https://trungtamthuoc.com/

Status: Currently Official on 17-Feb-2025
Official Date: Official as of 01-Jun-2023
Document Type: USP Monographs
DocId: GUID-D9B34A1D-4805-442A-A9ED-9084F4BCDBB8_3_en-US
DOI: https://doi.org/10.31003/USPNF_M89570_03_01
DOI Ref: n9npi

© 2025 USPC
Do not distribute

Zinc Carbonate

$3Zn(OH)_2 \cdot 2ZnCO_3$ 548.96

Basic zinc carbonate;

Zinc subcarbonate CAS RN®: 5263-02-5; UNII: EQR32Y7H0M.

DEFINITION

Zinc Carbonate contains the equivalent of NLT 70.0% of zinc oxide (ZnO).

IDENTIFICATION

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

  Sample solution: Dissolve in a slight excess of hydrochloric acid.

  Acceptance criteria: Meets the requirements

- **B.** The retention time of the zinc peak of the *Sample solution* corresponds to that of the *Standard solution*, as obtained in the *Assay*.

ASSAY

- **Procedure**

  Diluent, Mobile phase, Post-column derivatization reagent, and **System suitability:** Prepare as directed in *Zinc Determination ⟨591⟩, Procedure, Ion Chromatographic Method*.

  Standard stock solution: 2 mg/mL of USP Zinc Oxide RS, prepared as directed in *Zinc Determination ⟨591⟩, Procedure, Ion Chromatographic Method*

  Standard solution: 20 µg/mL of USP Zinc Oxide RS in *Diluent* from the *Standard stock solution*

  Sample solution: 27 µg/mL of Zinc Carbonate in *Diluent* prepared as follows. Transfer an appropriate portion of homogenized Zinc Carbonate to a suitable volumetric flask. Add *Diluent* to about 50% of the final flask volume to dissolve. Sonication may be needed to aid dissolution. Dilute with *Diluent* to volume.

  Chromatographic system: Proceed as directed in *Zinc Determination ⟨591⟩, Procedure, Ion Chromatographic Method* except for the *Columns*.

  Columns

  Guard: 4.0-mm × 5-cm; 9-µm packing L100 or 4.0-mm × 0.5-cm; 4.6-µm packing L91

  Analytical: 4.0-mm × 25-cm; 9-µm packing L100 or 4.0-mm × 25-cm; 4.6-µm packing L91

  Analysis

  Samples: *Standard solution* and *Sample solution*

  Calculate the percentage of zinc oxide (ZnO) in the portion of Zinc Carbonate taken:

$$\text{Result} = (r_U/r_S) \times (C_S/C_U) \times 100$$

  r_U = peak response of zinc from the *Sample solution*

  r_S = peak response of zinc from the *Standard solution*

  C_S = concentration of USP Zinc Oxide RS in the *Standard solution* (µg/mL)

  C_U = concentration of Zinc Carbonate in the *Sample solution* (µg/mL)

  Acceptance criteria: NLT 70.0%

IMPURITIES

- **Chloride and Sulfate ⟨221⟩, *Chloride***

  Standard solution: 0.03 mL of 0.02 N hydrochloric acid

  Sample solution: Dissolve 1.0 g of Zinc Carbonate in a mixture of 20 mL of water and 3 mL of nitric acid.

  Acceptance criteria: The *Sample solution* shows no more chloride than the *Standard solution* (0.002%).

OFFICIAL

www.webofpharma.com

https://trungtamthuoc.com/

- **Sulfate**

Standard solution: Dilute 0.10 mL of 0.02 N sulfuric acid with water to 10 mL.

Sample solution: Dissolve 10.0 g of Zinc Carbonate in a mixture of 75 mL of water and 10 mL of hydrochloric acid, and filter. Neutralize the filtrate with ammonium hydroxide, and dilute with water to 100 mL.

Analysis: To 10.0 mL each of the *Standard solution* and the *Sample solution*, add 1 mL of 0.6 N hydrochloric acid and 1 mL of barium chloride TS, and allow to stand for 10 min.

Acceptance criteria: The turbidity produced in the *Sample solution* is NMT that produced in the *Standard solution* (0.01%).

Change to read:

- ▲**Iron** ⟨241⟩, *Procedures, Procedure 1*▲ (CN 1-Jun-2023)

Test preparation: Dissolve 0.5 g of Zinc Carbonate in 20 mL of water and 3 mL of hydrochloric acid.

Acceptance criteria: NMT 0.002%

- **Lead**

Standard lead solution: Standard lead solution TS

Sample solution: Transfer 10.0 g of Zinc Carbonate to a 100-mL volumetric flask, add 20 mL of nitric acid and 10 mL of water, swirl to dissolve, and dilute with water to volume.

Blank: 4% (v/v) nitric acid in water

Instrumental conditions

(See *Atomic Absorption Spectroscopy* ⟨852⟩.)

Mode: Atomic absorption spectrophotometry

Analytical wavelength: 217.0 nm (lead emission line)

Lamp: Lead hollow-cathode

Flame: Air–acetylene

Analysis

Samples: *Standard lead solution* and *Sample solution*

Add 10.0 mL of the *Sample solution* to each of three 25-mL volumetric flasks. To the respective volumetric flasks add 0, 5.0, and 10.0 mL of *Standard lead solution*, and dilute with water to volume. These solutions contain 0, 0.002, and 0.004 mg/mL of added lead, respectively. Determine the absorbances of these three solutions. Plot the absorbances of the three solutions versus their contents of added lead, in mg/mL, as furnished by the *Standard lead solution*. Draw a straight line (calibration curve) best fitting the three points, and extrapolate the line until it intersects the concentration axis. From the intercept determine the concentration, in mg/mL, of lead in the *Sample solution*.

Calculate the quantity, in ppm, of lead in the portion of Zinc Carbonate taken:

$$\text{Result} = (V_1/W) \times (V_2/V_3) \times (C/F)$$

V_1 = total volume of the *Sample solution*, 100 mL

W = weight of Zinc Carbonate (g)

V_2 = final volume of the solution used for analysis, 25 mL

V_3 = volume of the *Sample solution* used for analysis, 10 mL

C = concentration of lead in the *Sample solution*, as determined from the calibration curve (mg/mL)

F = conversion factor, 0.001 µg/mg

Acceptance criteria: NMT 5 ppm

- **Insoluble Matter**

Sample: 10 g of Zinc Carbonate

Sample solution: Dissolve the *Sample* in a mixture of 100 mL of water and 7 mL of sulfuric acid.

Analysis: Heat the *Sample solution* on a steam bath for 1 h. Filter the solution through a tared sintered-glass crucible, wash with hot water, and dry the crucible at 105°. Cool, and weigh.

Acceptance criteria: The residue weighs NMT 2 mg (0.02%).

- **Substances Not Precipitated by Ammonium Sulfide**

Sample: 1.0 g of Zinc Carbonate

Sample solution: Dissolve the *Sample* in 10 mL of water and 2 mL of sulfuric acid. Dilute with water to 80 mL, add 10 mL of ammonium hydroxide, and pass hydrogen sulfide through the solution for 30 min. Dilute with water to 100 mL, and allow the precipitate to settle. Decant the supernatant through a filter. Use the clear filtrate.

OFFICIAL

https://trungtamthuoc.com/

Analysis: Transfer 50 mL of the *Sample solution* to a tared dish, and evaporate to dryness. Ignite, gently at first, and finally at 800 ± 25°. Cool, and weigh.

Acceptance criteria: The weight of the residue is NMT 2 mg (0.4%).

ADDITIONAL REQUIREMENTS

• **Packaging and Storage:** Preserve in tight containers.

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

Topic/Question	Contact	Expert Committee
ZINC CARBONATE	Documentary Standards Support	SM32020 Small Molecules 3
REFERENCE STANDARD SUPPORT	RS Technical Services RSTECH@usp.org	SM32020 Small Molecules 3

Chromatographic Database Information: Chromatographic Database

Most Recently Appeared In:
Pharmacopeial Forum: Volume No. 46(1)

Current DocID: GUID-D9B34A1D-4805-442A-A9ED-9084F4BCDBB8_3_en-US

DOI: https://doi.org/10.31003/USPNF_M89570_03_01

DOI ref: n9npi

OFFICIAL

www.webofpharma.com