ICS 77.120.10 H 12



# NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

# 中华人民共和国国家标准

**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-Phenanthrolion 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

Issued on October 25, 2007

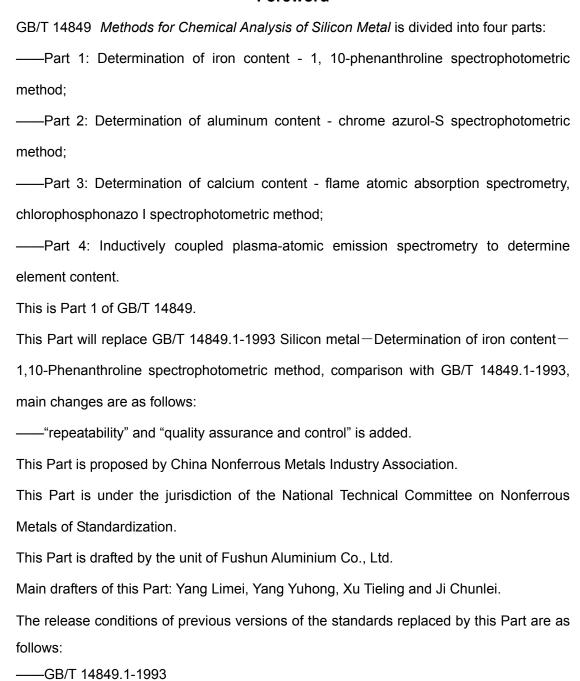
Implemented on April 1, 2008

Issued by General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China and Committee of Standardization Administration of the People's Republic of China

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#### **Foreword**



# Methods for chemical analysis of silicon metal—Part 1: Determination of Iron content—1, 10-Phenanthrolion 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 ( $\rho$ 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<sub>3</sub>COONa·3H<sub>2</sub>O) is put into a beaker and 500mL water is added. The sample is filtered into a 1000mL volumetric flask, and 240mL glacial acetic acid (ρ1.05g/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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