International Standard 5997

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Chromium ores and concentrates — Determination of silicon content — Molecular absorption spectrometric method and gravimetric method

Minerais et concentrés de chrome — Dosage du silicium — Méthode par spectrométrie d'absorption moléculaire et méthode gravimétrique

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

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Chromium ores and concentrates — Determination of silicon content — Molecular absorption spectrometric method and gravimetric method

1 Scope and field of application

This International Standard specifies the following methods for the determination of the silicon content of chromium ores and concentrates :

— **method A** : molecular absorption spectrometric method, applicable to products having silicon contents from 0,05 to 0,5 % (*m/m*);

— **method B** : gravimetric method, applicable to products having silicon contents from 0,5 to 15 % (*m/m*).

This International Standard should be read in conjunction with ISO 6629.

2 Reference

ISO 6629, *Chromium ores and concentrates — Methods of chemical analysis — General instructions.*

3 Method A — Spectrometric method for silicon contents from 0,05 to 0,5 % (*m/m*)

3.1 Principle

Decomposition of a test portion by fusing with fusion mixture. Dissolution of the melt in water.

Adjustment of pH of the solution with hydrochloric acid. Reaction of the silica with ammonium molybdate and reduction with ascorbic acid in the presence of citric acid.

Spectrometric measurement at the wavelength 810 nm or 620 to 640 nm.

3.2 Reactions

The method is based on the interaction of silicic acid with ammonium molybdate with the formation of a yellow silicomolybdate heteropolyacid which is reduced with ascorbic acid to a blue silicomolybdate complex.

3.3 Reagents

3.3.1 Fusion mixture.

Mix 100 g of sodium carbonate anhydrous, 50 g of sodium tetraborate (previously ignited till foaming ceases) and 0,5 g of potassium nitrate and thoroughly grind in a corundum or hard steel mortar.

3.3.2 Ammonium molybdate, 50 g/l solution.

Keep the solution in a polyethylene container. In case of need, the reagent shall be previously recrystallized. For this transfer 250 g of the reagent to a 600 ml beaker and dissolve in 400 ml of water while heating at 70 to 80 °C. Filter the solution through a close-texture filter paper, add 300 ml of ethanol [96 % (*m/m*)] while mixing and allow to stand for 1 h until the precipitate coagulates.

Filter the precipitate with suction on a medium-texture filter paper, wash two or three times with ethanol and dry in the air.

3.3.3 Hydrochloric acid, ϱ 1,19 g/ml, diluted 1 + 3.

3.3.4 Mixture of acids.

Dissolve 5 g of citric acid and 1 g of ascorbic acid in 100 ml of water.

Prepare the mixture fresh.

3.3.5 Silicon, standard solution corresponding to 50 mg of Si per litre.

Weigh 0,107 0 g of silicon dioxide, calcined at 1 000 to 1 100 °C to constant mass, into a platinum crucible, add 2 g of fusion mixture (3.3.1), mix with a platinum wire, cover with a platinum lid and fuse at 1 000 to 1 100 °C. Transfer the crucible with the melt to a 1 000 ml beaker. Dissolve the melt in 100 to 150 ml of 10 g/l sodium carbonate solution while heating gently. Cool the solution, dilute with 10 g/l sodium carbonate solution to about 750 ml, transfer to a 1 000 ml one-mark volumetric flask, dilute with 10 g/l sodium carbonate solution to the mark and mix.