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

GB/T 18115.15-2010

**Chemical analysis methods of rare earth impurities in rare earth metals and their oxides -
Part 15: Lutetium - Determination of lanthanum, cerium, praseodymium, neodymium,
samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium,
ytterbium and yttrium contents**

稀土金属及其氧化物中稀土杂质化学分析方法 第15部分：镧中镧、铈、镨、钕、钐、
钕、铕、钆、铽、镱、镱、铒、铥、钬、铈、钕、钕和钕量的测定

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Foreword

GB/T 18115 "rare earth metals and rare earth oxide impurity analysis chemistry" is divided into 15 parts.

--- Part 1. lanthanum, cerium, praseodymium, neodymium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium and yttrium measured quantity;

--- Part 2. lanthanum, cerium, praseodymium, neodymium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium and yttrium measured quantity;

--- Part 3. of lanthanum, cerium, neodymium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium and yttrium measured quantity;

--- Part 4. lanthanum, neodymium, cerium, praseodymium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium and yttrium measured quantity;

--- Part 5. Samarium lanthanum, cerium, praseodymium, neodymium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium and yttrium measured quantity;

--- Part 6. Eu lanthanum, cerium, praseodymium, neodymium, samarium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium and yttrium measured quantity;

--- Part 7. gadolinium lanthanum, cerium, praseodymium, neodymium, samarium, europium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium and yttrium measured quantity;

--- Part 8. terbium lanthanum, cerium, praseodymium, neodymium, samarium, europium, gadolinium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium and yttrium measured quantity;

--- Part 9. dysprosium lanthanum, cerium, praseodymium, neodymium, samarium,

europium, gadolinium, terbium, holmium, erbium, thulium, ytterbium, lutetium and yttrium measured quantity;

--- Part 10. holmium lanthanum, cerium, praseodymium, neodymium, samarium, europium, gadolinium, terbium, dysprosium, erbium, thulium, ytterbium, lutetium and yttrium measured quantity;

--- Part 11. Erbium lanthanum, cerium, praseodymium, neodymium, samarium, europium, gadolinium, terbium, dysprosium, holmium, thulium, ytterbium, lutetium and yttrium content;

--- Part 12. yttrium lanthanum, cerium, praseodymium, neodymium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium and lutetium measured quantity;

--- Part 13. thulium lanthanum, cerium, praseodymium, neodymium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, ytterbium, lutetium and yttrium measured quantity;

1 Scope

GB/T 18115.15-2010 is the Chinese national standard on chemical analysis methods of rare earth impurities in rare earth metals and their oxides - part 15: lutetium - determination of lanthanum, cerium, praseodymium, neodymium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium and yttrium contents, 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.

This section method GB/T 18115 1 specifies lutetium oxide lanthanum oxide, cerium oxide, praseodymium oxide, neodymium oxide, samarium oxide, europium oxide Gadolinium oxide, terbium oxide, dysprosium oxide, holmium oxide, erbium oxide, thulium, ytterbium oxide and yttrium oxide content determination. Part 1 applies to lutetium oxide lanthanum oxide, cerium oxide, praseodymium oxide, neodymium oxide, samarium oxide, europium oxide, gadolinium oxide, terbium oxide Dysprosium oxide - Determination of holmium oxide, erbium oxide, thulium, ytterbium oxide and yttrium oxide content. Determination of the range in Table 1. Part 1 of this method is also applicable to metal lutetium lanthanum, cerium, praseodymium, neodymium, samarium, europium, gadolinium, terbium,

dysprosium, holmium, erbium, thulium determination, ytterbium and yttrium content. Table

1 Oxide mass fraction /% oxide mass fraction /% Lanthanum oxide Ceria Praseodymium
oxide Neodymium oxide Samarium oxide Europium oxide Gadolinium oxide 0.0003 ~ 0.10
0.0005 ~ 0.10 0.0005 ~ 0.10 0.0003 ~ 0.10 0.0003 ~ 0.10 0.0003 ~ 0.10 0.0003 ~

0.10 Terbium oxide Dysprosium Holmium oxide Erbium oxide Thulium oxide Ytterbium oxide
Yttria 0.0003 ~ 0.10 0.0003 ~ 0.20 0.0003 ~ 0.20 0.0003 ~ 0.20 0.0003 ~ 0.20 0.0003 ~
0.20 0.0003 ~ 0.20

2 Principle of the method

The sample is dissolved in hydrochloric acid, in dilute hydrochloric acid medium, direct excitation of argon plasma light source, subjected to spectral measurement, with the correction matrix matching method Effect of matrix on the determination.

3 Reagents and materials

3.1 Hydrogen peroxide ($\rho=1.44\text{g/mL}$), pure class distinctions.

3.2 hydrochloride (11).

3.3 hydrochloric acid (119).

3.4 nitric acid (11).

3.5 lutetium oxide substrate solution. Weigh 25.0000g by burning 900 °C 1h lutetium oxide [$w(\text{Lu}_2\text{O}_3/\text{REO}) > 99.999\%$, $w(\text{REO}) > 99.5\%$], placed in 250mL beaker, add 75mL of hydrochloric acid (3.2), low-temperature heating to fully dissolve, cooled to room temperature, transfer Into 500mL volumetric flask, dilute with water to volume, and mix. This solution 1mL containing 50mg lutetium oxide.

3.6 lanthanum oxide standard stock solution. Weigh 0.1000g burning lanthanum oxide at 900 °C for 1h [$w(\text{La}_2\text{O}_3/\text{REO}) > 99.99\%$, $w(\text{REO}) > 99.5\%$], placed in 100mL beaker, add 10mL of hydrochloric acid (3.2), low-temperature heating to fully dissolve, cooled to room temperature, transfer Into 100mL volumetric flask, dilute with water to volume, and mix. This solution 1mL 1mg containing lanthanum oxide. This solution was then washed with hydrochloric acid (3.3) Diluted to 1mL 1mL containing 100 μg and 10 μg standard solution containing lanthanum oxide.