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

XB/T 614.5-2011

**Chemical analysis methods of gadolinium-magnesium
alloy-Part 5: Determination of rare earth impurity content
(English Translation)**

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Foreword

XB/T 614 "Methods for Chemical Analysis of Gadolinium Magnesium Alloys" is divided into 6 parts.

- Part 1: Determination of the total amount of rare earths by gravimetric method;
- Part 2: Determination of magnesium content EDTA titration;
- Part 3: Determination of carbon content high frequency-infrared absorption method;
- Part 4: Determination of fluorine content by steam distillation spectrophotometry;
- Part 5: Determination of rare earth impurities;
- Part 6: Determination of the amount of aluminum, calcium, copper, iron, nickel, and silicon inductively coupled plasma atomic emission spectrometry.

This part is part 5.

When the measurement ranges of the two methods in this section overlap, method 2 is used as the arbitration method.

This part is under the jurisdiction of the National Rare Earth Standardization Technical Committee (SAC/TC229).

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1 Method, Inductively coupled plasma atomic emission spectrometry

1 Scope

This method specifies the determination method for the content of lanthanum, cerium, praseodymium, neodymium, samarium, europium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium, and yttrium in gadolinium-magnesium alloys.

This method is suitable for the determination of lanthanum, cerium, praseodymium, neodymium, samarium, europium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium, and yttrium in gadolinium-magnesium alloys. Measuring range See Table 1.

Table 1

Element mass fraction/%	La 0.010~0.50	Ce 0.010~0.50	Pr 0.010~0.50	Nd 0.010~0.50	Sm 0.010~0.50	Eu 0.010~0.50	Tb 0.010~0.50	Element mass fraction/%	Dy 0.010~0.50	Ho 0.010~0.50	Er 0.010~0.50	Tm 0.010~0.50	Yb 0.002~0.50	Lu 0.002~0.50	Y 0.010~0.50
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2 Method principle

The sample is dissolved in hydrochloric acid, and the influence of the matrix on the measurement is corrected by the matrix matching method in the dilute hydrochloric acid medium, and the argon plasma light source is directly used Excite and perform spectrometry.

3 Reagents and materials

3.1

Hydrochloric acid (1 1).

3.2

Hydrochloric acid (1 19).

3.3

Nitric acid (1 1).

3.4

Hydrogen peroxide (30%).

3.5

Lanthanum standard solution. Weigh 0.1173g of lanthanum oxide (REO >99.5%, La₂O₃/REO >99.99%) that has been burned at 950°C for 1h Place it in a 100mL beaker, add 10mL of hydrochloric acid (3.1), heat at low temperature to dissolve until clear, remove and cool, and transfer the solution to a 100mL volumetric flask.

Dilute with water to the mark, mix well, this solution 1mL contains 1000 μ g lanthanum. Dilute this solution with hydrochloric acid (3.2) into 1mL containing 100 μ g Standard solution of lanthanum.

3.6

Cerium standard solution. Weigh 0.1228g of cerium oxide (REO >99.5%, CeO₂/REO >99.99%) which has been burned at 950°C for 1h Place in a 100mL beaker, add 10mL of nitric acid (3.3), add 2mL of hydrogen peroxide (3.4), heat at low temperature to complete dissolution, remove and cool,