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

GB/T 12690.17-2010

**Chemical analysis methods of non-rare earth impurities in rare
earth metals and the oxides - Part 17: Determination of niobium
and tantalum contents of rare earth metals**

稀土金属及其氧化物中非稀土杂质化学分析方法 第17部分：稀土金属中铌、钽量
的测定

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Foreword

GB/T 12690 "non - rare earth impurities in rare earth metals and their oxides chemical analysis method" is divided into 17 parts.

- Part 1. Carbon and sulfur content was measured high-frequency infrared method;
- Part 2. Determination of the weight loss on ignition;
- Part 3. rare earth oxide in water content - Gravimetric method;
- Part 4. oxygen, nitrogen pulse measurement - infrared absorption method and pulse - heating thermal conductivity;
- Part 5. aluminum, chromium, manganese, iron, cobalt, nickel, copper, zinc, lead content was measured;
- Part 6. Determination of iron content of potassium thiocyanate, 1,10-phenanthroline spectrophotometry;
- Part 7. Determination of silicon content - Molybdenum blue spectrophotometric method;
- Part 8. Determination of sodium content by flame atomic absorption spectrometry;
- Part 9. Determination of chlorine content of silver nitrate turbidimetry;
- Part 10. Determination of phosphorus content - Molybdenum blue spectrophotometric method;
- Part 11. Determination of magnesium content - Flame atomic absorption spectrometry;
- Part 12. Determination of the amount of thorium;
- Part 13. Determination of tungsten, molybdenum content;

1 Scope

GB/T 12690.17-2010 is the Chinese national standard on chemical analysis methods of

non-rare earth impurities in rare earth metals and the oxides - part 17: determination of niobium and tantalum contents of rare earth metals, in the field of metallurgy. 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 14 January 2011 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 November 2011. Classification: ICS 77.120.99, CCS H14. 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.

GB/T 12690 Method 1 of this section provides a single method for the determination of rare earth metals niobium, tantalum content. Part 1 of this method for the determination of a single rare earth metals niobium and tantalum content. Measurement range. 0.010% to 0.50% of niobium; tantalum 0.020% to 0.50%.

2 Principle of the method

Sample with nitric acid, hydrofluoric acid is dissolved, after the separation of rare earth matrix ion spectrometry argon.

3 Reagents and materials

3.1 Hydrofluoric acid ($\rho=1.14\text{g/mL}$).

3.2 nitric acid (11).

3.3 boric acid solution (100g/L).

3.4 niobium standard stock solution. Weigh 1.0000g niobium [$w(\text{Nb}) \geq 99.99\%$] in Teflon beaker, add 5mL hydrogen Hydrofluoric acid (3.1), heated and dissolved to clear after cooling transferred to 1000mL volumetric flask, supplemented with 35mL hydrofluoric acid (3.1), dilute to the mark, Mix well. 1mL solution containing 1mg niobium. Stored in plastic bottles.

3.5 tantalum standard stock solution. Weigh 1.0000g tantalum [$w(\text{Ta}) \geq 99.99\%$] in Teflon beaker, add 5mL hydrogen Hydrofluoric acid (3.1), heated and dissolved to clear after cooling transferred to 1000mL volumetric flask, supplemented with 35mL hydrofluoric acid (3.1), dilute to the mark, Mix well. 1mL solution containing 1mg tantalum. Stored in plastic bottles.

3.6 mixed standard solution. Pipette 5mL niobium standard stock solution (3.4), 5mL tantalum standard stock solution (3.5) in 100mL flask Added 2mL of hydrofluoric acid (3.1),

dilute to the mark and mix. This solution 1mL containing 50 μ g niobium, 50 μ g tantalum. Stored in plastic Bottle.

3.7 Argon [w (Ar) $\geq$ 99.99%].

4 Instrument

4.1 Inductively coupled plasma spectrometer with a resolution of $< 0.006\text{nm}$ (200nm office).

4.2 source. argon plasma light source.

5 Sample

The sample surface oxide layer is removed and weighed immediately after sampling.