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

GB/T 11842-2025

Replacing GB/T 11842-1989

**Determination of oxygen to uranium atomic ratio in uranium
dioxide powder and pellets - Thermogravimetric method**

二氧化铀粉末和芯块的氧铀原子比测定 热重法

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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 replaces GB 11842-1989 "Determination of oxygen-uranium atomic ratio of uranium dioxide powder and pellets by thermogravimetric method" and is consistent with GB 11842- Compared with 1989, in addition to structural adjustments and editorial changes, the main technical changes are as follows:

- a) The test device has been changed (see Chapter 5, Chapter 7, Chapter 3 and Chapter 4 of the 1989 edition);
- b) The oxidation temperature has been changed (see Chapter 4, 4.4.1 of the 1989 edition);
- c) The sample weight has been changed (see 7.1, 4.1.2 of the 1989 edition);
- d) The use of protective gas has been deleted (see 4.3.3 of the 1989 edition);
- e) The test steps have been changed (see 7.2, 7.3 and 7.4, 4.2, 4.4 of the 1989 edition);
- f) The form of the result calculation formula has been changed (see 8.1, Chapter 5 of the

1989 edition);

g) The method for correcting sample mass for volatile impurities has been changed (see 8.1, 8.4, and

1 Scope

GB/T 11842-2025 is the Chinese national standard on determination of oxygen to uranium atomic ratio in uranium dioxide powder and pellets - thermogravimetric 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 25 April 2025 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 August 2025. Classification: ICS 27.120.30, CCS F 46. 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 specifies the principle, instrumentation, samples, test procedures, and methods for determining the oxygen-uranium atomic ratio of uranium dioxide powder and pellets by thermogravimetric method. Experimental data processing and precision, etc. This document applies to the determination of the oxygen-uranium atomic ratio of uranium dioxide powder and pellets, and the determination of uranium content in uranium dioxide powder and pellets. Use as directed.

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 Principles of the method

The uranium dioxide powder and pellet samples were fully oxidized at $900^{\circ}\text{C} \pm 50^{\circ}\text{C}$ in air atmosphere to generate stable product uranium trioxide. By measuring the mass of the sample before and after oxidation and deducting the impurity content, the oxygen-uranium atomic ratio and uranium content are calculated.

5 Instruments and Equipment

5.1 Muffle furnace. The operating temperature range is from room temperature to 1000°C ,

the temperature control accuracy is $\pm 2^{\circ}\text{C}$, and the furnace atmosphere is air.

5.2 Electronic balance. graduation value

0.1 mg.

5.3 Dryer (including desiccant).

5.4 Crucible, made of platinum.

6 Samples

The sample is dry uranium dioxide powder or pellets stored in a desiccator.

7 Test steps

7.1 Take out the empty crucible that has been burned to constant weight at $900^{\circ}\text{C} \pm 50^{\circ}\text{C}$ from the desiccator and weigh the mass m_0 of the crucible to an accuracy of

0.1 mg. Weigh 5g~12g of uranium dioxide powder or pellet sample and place it in a crucible. The total mass of the sample and crucible is recorded as m_1 , accurate to 0.1mg.

7.2 For uranium dioxide powder samples, place the crucible containing the powder in a muffle furnace and raise the temperature of the muffle furnace to $900^{\circ}\text{C} \pm 50^{\circ}\text{C}$. 3h; For uranium dioxide pellet samples, place the crucible containing the pellets in a muffle furnace, raise the temperature of the muffle furnace to $500^{\circ}\text{C} \pm 50^{\circ}\text{C}$, and keep it warm for 3 hours.