

ICS 71.040.99

CCS Z 16



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

GB/T 36084-2018

**Nanotechnology - Determination of copper, manganese and
chromium ions in aqueous solution - Ultraviolet-visible
spectrophotometry**

纳米技术 水溶液中铜、锰、铬离子含量的测定 紫外-可见分光光度法

Issued on: March 15, 2018

Implemented on: October 1, 2018

**Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC**

Table of Contents

- 1 Scope
- 2 Normative references
- 3 Terms and Definitions, Abbreviations
- 4 Principle

Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009. This standard was proposed by the Chinese Academy of Sciences. This standard is under the jurisdiction of the National Nanotechnology Standardization Technical Committee (SAC/TC279). This standard was drafted by: Ningbo Institute of Materials Technology and Engineering, Chinese Academy of Sciences, University of Science and Technology of China. The main drafters of this standard. Wu Aiguo, Zhang Yujie, Huang Wenhao, Zhu Wulin, Zhu Shanshan, and Gao Yuexia.

The colorimetric detection method based on surface plasmon resonance characteristics of precious metal nanoparticles is simple, flexible in design, and does not require large-scale instrumentation equipment. With high sensitivity and good selectivity, it is widely used for qualitative and quantitative analysis of inorganic anions, cells, proteins, DNA, and small molecules. analysis. In recent years, researchers have developed a variety of methods for the colorimetric detection of heavy metal ions, which are the scene and fast of heavy metal ions in water. The detection and monitoring requirements provide effective technical means, but due to the lack of application guidance and data evaluation specifications, such methods have not yet been truly For the water heavy metal ion detection industry services. Therefore, this standard is specifically formulated. The issuing authority of this document draws attention to the fact that when the statement is in compliance with this document, it may involve "9 analysis steps" and "a rapid test solution Method of Copper Ion" (ZL201210097477.7), "Method of Detecting Divalent Manganese Ions" (ZL201210310138.2) and "A Type Six The method of detection of chrome ions (ZL201110378260.9) is related to the use of patents. The issuing agency of this document has no position on the authenticity, validity and scope of the patent. The patent holder has assured the issuing agency of this document that he is willing to work with any applicant on reasonable and non-discriminatory terms and conditions. Negotiate on licensing of patents. The patent holder's statement has been filed with the issuing agency of this document. Related information can be passed below Contact information is obtained. Name of Patent Holder. Ningbo Institute of Materials Technology and Engineering, Chinese Academy of Sciences Address. No. 1219, Zhongguan West Road, Zhenhai District, Ningbo City,

Zhejiang Province, China Please note that in addition to the above-mentioned patents, some of the contents of this document may still involve patents. The issuing agency of this document does not bear the responsibility of identifying these patents. Responsibility.

Copper, manganese and chromium ions in aqueous solution of nanotechnology
Determination of content UV-visible spectrophotometry

1 Scope

China's national method for determining copper, manganese and chromium ions in aqueous solution by ultraviolet-visible spectrophotometry. Its place in the nanotechnology series is the point of it: when a metal or metal oxide nanomaterial is put into water, some of it dissolves, and the dissolved fraction behaves completely differently from the particles. Much of what has been reported as nanoparticle toxicity turned out on examination to be ordinary metal ion toxicity from material that had dissolved, which is a different hazard with a different remedy. So a nanomaterial study has to distinguish the two, and that means measuring the ion concentration in the supernatant after the particles are separated. UV-visible spectrophotometry is chosen here over the more sensitive spectrometric techniques because it is available in every laboratory, needs no specialist instrument, and is adequate at the concentrations these dissolution experiments produce.

This standard specifies the determination of divalent copper ions (Cu^{2+}) and divalent manganese ions (Mn^{2+}) in aqueous solutions using an ultraviolet-visible spectrophotometer. Method of hexavalent chromium ion [$\text{Cr}(\text{VI})$] content. This standard applies to the determination of divalent copper ions, divalent manganese ions and hexavalent chromium ions in aqueous solution samples, soil, food or biological samples. After appropriate treatment, refer to this standard for determination. The lower limit of detection of each ion in the water sample to be tested in this standard is. the content of Cu^{2+} is not less than $1.00 \times 10^{-7} \text{ mol} \cdot \text{L}^{-1}$, Mn

2 The content of $\text{Cr}(\text{VI})$ is not less than $1.00 \times 10^{-6} \text{ mol} \cdot \text{L}^{-1}$, and the content of $\text{Cr}(\text{VI})$ is not less than $4.00 \times 10^{-7} \text{ mol} \cdot \text{L}^{-1}$. The pH range of the water samples to be tested for this standard is. the aqueous solution containing Cu^{2+} has a pH range of 2 to 6 and an aqueous solution containing Mn^{2+} . The pH range is 3 to 7, and the aqueous solution containing $\text{Cr}(\text{VI})$ has a pH range of 1 to 6.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only dated versions apply to this article Pieces. For undated references, the latest version (including all amendments) applies to this document.

GB/T 6682 Analysis Laboratory Water Specifications and Test Methods

GB/T 14666 Analytical Chemistry Terms GB/T 19619 nanomaterials

GB/T 26813 Double beam UV-Vis spectrophotometer Uncertainty evaluation methods and expressions commonly used in

GB/T 27411 testing laboratories

3 Terms and Definitions, Abbreviations

3.1 Terms and Definitions The terms and definitions defined in GB/T 14666, GB/T 19619 and

GB/T 27411 apply to this document.

3.2 Abbreviations The following abbreviations apply to this document. NPs. Nanoparticles AgNPs-T. Tween-

20 Modified Silver Nanoparticles AgNPs-P. tripolyphosphatemodifiedsillownanoparticles CTAB. cetyltrimethylammonium bromide Ag@AuNPs. Silver Core Gold Nanoparticles (Ag@Aucore/shelnanoparticles) SPR. Surface plasmon resonance (surface plasmon resonance)

4 Principle

The principle of measurement is as follows: