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**NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC
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GB/T 14849.1-2007
Replace GB/T 14849.1-1993

**Methods for chemical analysis of silicon
metal—Part 1: Determination of Iron content—1,
10-Phenanthroline spectrophotometric method**
**工业硅化学分析方法 第 1 部分:铁含量的测定 1, 10-
二氮杂菲分光光度法**

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Standardization Administration of the People's Republic of China**

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Foreword

GB/T 14849 *Methods for Chemical Analysis of Silicon Metal* is divided into four parts:

——Part 1: Determination of iron content - 1, 10-phenanthroline spectrophotometric method;

——Part 2: Determination of aluminum content - chrome azurol-S spectrophotometric method;

——Part 3: Determination of calcium content - flame atomic absorption spectrometry, chlorophosphonazo I spectrophotometric method;

——Part 4: Inductively coupled plasma-atomic emission spectrometry to determine element content.

This is Part 1 of GB/T 14849.

This Part will replace GB/T 14849.1-1993 Silicon metal—Determination of iron content—1,10-Phenanthroline spectrophotometric method, comparison with GB/T 14849.1-1993, main changes are as follows:

——“repeatability” and “quality assurance and control” is added.

This Part is proposed by China Nonferrous Metals Industry Association.

This Part is under the jurisdiction of the National Technical Committee on Nonferrous Metals of Standardization.

This Part is drafted by the unit of Fushun Aluminium Co., Ltd.

Main drafters of this Part: Yang Limei, Yang Yuhong, Xu Tieling and Ji Chunlei.

The release conditions of previous versions of the standards replaced by this Part are as follows:

——GB/T 14849.1-1993

Methods for chemical analysis of silicon metal—Part 1:

Determination of Iron content—1, 10-Phenanthroline spectrophotometric method

1 Scope

This Part specifies the method for determination of iron content in silicon metal.

This Part applies to the determination of iron content in silicon metal. Determination range (quality fraction): 0.10%~0.65%.

2 Method summary

The specimen is decomposed with hydrofluoric acid and nitric acid, sulfuric acid smoking removes silicon, fluorine, etc. and the residue is dissolved with hydrochloric acid. Hydroxylamine hydrochloride is used as reductant to react with Fe (III) to form Fe (II). A red complex compound is formed by the reaction between iron and 1, 10-phenanthroline in subacid medium of pH3-5. Use the spectrophotometer with wavelength of 510nm to determine the absorbance.

3 Reagents

3.1 Hydrofluoric acid (ρ 1,14g/mL)

3.2 Nitric acid (1+1)

3.3 Sulfuric acid (1 + 1)

3.4 Hydrochloric acid (1 + 1)

3.5 Hydroxylamine hydrochloride solution (10g/L)

3.6 1,10-phenanthroline solution (2.5g/L): 1.25g 1,10-phenanthroline ($C_{12}H_8O_2 \cdot H_2O$) is put into a beaker, and 2mL hydrochloric acid (3.4) and about 300mL water are added. The sample is diluted to 500mL with water and evenly mixed.

3.7 Acetic acid-sodium acetate buffer solution: 272g sodium acetate ($CH_3COONa \cdot 3H_2O$) is put into a beaker and 500mL water is added. The sample is filtered into a 1000mL volumetric flask, and 240mL glacial acetic acid (ρ 1.05g/mL) is added. The sample is diluted to the scale with water and evenly mixed.

3.8 Mixed chromogenic solution: Hydroxylamine hydrochloride solution (3.5), 1,



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