

ICS 27.120.30

CCS F46



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

GB/T 11846-2015

Replacing GB/T 11846-1989

**Determination of silicon in uranium dioxide powder and pellets
by spectrophotometry**

二氧化铀粉末和芯块中硅的测定 分光光度法

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Standardization Administration of China**

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Foreword

This standard was drafted in accordance with GB/T 1.1-2009 given rules. This standard replaces GB/T 11846-1989 "uranium dioxide powder and pellets - Determination of silicon by spectrophotometry." This standard compared with GB/T 11846-1989, the main changes are as follows:

- Increased nitric - hydrofluoric acid sample dissolution method (see 6.3);
- "Range" in the measurement range increases the acid-soluble law;
- "Method summary" added sample dissolution temperature of the acid-soluble law;
- "The precision" in the table header increased the "r, R" replaced "Sr, SR", modify the printing errors, increase acid The method of solution method precision. The standard proposed by China National Nuclear Corporation. This standard by the National Standardization Technical Committee on Nuclear Energy (SAC/TC58) centralized. This standard was drafted. China Jianzhong Nuclear Fuel Limited. The main drafters of this Standard. Liang Hua, Xu Jianping, Lin Weizhi. This standard replaces the standards previously issued as follows:
- GB/T 11846-1989. Determination of uranium dioxide powder and pellets of silicon Spectrophotometry

1 Scope

GB/T 11846-2015 is the Chinese national standard on determination of silicon in uranium dioxide powder and pellets by spectrophotometry, 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 3 July 2015 by the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China; Standardization Administration of China, and has been in force since 1 February 2016. Classification: ICS 27.120.30, 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 standard specifies the uranium dioxide powder and pellets - Determination of silicon method feeds, reagents and materials, apparatus and equipment, sample analysis step Suddenly, the results of calculation and precision of the method. This standard applies dioxide powder and pellets - Determination of uranium silicon, also apply to the determination of nuclear Triuranium in silicon. Alkali fusion method to take 0.5g sample volume, the measurement range of $10\mu\text{g/g} \sim 80\mu\text{g/g}$; acid digestion method of sampling is 0.2g, the measurement range of $10\mu\text{g/g} \sim 300\mu\text{g/g}$. The main elements of the sample of interference allowable amount. As of $30\mu\text{g/g}$, P is $250\mu\text{g/g}$.

2 Method summary

Nitric acid - hydrofluoric acid $60\text{ }^{\circ}\text{C} \sim 70\text{ }^{\circ}\text{C}$ or alkali fusion method decompose the sample, at a certain pH conditions, the addition of ammonium molybdate and silicon to form a silicon Molybdenum yellow, mixed acid medium, ascorbic acid was added to the silicon-molybdenum blue at the wavelength of 810nm (or 800nm) Department, with 5cm (or 3cm) Cuvette with water as a reference photometrically.

3 Reagents and materials

Unless otherwise indicated, the analysis should be used in line with national standards for gifted class pure reagents. The water meets conductivity ($25\text{ }^{\circ}\text{C}$) is not greater than 0.1mS/m .

3.1 Reagents

3.1.1 sodium carbonate (Na_2CO_3).

3.1.2 hydrofluoric acid (HF), $\rho = 1.15\text{g/mL}$.

3.1.3 boric acid solution, 35g/L .

3.1.4 ammonium molybdate $[(\text{NH}_4)_6\text{Mo}_7\text{O}_{24} \cdot 4\text{H}_2\text{O}]$ solution, 50g/L , the clarified solution was used.

3.1.5 sulfuric acid solution, 1.5mol/L .

3.1.6 ascorbic acid ($\text{C}_6\text{H}_8\text{O}_6$) solution, 10g/L , the solution was formulated the day of use.

3.1.7 nitric acid (HNO_3), $\rho = 1.40\text{g/mL}$.

3.1.8 nitric acid solution by (3.1.7) formulated with water volume ratio of 1. 3.1.9

2,4-dinitrophenol ethanol solution $[(\text{NO}_3)_2\text{C}_6\text{H}_3\text{OH}]$, 2,4-dinitrophenol weighed 0.1g ,

dissolved in 100mL anhydrous Alcohol.

3.1.10 oxalic acid - sulfuric acid mixed solution, weighed 45g oxalic acid ($\text{H}_2\text{C}_2\text{O}_4 \cdot 2\text{H}_2\text{O}$) in 1000mL beaker, add appropriate amount of water to dissolve After stirring at constant, sulfuric acid was slowly added to about 175mL ($\rho = 1.84\text{g/mL}$). After cooling to transfer 1000mL volumetric flask, add Water to the mark, into a polyethylene bottle save.

3.1.11 ammonia, before use by distillation or diffusion purified.

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