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Determination of transmittance for low rank coal

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Determination of transmittance for low rank coal

1 Scope

This Standard specifies the reagents and materials, instruments and equipment used to determine the transmittance of low rank coal, as well as determination procedure, expression and precision of determination results.

This Standard applies to lignite and low rank bituminous coal.

2 Method principle

Low rank coal reacts with mixed acid of nitric acid and phosphoric acid under the specified test conditions and produces a colored solution. According to the color depth of the solution, use potassium dichromate solution with different concentrations as the standard, determine the transmittance of the coal sample by visual colorimetry.

3 Reagents and materials

3.1 10 % sulfuric acid (GB/T 625, chemically pure) solution (volume fraction).

3.2 Potassium dichromate (GB/T 642, analytically pure): Before use, it shall be dried at 110 °C ~ 120 °C for 2 h.

3.3 (1 + 9) phosphoric acid (GB/T 1282, chemically pure) solution (volume fraction).

3.4 Nitric acid (GB/T 626, chemically pure): Yellow nitric acid cannot be used.

3.5 Mixed acid: Prepared by mixing 1 volume of nitric acid, 1 volume of phosphoric acid and 9 volumes of distilled water.

3.6 Potassium dichromate preparation solution

3.6.1 Weigh 2.500 0 g (accurate to 0.000 2 g) of potassium dichromate powder (3.2), use 10 % sulfuric acid solution (3.1) to prepare it into 250 mL of solution in a volumetric flask. This solution is used for preparing the standard series solution with transmittance between 30 % and 100 %.

3.6.2 Weigh 5.000 0 g (accurate to 0.000 2 g) of potassium dichromate powder (3.2), use 10 % sulfuric acid solution (3.1) to prepare it into 250 mL of solution

4.6 Small glass funnel: The funnel mouth inner diameter is 30 mm, the funnel handle length is about 40 mm, and the inner diameter is 4 mm ~ 5 mm.

5 Determination procedure

5.1 WEIGH test coal sample for general analysis (require raw coal sample or floating coal sample with ash A_d ≤ 10 %, but it may use raw coal sample for lignite that is easily argillized in water) equivalent to 1.000 0 g (accurate to 0.000 2 g) of dry ash-free coal, TRANSFER into a dry 100 mL volumetric flask.

5.2 When the water bath temperature rises to 99.5 °C ± 0.5 °C (in the highland area, it may add a certain amount of glycerin to the water, so that the water bath temperature can be maintained at 99.5 °C ± 0.5 °C), USE pipette to pipette 25 mL of mixed acid (3.5) to a volumetric flask, SHAKE the volumetric flask while adding acid to soak the coal sample. PLACE the volumetric flask added with mixed acid (3.5) immediately into water bath; INSERT a small funnel (4.6) into the bottle opening. The water bath temperature shall be controlled to rise back to 99.5 °C ± 0.5 °C within 5 min.

5.3 After heating for 90 min, REMOVE the volumetric flask from the water bath and allow it to quickly cool to room temperature. USE (1 + 9) phosphate (3.3) to rinse the small funnel and volumetric flask neck, then ADD (1 + 9) phosphoric acid (3.3) to the volumetric flask to the mark. SHAKE after stoppering.

5.4 After standing for 15 min to 30 min, filter with dry funnel and dense qualitative filter paper. FILTER the filtrate into a dry 100 mL Erlenmeyer flask (it shall take care to prevent extremely fine pulverized coal from diafiltration, otherwise it shall be filtered again), DISCARD a small amount of filtrate that is originally filtered out. After filtration, discard the residue. The filtrate shall be determined for transmittance by visual colorimetry on the same day.

5.5 When performing colorimetric analysis, proceed as follows:

- Firstly, USE a small amount of filtrate (5.4) to rinse a 25 mL dry colorimetric tube (4.2), and POUR the filtrate into the colorimetric tube at 10 mL mark (the height of the liquid column shall be adjusted to be consistent with that of the potassium dichromate standard solution series), PERFORM colorimetric analysis visually with standard series solution.

- The colorimetric analysis shall be performed in bright natural light, but it should not be performed in direct sunlight. When performing colorimetric analysis, it shall put (2 ~ 3) pieces of pure white filter paper under the colorimetric tube, but the distance between the filter paper and the colorimetric tube shall be about 30 mm. When performing colorimetric analysis, look straight down from the top of the colorimetric tube, repeatedly

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