

International Standard



7969

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Manganese ores and concentrates — Determination of sodium and potassium contents — Flame atomic absorption spectrometric method

Minerais et concentrés de manganèse — Dosage du sodium et du potassium — Méthode par spectrométrie d'absorption atomique dans la flamme

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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.

International Standard ISO 7969 was prepared by Technical Committee ISO/TC 65, *Manganese and chromium ores*.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

Manganese ores and concentrates — Determination of sodium and potassium contents — Flame atomic absorption spectrometric method

1 Scope and field of application

This International Standard specifies a flame atomic absorption spectrometric method for the determination of sodium and/or potassium in manganese ores and concentrates.

The method is applicable to products having sodium contents from 0,02 to 1,0 % (m/m), and potassium contents from 0,08 to 3,0 % (m/m).

It should be read in conjunction with ISO 4297.

2 References

ISO 4296/1, *Manganese ores — Sampling — Part 1: Increment sampling*.

ISO 4296/2, *Manganese ores — Sampling — Part 2: Preparation of samples*.

ISO 4297, *Manganese ores and concentrates — Methods of chemical analysis — General instructions*.

3 Principle

In the case of ores which are easy to decompose, decomposition of a test portion by treatment with nitric, hydrofluoric and sulfuric acids. Removal of hydrofluoric acid by evaporation of the solution until the fumes of sulfuric acid disappear completely. Treatment of the solution with sulfuric acid and hydrogen peroxide to dissolve manganese dioxide.

In the case of ores which are difficult to decompose, decomposition of a test portion by treatment with hydrochloric, nitric, hydrofluoric and perchloric acids. Removal of hydrofluoric and perchloric acid by evaporation of the solution until fumes of perchloric acid disappear completely. Treatment of the solution with hydrochloric acid to dissolve manganese dioxide.

Addition of a caesium nitrate solution and appropriate dilution.

Aspiration of the solution into the flame of an atomic absorption spectrometer using an air/acetylene burner.

Comparison of absorbance values obtained for potassium and/or sodium with those obtained from calibration solutions.

4 Reagents

NOTE — Reagents are to be selected or purified for lowest possible blank values.

4.1 Nitric acid, ρ 1,40 g/ml.

4.2 Hydrofluoric acid, ρ 1,14 g/ml.

4.3 Hydrochloric acid, ρ 1,19 g/ml.

4.4 Perchloric acid, ρ 1,51 g/ml.

4.5 Sulfuric acid, ρ 1,84 g/ml, diluted 1 + 1.

4.6 Hydrochloric acid (4.3), diluted 1 + 2.

4.7 Hydrogen peroxide, 30 % (m/m), free from alkali metals.

4.8 Caesium nitrate, 15 g/l solution.

4.9 Iron, 10 g/l background solution.

Dissolve 2,5 g of high-purity iron by adding 15 ml of the nitric acid (4.1) and 30 ml of water in a 400 ml beaker. Then add 15 ml of the sulfuric acid (4.5) and evaporate the solution to fumes of sulfuric acid, cool and transfer to a 250 ml one-mark volumetric flask, dilute with water to the mark and mix.

4.10 Manganese, 25 g/l background solution.

Dissolve 6,25 g of electrolytic manganese [purity 99,95 % (m/m)] by adding 30 ml of the hydrochloric acid (4.3) and 30 ml of water in a 400 ml beaker.

NOTE — Any slight surface oxidation on the electrolytic manganese shall be removed by rinsing in dilute hydrochloric acid, distilled water, and then in acetone prior to drying and weighing.

Add 35 ml of the sulfuric acid (4.5) and evaporate to fumes of sulfuric acid, cool and transfer to a 250 ml one-mark volumetric flask, dilute with water to the mark and mix.