

ICS 27.120
CCS F46



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

GB/T 11926-2025

Replacing GB/T 11926-1989

**Determination of phosphorus in uranium dioxide powder and
pellets - Molybdenum blue spectrophotometric method**

二氧化铀粉末和芯块中磷的测定 钼蓝分光光度法

Issued on: August 29, 2025

Implemented on: August 29, 2025

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

Table of Contents

1	Scope
1.5	h) to the nearest
2	Normative references
3	Terms and Definitions
4	Ascorbic acid-molybdenum blue spectrophotometry
4.2.1	Hydrochloric acid. $\rho(\text{HCl}) =$
4.2.5	Ascorbic acid solution. $\rho(\text{C}_6\text{H}_8\text{O}_6) = 10 \text{ g/L}$. Weigh
4.2.6	Phosphorus standard stock solution. Accurately weigh about
5	Bismuth salt ascorbic acid-molybdenum blue spectrophotometry
6	Experimental data processing
7	Precision
8	Test Report

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 replaces GB/T 11926-1989 "Determination of phosphorus in uranium dioxide powder and pellets - Molybdenum blue spectrophotometric method" Compared with GB/T 11926-1989, in addition to structural adjustments and editorial changes, the main technical changes are as follows:

--- Changed the range from "(50~300) $\mu\text{g/g}$ " to "10 $\mu\text{g/g}$ ~300 $\mu\text{g/g}$ " (see Chapter 1, Chapter 1 of the 1989 edition);

--- Changed the sample weight in the ascorbic acid-molybdenum blue spectrophotometry method from 0.2g to 0.2g and 0.5g (see 4.4.2, 1989 Chapter 6 of the 2001 edition);

--- Changed the content of sample dissolution in the test steps, and changed the dissolution method of powder and pellets in the ascorbic acid-molybdenum blue spectrophotometry to Harmonization (see 4.5.2, Chapter 6 of the 1989 edition);

--- Added the detection method of "Bismuth salt ascorbic acid-molybdenum blue spectrophotometry" (see Chapter 5). 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 and coordinated by

the National Technical Committee for Nuclear Energy Standardization (SAC/TC58). This document was drafted by: China National Nuclear Corporation Northern Nuclear Fuel Components Co., Ltd., China National Nuclear Corporation Jianzhong Nuclear Fuel Components Co., Ltd., and China Nuclear Industry Beijing Chemical Industry Co., Ltd. Metallurgical Research Institute, Nuclear Industry Standardization Institute. The main drafters of this document are: Yang Lichun, Tang Hui, Zhao Shenglu, Pan Cuicui, Chen Huihui, Li Honggang, Yang Yongming, Guo Guolong, Yang Xuwei, Niu Li, Cui Jing, Li Xin, Zhao Bing, Chen Changyou, Wang Haisheng, Dong Qiushi, and Zhao Suyu. The previous versions of this document and the documents it replaces are as follows:

---First published in 1989 as GB/T 11926-1989;

---This is the first revision. Determination of phosphorus in uranium dioxide powder and pellets Molybdenum blue spectrophotometry

1 Scope

GB/T 11926-2025 is the Chinese national standard on determination of phosphorus in uranium dioxide powder and pellets - molybdenum blue spectrophotometric method, in the field of energy and heat transfer engineering. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 29 August 2025 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 29 August 2025.

Classification: ICS 27.120, CCS F46. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This document describes the determination of phosphorus content in uranium dioxide powder and pellets using the molybdenum blue spectrophotometric method. This document is applicable to the determination of phosphorus in uranium dioxide powder and pellets, and is used as a reference for the determination of phosphorus in uranium oxides such as uranium trioxide. The determination range of this document is 10µg/g~300µg/g, and the allowable impurity amount is Co0.2mg/g; Ni0.4mg/g; Fe, Mn, Cr, Sn, Cu, V, W, Si, Ti, F, and Zn are all

0.5 mg/g.

1.5 h) to the nearest

0.1 mg and place it in 100 mL Dissolve in water in a beaker, transfer to a 500mL volumetric flask, add 5mL of hydrochloric acid (4.2.1), dilute to the mark with water, and shake well.

2 Normative references

This document has no normative references.

3 Terms and Definitions

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

4 Ascorbic acid-molybdenum blue spectrophotometry

4.1 Principle The sample is dissolved in hydrochloric acid-hydrogen peroxide or nitric acid-perchloric acid. In the hydrochloric acid medium, the phosphorus in the sample reacts with ammonium molybdate to form phosphomolybdate yellow heteropolyphosphate. The sample was reduced to phosphomolybdenum blue heteropoly acid by ascorbic acid and the absorbance of phosphomolybdenum blue was measured at 650nm. Phosphorus content.

4.2 Reagents or materials Unless otherwise specified, the reagents used in the analysis are all high-grade pure reagents that meet national standards, and the water used for analysis is of low conductivity (25°C). Deionized water at 0.10mS/m.

4.2.1 Hydrochloric acid. $\rho(\text{HCl}) =$

4.2.2 Hydrogen peroxide. $\omega(\text{H}_2\text{O}_2)=30\%$.

4.2.3 Hydrochloric acid solution. $\phi(\text{HCl}) = 50\%$, prepared by mixing hydrochloric acid (4.2.1) with water.

4.2.4 Ammonium molybdate solution. $\rho[(\text{NH}_4)_6\text{Mo}_7\text{O}_{24} \cdot 4\text{H}_2\text{O}]=50\text{g/L}$. Weigh 25g of ammonium molybdate (analytical grade) and dissolve it in hot water (water temperature 50°C~60°C), dilute to 500mL, shake well, and store in a plastic bottle. Filter if necessary.

4.2.5 Ascorbic acid solution. $\rho(\text{C}_6\text{H}_8\text{O}_6) = 10 \text{ g/L}$. Weigh

1.0 g of ascorbic acid (analytical grade) and dissolve it in water, dilute to 100 mL, shake well, and prepare before use.

4.2.6 Phosphorus standard stock solution. Accurately weigh about

1.098 g of potassium dihydrogen phosphate standard material (pre-dried at 105°C for