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Cupric Chloride

$CuCl_2 \cdot 2H_2O$ 170.48
$CuCl_2$ 134.45
Copper chloride ($CuCl_2$) dihydrate;
Copper(2+) chloride dihydrate CAS RN®: 10125-13-0; UNII: S2QG84156O.
Anhydrous CAS RN®: 7447-39-4; UNII: P484053J2Y.

DEFINITION

Cupric Chloride contains NLT 99.0% and NMT 100.5% of $CuCl_2$, calculated on the dried basis.

IDENTIFICATION

- **A. Identification Tests—General, *Chloride* ⟨191⟩:** A solution (1 in 20) meets the requirements.
- **B. Identification Tests—General, *Copper* ⟨191⟩:** A solution (1 in 20) meets the requirements.

ASSAY

Change to read:

- **Procedure**

Sample solution: 8 mg/mL of Cupric Chloride in water

Analysis: ▲To 50 mL of the *Sample solution*▲ (ERR 1-Dec-2018) add 4 mL of acetic acid and 3 g of potassium iodide. Titrate the liberated iodine with 0.1 N sodium thiosulfate VS, adding 2 g of potassium thiocyanate and 3 mL of starch TS as the endpoint is approached. Each mL of 0.1 N sodium thiosulfate is equivalent to 13.45 mg of Cupric Chloride ($CuCl_2$).

Acceptance criteria: 99.0%–100.5% on the dried basis

IMPURITIES

- **Limit of Sodium**

Sample stock solution: Transfer 10.0 g of Cupric Chloride to a 100-mL volumetric flask, add water, and swirl to dissolve. Add 5 mL of nitric acid, and dilute with water to volume. This solution contains 0.1 g/mL of cupric chloride.

Sample solutions: To three 25-mL volumetric flasks add a volume of the *Sample stock solution* equivalent to the *Sample Weight* given in *Table 1*. To two of the flasks add the amounts of reference analyte ion specified in *Table 1*. Add 2 mL of potassium chloride solution (1 in 20) to each flask, and dilute with water to volume.

Analysis: Using atomic absorption spectrophotometry (see *Atomic Absorption Spectroscopy ⟨852⟩*), analyze the *Sample solutions* by the method of standard addition analysis according to *Table 1*.

Acceptance criteria: NMT 0.02%

Table 1

Limit Test	Wavelength (nm)	Sample Weight (g)	Reference Ion Added (mg)	Flame Type	Background Correction
Sodium	589.0	0.1	0.01/0.02	Air–acetylene	No
Potassium	766.5	0.1	0.01/0.02	Air–acetylene	No
Calcium	422.7	2.0	0.05/0.10	Air–acetylene	No

Limit Test	Wavelength (nm)	Sample Weight (g)	Reference Ion Added (mg)	Flame Type	Background Correction
Iron	248.3	2.0	0.05/0.10	Air–acetylene	Yes
Nickel	232.0	2.0	0.10/0.20	Air–acetylene	No

- **Limit of Potassium**

  Sample stock solution: Prepare as directed in the test for *Limit of Sodium*.

  Sample solutions: To three 25-mL volumetric flasks add a volume of the *Sample stock solution* equivalent to the *Sample Weight* given in *Table 1*. To two of the flasks add the amounts of reference analyte ion specified in *Table 1*, and dilute with water to volume.

  Analysis: Using atomic absorption spectrophotometry (see *Atomic Absorption Spectroscopy ⟨852⟩*), analyze the *Sample solutions* by the method of standard addition analysis according to *Table 1*.

  Acceptance criteria: NMT 0.01%

- **Limit of Calcium**

  Sample stock solution: Prepare as directed in the test for *Limit of Sodium*.

  Sample solutions: To three 25-mL volumetric flasks add a volume of the *Sample stock solution* equivalent to the *Sample Weight* given in *Table 1*. To two of the flasks add the amounts of reference analyte ion specified in *Table 1*, and dilute with water to volume.

  Analysis: Using atomic absorption spectrophotometry (see *Atomic Absorption Spectroscopy ⟨852⟩*), analyze the *Sample solutions* by the method of standard addition analysis according to *Table 1*.

  Acceptance criteria: NMT 0.005%

- **Limit of Iron**

  Sample stock solution: Prepare as directed in the test for *Limit of Sodium*.

  Sample solutions: To three 25-mL volumetric flasks add a volume of the *Sample stock solution* equivalent to the *Sample Weight* given in *Table 1*. To two of the flasks add the amounts of reference analyte ion specified in *Table 1*, and dilute with water to volume.

  Analysis: Using atomic absorption spectrophotometry (see *Atomic Absorption Spectroscopy ⟨852⟩*), analyze the *Sample solutions* by the method of standard addition analysis according to *Table 1*.

  Acceptance criteria: NMT 0.005%

- **Limit of Nickel**

  Sample stock solution: Prepare as directed in the test for *Limit of Sodium*.

  Sample solutions: To three 25-mL volumetric flasks add a volume of the *Sample stock solution* equivalent to the *Sample Weight* given in *Table 1*. To two of the flasks add the amounts of reference analyte ion specified in *Table 1*, and dilute with water to volume.

  Analysis: Using atomic absorption spectrophotometry (see *Atomic Absorption Spectroscopy ⟨852⟩*), analyze the *Sample solutions* by the method of standard addition analysis according to *Table 1*.

  Acceptance criteria: NMT 0.01%

- **Insoluble Matter**

  Sample: 10 g of Cupric Chloride

  Analysis: Transfer the *Sample* to a 250-mL beaker. Add 100 mL of water and 2 mL of hydrochloric acid. Cover the beaker, and heat to boiling. Digest the hot 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. Retain the combined filtrate and washings for the test for *Limit of Sulfate*. Dry the filter at 105°.

  Acceptance criteria: The residue weighs NMT 1.0 mg (0.01%).

- **Limit of Sulfate**

  Analysis: Heat to boiling the combined filtrate and washings retained from the test for *Insoluble Matter*. Add 10 mL of barium chloride TS, digest for 2 h on a steam bath, and allow to stand overnight. Pass the solution through a tared, porcelain filtering crucible of medium-pore size, and wash the residue with two 10-mL portions of hot water. Ignite at 800 ± 25° to constant weight.

  Acceptance criteria: The weight of the residue, corrected for the weight obtained in a blank test, does not exceed 1.2 mg (0.005%).

SPECIFIC TESTS

- **Loss on Drying ⟨731⟩:** Dry a sample at 105° for 16 h: it loses 20.9%-21.4% of its weight.

ADDITIONAL REQUIREMENTS

- **Packaging and Storage:** Preserve in tight containers. Store at controlled room temperature.

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

Topic/Question	Contact	Expert Committee
CUPRIC CHLORIDE	Documentary Standards Support	SM12020 Small Molecules 1

Chromatographic Database Information: Chromatographic Database

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