Tobacco Group Beijing Cigarette Factory Co:, Ltd:, Beijing Boya Instrument Ltd: The main drafters of this document are: Huang Xiu, Li Ming, Guo Wei, Fan Bowen, Xing Zhi, Wu Xi, Zhao Kang, Li Shuguang, Li Yi, Shi Chao, Zheng Qinglin, Gao Yonggang, Xu Tongguang and Zhao Ping: Chemical Vapor Generation-Atomic Fluorescence Spectroscopy General principles of analytical methods

1 Scope

GB/T 43970-2024 gives the general rules for chemical vapour generation atomic fluorescence spectrometry. AFS is a Chinese speciality: while much of the world determines arsenic, mercury, selenium, antimony, bismuth, tellurium, germanium, tin, lead, cadmium and zinc by ICP-MS, the hydride and cold vapour generation AFS instrument is far cheaper,

more sensitive for these particular elements and is the workhorse of Chinese food, water and environmental laboratories. The standard sets the common ground under the many element-specific methods: the principle of vapour generation and atomic fluorescence detection, the instrument and its components, the reagents and their purity, the sample digestion and the valence state adjustment that hydride generation requires, the generation conditions, the interferences and their control, the calibration, the calculation, the performance characteristics of detection limit, precision and recovery and their verification, and the reporting. It takes effect on 1 November 2024.

This document establishes general rules for the quantitative analysis of elements by chemical vapor generation-atomic fluorescence spectrometry: This document is applicable to the use of chemical vapor generation-atomic fluorescence spectrometer to analyze the hydride and gaseous components in the sample by liquid injection: Quantitative analysis of the content of elements such as centrifuge or cold vapor: This document is not applicable to direct injection analysis of solids:

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 602 Preparation of standard solutions for determination of impurities in chemical reagents

GB/T 4470 Terminology for flame emission, atomic absorption and atomic fluorescence spectrometry GB/T 4842 Argon

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

GB/T 13966 Terminology of analytical instruments

GB/T 27411 Uncertainty assessment methods and expressions commonly used in testing laboratories JJG939 Atomic Fluorescence Spectrometer

3 Terms and definitions

The terms and definitions defined in GB/T 4470 and GB/T 13966 and the following apply to this document: 3:

1 Use chemical reactions to generate gaseous atoms or compounds from elements:

Note: Includes hydride generation and cold vapor generation, etc: 3:

2 Hydride generation The element compound reacts with the reducing agent to form a

gaseous covalent hydride: 3:

3 Cold vapor generation The element compound reacts with the reducing agent to produce gaseous ground state free atoms:

4 Principle of analytical method

The elements to be tested in the sample generate gaseous chemical vapor in a certain way and are converted into ground state atoms in the atomizer: