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Barium Sulfate

$BaSO_4$ 233.39

Sulfuric acid, barium salt (1:1);

Barium sulfate (1:1) CAS RN®: 7727-43-7; UNII: 25BB7EKE2E.

DEFINITION

Barium Sulfate contains NLT 97.5% and NMT 100.5% of barium sulfate ($BaSO_4$).

IDENTIFICATION

- **A. Identification Tests—General, *Sulfate*⟨191⟩**

  Sample solution: Mix 0.5 g of Barium Sulfate with 2 g each of anhydrous sodium carbonate and anhydrous potassium carbonate, heat the mixture in a crucible until fusion is complete, treat the resulting fused mass with hot water, and filter.

  Acceptance criteria: The filtrate, acidified with hydrochloric acid, meets the requirements.

- **B. Identification Tests—General, *Barium*⟨191⟩**

  Sample solution: Dissolve a portion of the well-washed residue from *Identification* test *A* in 6 N acetic acid.

  Acceptance criteria: The solution meets the requirements.

ASSAY

- **Procedure**

  Sample: 0.58–0.62 g, weighed in a tared platinum crucible

  Analysis: Add 10 g of anhydrous sodium carbonate to the crucible, and mix by rotating the crucible. Fuse over a blast burner until a clear melt is obtained, and heat for an additional 30 min. Cool, place the crucible in a 400-mL beaker, add 250 mL of water, stir with a glass rod, and heat to dislodge the melt. Remove the crucible from the beaker, and wash with water, collecting the washings in the beaker. Rinse the inside of the crucible with 2 mL of 6 N acetic acid and then with water, again collecting the washings in the beaker, and continue heating and stirring until the melt is disintegrated. Cool the beaker in an ice bath until the precipitate settles, and decant the clear liquid through filter paper (Whatman No. 40, or equivalent), taking care to transfer as little precipitate as possible to the paper.

  Wash twice by decantation as follows. Wash down the inside of the beaker with 10 mL of cold sodium carbonate solution (1 in 50), swirl the contents of the beaker, allow the precipitate to settle, and decant the supernatant through the same filter paper as before, transferring as little precipitate as possible to the paper. Place the beaker containing the bulk of the barium carbonate precipitate under the funnel, wash the filter paper with five 1-mL portions of 3 N hydrochloric acid, and wash the paper with water. [Note—The solution may be slightly hazy.]

  Add 100 mL of water, 5.0 mL of hydrochloric acid, 10.0 mL of ammonium acetate solution (2 in 5), 25 mL of potassium dichromate solution (1 in 10), and 10.0 g of urea. Cover the beaker with a watch glass, and digest at 80°–85° for NLT 16 h. Filter while hot through a tared, fine-porosity, sintered-glass crucible, transferring all of the precipitate with the aid of a rubber-tipped stirring rod. Wash the precipitate with potassium dichromate solution (1 in 200), and finally with 20 mL of water. Dry at 105° for 2 h, cool, and weigh. The weight of the barium chromate so obtained, multiplied by 0.9213, represents the weight of barium sulfate ($BaSO_4$).

  Acceptance criteria: 97.5%–100.5%

IMPURITIES

- **Limit of Sulfide**

  Sample solution: Transfer 10 g to a 500-mL conical flask. Add 100 mL of 0.3 N hydrochloric acid.

  Control solution: 100 mL of 0.3 N hydrochloric acid containing 5 µg of sulfide in a 500-mL conical flask

  Analysis: Cover the mouth of both conical flasks with a circle of filter paper that has been moistened at the area over the mouth of the flask with 0.15 mL of lead acetate TS, the paper being held in place with a string tied around the neck of the flask. Boil each mixture gently for 10 min, taking care to avoid spattering the paper.

  Acceptance criteria: NMT 0.5 µg/g; any darkening of the paper by the *Sample solution* is not greater than that produced by the similarly treated *Control solution*.

- **Limit of Acid-Soluble Substances**

  Sample solution: Cool the mixture obtained in the test for *Limit of Sulfide*, add water to restore approximately the original volume, and filter it through paper that previously has been washed with a mixture of 10 mL of 3 N hydrochloric acid and 90 mL of water, returning the first portions, if necessary, to obtain a clear filtrate.

Analysis: Evaporate 50 mL of the filtrate on a steam bath to dryness, and add 2 drops of hydrochloric acid and 10 mL of hot water. Filter again through acid-washed paper, prepared as directed above. Wash the filter with 10 mL of hot water, and evaporate the combined filtrate and washings in a tared dish on a steam bath to dryness. Dry the residue at 105° for 1 h.

Acceptance criteria: NMT 0.3%; the residue weighs NMT 15 mg.

- **Limit of Soluble Barium Salts**

Sample: The residue obtained in the test for *Limit of Acid-Soluble Substances*

Control: 10 mL of water containing 0.5 mL of 2 N sulfuric acid and 50 µg of barium

Analysis: Treat the *Sample* with 10 mL of water, pass the solution through a filter previously washed with 100 mL of 0.3 N hydrochloric acid, and add 0.5 mL of 2 N sulfuric acid.

Acceptance criteria: NMT 0.001%; any turbidity formed in the *Sample* within 30 min is NMT that produced in the similarly treated *Control*.

SPECIFIC TESTS

- **pH** ⟨791⟩**:** 3.5–10.0, in a 10% (w/w) aqueous suspension

ADDITIONAL REQUIREMENTS

- **Packaging and Storage:** Preserve in well-closed containers.

Auxiliary Information - Please check for your question in the FAQs before contacting USP.

Topic/Question	Contact	Expert Committee
BARIUM SULFATE	Documentary Standards Support	SM42020 Small Molecules 4

Chromatographic Database Information: Chromatographic Database

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