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Chromic Chloride

$CrCl_3 \cdot 6H_2O$ 266.45
Chromium chloride ($CrCl_3$) hexahydrate;
Chromium(3+) chloride hexahydrate CAS RN®: 10060-12-5; UNII: KB1PCR9DMW.
$CrCl_3$ 158.36
Anhydrous CAS RN®: 10025-73-7; UNII: Z310X5O5RP.

DEFINITION

Chromic Chloride contains NLT 98.0% and NMT 101.0% of $CrCl_3 \cdot 6H_2O$.

IDENTIFICATION

- **A.**

Analysis: To 5 mL of a solution (1 in 250) in a test tube, add 1 mL of 5 N sodium hydroxide and 10 drops of 30% hydrogen peroxide, and heat gently for about 2 min.

Acceptance criteria: A yellow color develops.

- **B.**

Analysis: To 5 mL of a solution (1 in 250) in a test tube, add 5 drops of silver nitrate TS.

Acceptance criteria: A white, curdy precipitate that is insoluble in nitric acid is formed.

ASSAY

- **Procedure**

Sample solution: Dissolve 0.4 g of Chromic Chloride in 100 mL of water contained in a glass-stoppered, 500-mL conical flask. Add 5 mL of 5 N sodium hydroxide, and mix. Pipet slowly 4 mL of 30% hydrogen peroxide into the flask, and boil the solution for 5 min. Cool the solution slightly, and add 5 mL of nickel sulfate solution (1 in 20). Boil the solution until no more oxygen is evolved. Cool, and add 2 N sulfuric acid dropwise until the color of the solution changes from yellow to orange. Add to the flask a freshly prepared solution of 4 g of potassium iodide and 2 g of sodium bicarbonate in 100 mL of water, then add 6 mL of hydrochloric acid. Immediately insert the stopper in the flask, and allow to stand in the dark for 10 min. Rinse the stopper and the sides of the flask with a few mL of water.

Analysis: Titrate the liberated iodine with 0.1 N sodium thiosulfate VS to an orange color. Add 3 mL of starch TS, and continue the titration to a blue-green endpoint. Each mL of 0.1 N sodium thiosulfate is equivalent to 8.882 mg of chromium chloride hexahydrate ($CrCl_3 \cdot 6H_2O$).

Acceptance criteria: 98.0%–101.0%

IMPURITIES

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

Sample solution: Dissolve 2.0 g of Chromic Chloride in 10 mL of water. Add 1 mL of 3 N hydrochloric acid, and filter if necessary to obtain a clear solution. Wash the filter with two 5-mL portions of water, and dilute with water to 40 mL.

Control solution: Prepare as directed in the *Sample solution*, but use 1.0 g of the substance under test. After the filtration step, add 0.10 mL of 0.020 N sulfuric acid.

Analysis: To each solution add 3 mL of barium chloride TS, mix, and allow to stand overnight. Decant most of the supernatants, without disturbing the precipitates, but leaving twice the volume of liquid in the *Control solution* as in the *Sample solution*. Dilute each solution with water to 25 mL, and sonicate for 1 min.

Acceptance criteria: Any turbidity in the *Sample solution* does not exceed that in the *Control solution* (0.01%).

Change to read:

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

Test preparation: Dissolve 1.0 g of Chromic Chloride in 100 mL of water. Transfer 10 mL of this solution to a 100-mL color comparison tube. Dilute with water to 45 mL, add 2 mL of hydrochloric acid, and mix.

Analysis: Proceed as directed for *Procedure*, except add 15 mL of butyl alcohol to the *Test preparation* and the *Standard Preparation* at the same time that the *Ammonium Thiocyanate Solution* is added. Shake for 30 s, and allow the layers to separate.

Acceptance criteria: The color in the upper butyl alcohol layer from the *Test preparation* is not darker than that from the *Standard Preparation* (NMT 0.01%).

SPECIFIC TESTS

• **Insoluble Matter**

Sample: 10 g

Analysis: Transfer the *Sample* to a 250-mL beaker. Add 100 mL of water, cover the beaker, and heat to boiling. Digest the hot solution on a steam bath for 30 min, and filter through a tared filtering crucible of fine porosity. Rinse the beaker with hot water, passing the rinsings through the filter, and wash the filter with hot water until the last washing is colorless. Dry the filter at 105°.

Acceptance criteria: The weight of the residue does not exceed 1 mg (0.01%).

• **Substances Not Precipitated by Ammonium Hydroxide**

Sample: 2.0 g

Analysis: Dissolve the *Sample* in 80 mL of water, heat the solution to boiling, and add a slight excess of ammonium hydroxide. Continue heating to remove the excess ammonia. Cool, dilute with water to 100.0 mL, and mix. Pass through a retentive filter, and transfer 50.0 mL of the clear filtrate to an evaporating dish that previously has been ignited and tared. Add 0.5 mL of sulfuric acid to the filtrate, and evaporate on a steam bath to dryness. Heat gently to remove the excess acid, and ignite gently.

Acceptance criteria: The weight of the residue does not exceed 2.0 mg (0.20% as sulfate).

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
CHROMIC CHLORIDE	Documentary Standards Support	SM52020 Small Molecules 5

Chromatographic Database Information: Chromatographic Database

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