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Manganese Chloride

$MnCl_2 \cdot 4H_2O$ 197.91
Manganese chloride ($MnCl_2$) tetrahydrate;
Manganese (2+) chloride tetrahydrate CAS RN®: 13446-34-9; UNII: QQE170PANO.
Anhydrous 125.84 CAS RN®: 7773-01-5.

DEFINITION

Manganese Chloride contains NLT 98.0% and NMT 101.0% of $MnCl_2$, calculated on the dried basis.

IDENTIFICATION

• **A. Identification Tests—General, *Chloride*⟨191⟩:** Yields white, curdy precipitate of silver chloride with silver nitrate TS, which is insoluble in nitric acid. After being washed with water, this precipitate is soluble in a slight excess of 6 N ammonium hydroxide.

• **B. Identification Tests—General, *Manganese*⟨191⟩:** Meets the requirements

ASSAY

• **Procedure**

Sample: 425 mg

Analysis: Transfer the *Sample* to a 400-mL beaker, dissolve in 25 mL of water, add 300 mg of ammonium chloride and 0.5 g of hydroxylamine hydrochloride, and swirl to dissolve. Warm slightly on a hot plate, and dilute with water to 100 mL. Add 3 mL of triethanolamine and stir the solution, preferably using a magnetic stirrer. Begin the titration by adding 25 mL of 0.05 M edetate disodium VS, then add 10 mL of ammonia–ammonium chloride buffer TS, and 1 mL of eriochrome black TS. Continue to titrate with 0.05 M edetate disodium VS to a blue endpoint. Each mL of 0.05 M edetate disodium is equivalent to 6.292 mg of $MnCl_2$.

Acceptance criteria: 98.0%–101.0% of $MnCl_2$ on the dried basis

IMPURITIES

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

Sample: 2.0 g

Acceptance criteria: Shows no more sulfate than corresponds to 0.10 mL of 0.020 N sulfuric acid (0.005%).

Change to read:

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

Sample solution: 2.0 g in 40 mL of water

Acceptance criteria: NMT 5 ppm

• **Zinc**

Sample solution: Dissolve 1 g in a mixture of 48 mL of water and 2 mL of sulfuric acid.

Analysis: To the *Sample solution*, add, slowly and with constant agitation, 1 mL of potassium ferrocyanide solution (1 in 100).

Acceptance criteria: No turbidity is produced within 5 min.

SPECIFIC TESTS

• **Insoluble Matter**

Sample solution: Transfer 10 g to a 250-mL beaker, add 150 mL of water, cover the beaker, and heat to boiling.

Analysis: Digest the hot *Sample solution* on a steam bath for 1 h, and pass through a tared filtering crucible of fine pore size. Rinse the beaker with hot water, passing the rinsings through the filter, and finally wash the filter with additional hot water. Dry the filter at 105°.

Acceptance criteria: The residue weighs NMT 0.5 mg (0.005%).

• **Substances Not Precipitated by Ammonium Sulfide**

Sample solution: Dissolve 2.0 g in 90 mL of water, add 5 mL of ammonium hydroxide, and warm the solution to 80°. Pass a stream of hydrogen sulfide through the solution for 30 min. Dilute with water to 100 mL, mix, and allow the precipitate to settle. Decant the supernatant through a filter of fine pore size, and transfer 50.0 mL to an evaporating dish that previously has been ignited and tared.

Analysis: Evaporate the filtrate to dryness, cool, add 0.5 mL of sulfuric acid, heat gently to remove the excess acid, and ignite at 800 ± 25° for 15 min.

Acceptance criteria: The weight of the residue is NMT 2.0 mg (NMT 0.2% as sulfate).

• **pH ⟨791⟩**

Sample solution: 10 g in 200 mL of carbon dioxide- and ammonia-free water

Acceptance criteria: 3.5–6.0

• **Loss on Drying ⟨731⟩:** Dry a sample at 50° for 2 h, then raise the temperature to 150° for 24 h: it loses 36.0%–38.5% of its weight.

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
MANGANESE CHLORIDE	Documentary Standards Support	SM52020 Small Molecules 5

Chromatographic Database Information: Chromatographic Database

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