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Determination of chemical activity of light calcined magnesia

轻烧氧化镁化学活性测定方法

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Table of Contents

Determination of chemical activity of light calcined magnesia

1 Scope

This Standard specifies the determination method for the chemical activity of light calcined magnesia and the scope of the method for determining the content of active magnesia, instruments, reagents, sampling and sample preparation, determination method and test report.

This Standard applies to the determination of the chemical activity of light calcined magnesia with a particle size smaller than 0.045 mm or smaller than 0.125 mm.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 8170, *Rules of rounding off for numerical values and expression and judgement of limiting values*

GB/T 12573, *Sampling method for cement*

GB/T 12805, *Laboratory glassware - Burettes*

GB/T 12806, *Laboratory glassware - One-mark volumetric flasks*

GB/T 12808, *Laboratory glassware - One mark pipettes*

3 Reagents

Unless otherwise stated in the analysis, use analytically-pure reagents and distilled water or equivalent-pure water.

3.1 Citric acid.

3.2 Sodium hydroxide.

3.3 Potassium hydrogen phthalate: reference reagent.

3.4 Phenolphthalein indicator: 10 g/L ethanol solution.

3.5 Sodium hydroxide standard solution (0.2 mol/L).

3.5.1 Preparation: Weigh 8 g of sodium hydroxide (3.2) and dissolve in 100 mL of water. Cool to room temperature. Transfer into a 1000 mL volumetric flask. Dilute to the scale. Mix well. Transfer to a plastic bottle for later use (calibrate it when it is needed).

3.5.2 Calibration: Accurately weigh 3 portions of 0.8168 g of potassium hydrogen phthalate (3.3) that have been dried at 105°C~110°C for 2 h and cooled to room temperature. Respectively place them in 400 mL beakers. Add 200 mL of boil cooling water. Stir to make them dissolved. Then add 3 drops of phenolphthalein indicator (3.4). Use sodium hydroxide standard solution (3.5.1) to titrate to reddish, which shall be the end.

The concentration of sodium hydroxide standard solution is measured by the amount of substance concentration C_{NaOH}. The value is expressed in mol/L. Calculate according to formula (1):

$$c_{NaOH}=\frac{m}{V\times 204.2\times 10^{-3}} \qquad \cdots\cdots(1)$$

Where,

m - The numerical value of the mass of the weighed potassium hydrogen phthalate, in grams (g);

V - The numerical value of the volume of the consumed sodium hydroxide standard solution (3.5.1) to titrate potassium hydrogen phthalate, in milliliters (mL);

204.2 - The numerical value of the molar mass of potassium hydrogen phthalate, in grams per mole (g/mol).

Take the average value as the calculation result. Round to four significant figures.

3.6 Citric acid standard solution (0.07 mol/L)

3.6.1 Preparation: Weigh 14.71 g of citric acid, to the nearest of 0.0001 g. Place in a 400 mL of beaker. Add 200 mL of water to dissolve. Transfer to a 1000 mL volumetric flask. Use water to dilute to the scale. Mix well. Store in a refrigerator. It shall be valid for 1 month.

3.6.2 Calibration: Weigh 3 portions of 50.00 mL of citric acid solution. Respectively place them in 400 mL beakers. Add 200 mL of distilled water. Add 3 drops of phenolphthalein indicator (3.4). Use sodium hydroxide standard solution (3.5.1) to titrate to reddish, which shall be the end.

The concentration of the citric acid standard solution is calculated by the substance

4.12 Glass weighing bottle: Φ35 mm × 70 mm.

5 Sampling and sample preparation

5.1 Collect laboratory samples according to GB/T 12573.

5.2 Sample preparation

5.2.1 Crush lumpy laboratory samples to less than 6.7 mm. Use a sample divider or quartering method to divide to about 100 g.

5.2.2 Crush the divided sample to less than 0.5 mm. Then reduce to about 20 g. Process into specimens with a particle size as small as 0.045 mm or 0.125 mm.

5.2.3 The powdery laboratory sample is directly reduced to about 100 g. Pass through a 0.045 mm sieve (320 mesh) or a 0.125 mm sieve (120 mesh). Then reduce to about 20 g.

5.2.4 The specimen shall be dried at 105°C~110°C for 2 h before analysis. Then cool to room temperature in a desiccator.

6 Determination methods

6.1 Determination of chemical activity of light calcined magnesia by citric acid neutralization method

6.1.1 Method summary

A certain amount of light calcined magnesia reacts with citric acid solution. Measure the activity of light calcined magnesia according to the length of reaction. A short reaction time indicates good activity while a long reaction time indicates poor activity.

6.1.2 Determination steps

6.1.2.1 Specimen size

Weigh about 1.700 g of specimen, to the nearest of 0.0003 g.

6.1.2.2 Determination quantity

During the determination, two specimens shall be weighed for parallel determination.

6.1.2.3 Determination

Place the specimen (6.1.2.1) in a dry 300 mL beaker. Put in a stir bar. Place on a magnetic stirrer with constant temperature of 40°C. Immediately and quickly add 200.0

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