

ICS 77.120.99

CCS H 14



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

**GB/T 16484.1-2009**

Replacing GB/T 16484.1-1996

**Chemical analysis methods for rare earth chloride and light rare  
earth carbonate - Part 1: Determination of the cerium oxide  
content - Ammonium ferrous sulfate titrimetry**

氯化稀土、碳酸轻稀土化学分析方法 第1部分：氧化铈量的测定 硫酸亚铁铵滴定  
法

**Issued on: October 30, 2009**

**Implemented on: May 1, 2010**

**Issued by: General Administration of Quality Supervision, Inspection and  
Quarantine;  
Standardization Administration of the PRC**

## Table of Contents

- 1 Scope
- 2 Normative references
- 3 Principle
- 4 Reagents
- 5 Apparatus
- 6 Analysis procedure
- 7 Expression of the results
- 8 Precision
- 9 Test report

About this edition

Classification and status

How a Chinese national standard is set out

About this English translation

### 1 Scope

This part of GB/T 16484 specifies the determination of the cerium oxide content in rare earth chloride and light rare earth carbonate by ammonium ferrous sulfate titrimetry.

### Why cerium is the number that matters

Rare earth chloride and light rare earth carbonate are the bulk intermediates through which the light rare earths move from the mine to the separation plant.

Cerium is by far the largest component of both - roughly half the rare earth content of the common Chinese ores. The tonnage is priced against that figure, and the separation circuit downstream is designed around it.

### The one property that separates cerium

Cerium alone among the rare earths has an accessible tetravalent state. The others are locked in the trivalent form and cannot be titrated at all.

So cerium is oxidised to cerium(IV) and titrated back to cerium(III) with standard ammonium ferrous sulfate, with a redox indicator marking the end point. Nothing else in the matrix responds - which is what makes a simple volumetric method accurate in a sample of fourteen chemically similar elements.

## What still has to be controlled

The dissolution, the oxidation step and whether it went to completion, and the few interferences that do respond - iron above all, since the titrant is itself an iron salt.

Then the standardisation of the titre and the tolerances on the result, which is what lets a supplier certificate and a customer check analysis be reconciled.

## About this edition

GB/T 16484.1-2009 is the current edition. It was issued on 30 October 2009 and has been in force since 1 May 2010, replacing GB/T 16484.1-1996.

GB/T 16484.1-1996 has been superseded: a specification that still cites it is citing a withdrawn edition.

The interval between issue and effect is the transition period. It exists so that producers, laboratories and buyers can requalify products, revise procedures and use up documentation before the new text becomes the one that applies. The date on this page is the official one from the record of the Standardization Administration.

## Classification and status

GB/T 16484.1-2009 is classified under ICS 77.120.99. ICS is the International Classification for Standards, the same scheme used by ISO and by the national bodies of most countries, which is what allows a Chinese standard to be placed beside its foreign counterparts on subject rather than on number.

Its Chinese Standard Classification code is CCS H 14. CCS is the domestic scheme, a letter for the sector and two digits for the subject within it, and it is the code by which the standard is filed and searched in China.

The GB/T prefix marks a recommended national standard. It is not, in itself, law: it becomes binding when a contract names it, when a regulation or a mandatory standard refers to it, or when a producer declares conformity with it. In practice that covers most of the cases in which it will be read - a purchase specification, an inspection agreement or a certification scheme.

## How a Chinese national standard is set out

Chinese national standards are drafted to the rules of GB/T 1.1, which fixes the order in which a standard is set out. The document opens with a foreword recording the issuing bodies, the relationship to any previous edition and the technical committee responsible for it. Clause 1 is the scope. Clause 2 lists the normative references - the other standards that have to be applied together with this one, and without which its requirements cannot be

met. Clause 3 gives the terms and definitions. The technical clauses follow: the requirements themselves, the test or measurement methods by which conformity is established, the inspection rules that say how a lot is sampled and judged, and, for a product standard, the provisions on marking, packaging, transport and storage. Annexes, normative or informative, come last.

GB/T 16484.1-2009 runs to 15 pages in the English translation. What is delivered is the complete document in that order: every clause, every table, every figure and every annex of the Chinese original, with the same numbering, so that a reference to a clause number in a contract or a test report points to the same place in both languages.

## About this English translation

The English edition of GB/T 16484.1-2009 is a full translation of the official Chinese text, not a summary, an abstract or a machine rendering left unchecked. Clause and subclause numbers, table and figure numbers and annex letters are those of the original, because they are what a specification, a purchase order or a test report cites.

Technical terms are translated against the vocabulary standards of the same field, so that a term used in GB/T 16484.1-2009 reads the same way as in the other Chinese standards it is used beside. Where a term has an established English form in an ISO or IEC document on the same subject, that form is used; where China's term has no foreign counterpart, it is translated literally and the Chinese is kept alongside it rather than replaced by an approximation.

Quantities, units and symbols are carried over unchanged. Chinese standards use SI, so a value in the translation is the value in the original document, not a conversion, and a limit read from the English text is the limit that will be applied by a Chinese inspection body reading the Chinese one.

This page is compiled from the official publication record: the standard number and both titles, the issuing bodies, the dates of issue and effect, the edition it replaces, the ICS and CCS classification. The requirements, limits, tables and test conditions are in the document itself.