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

XB/T 610.2-2015

Replacing XB/T 610.2-2007

**Chemical analysis methods of samarium-cobalt permanent
magnet alloy. Part 2: Determination of calcium and iron content.
Atomic absorption spectrometry
(English Translation)**

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Foreword

This section drafted in accordance with GB/T 1.1-2009 given rules.

XB/T 610-2015 "samarium cobalt permanent magnet alloy chemical analysis method" is divided into three parts.

--- Part 1. Determination of samarium, cobalt, copper, iron, zirconium, gadolinium, praseodymium;

--- Part 2. Determination of calcium and iron content atomic absorption spectrometry;

--- Part 3. Determination of oxygen content pulse - infrared absorption method.

This part of XB/T 610.2 Part 2.

This section replaces XB/T 610.2-2007.

This section compared with the XB/T 610.2-2007, the main technical changes are as follows.

--- Expand the scope of application for samarium cobalt 1. 5 and samarium cobalt 2.17 permanent magnetic alloy powder;

--- Increasing the samarium cobalt 2.17 permanent magnet alloy in the assessment of calcium content;

--- Aqua replaced the original standard hydrochloric acid dissolved samples;

--- The standard curve method instead of the original standard addition method for the determination of samarium cobalt 1. 5 permanent magnet alloy powder;

--- Modify the quality of the sample, according to the content of the original standard and the relationship between the quality of the sample weighed to 1.0g;

--- Increasing the test solution content and dilution volume relationship table.

This part of the National Rare Earth Standardization Technical Committee (SAC/TC229) and focal point.

This section is responsible for the drafting unit. Baotou Rare Earth Research Institute, Nonferrous Metal Technology Economics Research Institute.

Participated in the drafting of this section. Beijing Nonferrous Metal Research Institute, the National Rare Earth Products Quality Supervision and Inspection Center, the state tungsten and rare earth products Quality Supervision and Inspection Center.

1 Scope

XB/T 610 provisions of this part of the samarium-cobalt permanent magnet alloy calcium, iron content of the determination.

This section applies to the determination of calcium and iron in SmCo permanent magnet alloys. Measurement range. 0.020% ~ 0.50%.

2 Method principle

The sample was dissolved in aqua regia, dilute hydrochloric acid medium, atomic absorption spectrometer with air - acetylene flame, the standard curve method for the determination of iron Amount of standard addition method for the determination of calcium.

3 Reagents and materials

3.1

Hydrochloric acid ($\rho = 1.19 \text{ g/mL}$).

3.2

Nitric acid ($\rho = 1.679 \text{ g/mL}$).

3.3

Hydrogen peroxide. 30%.

3.4

Hydrochloric acid (1:1).

3.5

Nitric acid (1:1).

3.6

Calcium standard stock solution. Weigh 2.4971g of anhydrous calcium carbonate (dried at 110 °C) in a 300mL beaker, add 20mL of water and 30mL nitric acid (3.2), heated to dissolve to clear, boil to remove all carbon dioxide. Cooled to room temperature, the

solution was transferred to 1000mL volumetric flask, Add 30mL nitric acid (3.2), diluted with water to the mark, and mix well. 1 mL of this solution contains 1 mg of calcium.

3.7

Calcium standard solution. Take 5.00mL calcium standard stock solution (3.6) in 100mL volumetric flask, add 10mL hydrochloric acid (3.4) to Dilute the water to the mark and mix well. 1 mL of this solution contains 50 µg of calcium.

3.8

iron standard stock solution. Weigh 1.0000g of metal iron [w (Fe) $\geq$ 99.99%] In a 300mL beaker, add 20mL of water and 30mL hydrochloric acid (3.4), heated to dissolve to clear, and steamed to salt precipitation. Remove, add 40mL nitric acid (3.2), heated to dissolve clear. cold but to room temperature, the solution into 1000mL volumetric flask, diluted with water to the mark, mix well. 1 mL of this solution contains 1 mg of iron.

3.9

iron standard solution. Take 5.00mL iron standard stock solution (3.8) in 100mL volumetric flask, add 10mL hydrochloric acid (3.4) to Dilute the water to the mark and mix well. 1 mL of this solution contains 50 µg of iron.

3.10

Acetylene. Purity $\geq$ 99.99%.

4 Instruments

Atomic absorption spectrophotometry, with calcium, iron hollow cathode lamp.

5 Sample

The sample is massive, made into powder.