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**General rules for high performance liquid
chromatography-atomic fluorescence spectrometry analysis
method**

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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: 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 Haiguang Instrument Co., Ltd., Beijing Jitian Instrument Co., Ltd., Beijing Beifen Rayleigh Analyzer Instrument (Group) Co., Ltd., Beijing Powerleader Instrument Co., Ltd., Beijing Qingzhi Analysis Technology Co., Ltd., Beijing Electronic Science and Technology Vocational College, Institute of Agricultural Quality Standards and Testing Technology, Chinese Academy of Agricultural Sciences, Institute of Testing and Analysis, Guangdong Academy of Sciences (Guangzhou Analytical and Testing Center, China Center), Shanghai Tobacco Group Beijing Cigarette Factory Co., Ltd: The main drafters of this document are: Fan Bowen, Liu Haitao, Huang Xiu, Xing Zhi, Liang Jing, Wei Min, Feng Ting, Chen Lu, Wang Xiaofang, Li Ming, Li Shuguang, Mao Xuefei, Pengran Guo, Yumei Song, Xue Li, Zhendong Yang, Deshui Liu, Jun Fang, Yibo Zhou: High performance liquid chromatography-atomic fluorescence spectrometry analysis General principles of the method

1 Scope

GB/T 43968-2024 gives the general rules for HPLC coupled to atomic fluorescence

spectrometry. The coupling exists to answer a question that total element analysis cannot: the toxicity of arsenic, mercury and selenium depends entirely on the species, inorganic arsenite and arsenate against arsenobetaine, methylmercury against inorganic mercury, and a regulation written on total content either over- or under-protects. Chromatography separates the species and the AFS detector, after on-line digestion and vapour generation, quantifies each. The standard sets the principle, the instrument configuration and the interface between the chromatograph and the detector, the on-line oxidation or digestion and the vapour generation conditions, the mobile phases and columns, the calibration with the species standards and their stability, the sample preparation and extraction which must preserve the species, the identification and quantification, the performance characteristics and their verification, and the reporting. It takes effect on 1 November 2024.

This document establishes general rules for the analysis of element content and its speciation by HPLC-AFS: This document is applicable to the qualitative and quantitative analysis of the content and form of elements that are prone to form hydrides, gaseous components or cold vapors:

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 4842 Argon GB/T 6379:

1 Accuracy (trueness and precision) of measurement methods and results Part 1: General principles and definitions

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

GB/T 13966 Terminology of analytical instruments

GB/T 16631 General rules for high performance liquid chromatography

GB/T 27411 Uncertainty assessment methods and expressions commonly used in testing laboratories

GB/T 27417 Guidelines for Confirmation and Validation of Chemical Analysis Methods for Conformity Assessment JJG1151 Liquid Chromatography-Atomic Fluorescence

Spectrometer JY/T 0566 General rules for atomic fluorescence spectrometry analysis

3 Terms and definitions

GB/T 6379:1, GB/T 13966, GB/T 16631, GB/T 27411, GB/T 27417 and JY/T 0566 and the following The following terms and definitions apply to this document: 3:

1 Chemical forms A specific form of a chemical element, defined by its isotopic composition, electronic or oxidation state, and/or complex or molecular structure: 3:

2 Speciation analysis Analytical work that identifies and/or quantitatively measures one or more chemical forms of a specific element in a sample:

4 Principle of analytical method

The components containing specific elements in the sample are separated after entering the chromatographic column with the mobile phase, and the specific elements are then generated into gaseous state in a certain way: The material is reduced to ground state atoms in the atomizer; the ground state atoms of the specific elements in each component are excited by the specific wavelength radiation of the light source After that, the emitted fluorescence time-resolved signal (i.e., chromatogram) is used for qualitative and quantitative analysis of the morphology of the component to be tested: The retention time of each chromatographic peak of the test component of the quality substance/standard sample is compared for qualitative analysis: