



>>Entry Name: Hexaammineruthenium(*III*)(3+), 10Cl

CAS Registry Number: 18943-33-4

[Ru(NH₃)₆]³⁽⁺⁾

Molecular Formula: H₁₈N₆Ru³⁽⁺⁾

Molecular Weight: 203.252

Accurate Mass: 204.063642

Percentage Composition: H 8.93%; N 41.35%; Ru 49.73%

Use/Importance: V. reactive under basic conditions, and undergoes a wide range of outer-sphere electron-transfer reactions. Standard reagent for testing Marcus theory

Solubility: Sol. H₂O

pKa Value: pK_a 12.4 (not certain)

Other Data: Basic solns. readily oxidised to give "ruthenium red". Acidic solns. are oxidised by HClO₄ to give nitrosyl derivs. Inert towards substitution reactions and to photosubstitution reactions. It readily undergoes deuteration (in D₂O), and reacts in basic conditions as a nucleophile towards ketones and aldehydes

>>Derivative: Trichloride

Synonym(s): Hexaammineruthenium(*III*) chloride. Ruthenium(*III*) chloride hexaammoniate

CAS Registry Number: 14282-91-8

Molecular Formula: Cl₃H₁₈N₆Ru

Molecular Weight: 309.611

Accurate Mass: 308.970198

Percentage Composition: Cl 34.35%; H 5.86%; N 27.14%; Ru 32.64%

Use/Importance: V. important synthetic reagent; commercially available

Physical Description: Colourless monoclinic cryst.

Solubility: Sol. H₂O

Other Data: Classically paramagnetic. μ_{eff} = 2.14μ_B. Dec. on heating → [Ru(NH₃)₅Cl]Cl₂ + NH₃

Aldrich: 26200-5

>>Derivative: Tribromide

Synonym(s): Hexaammineruthenium(*III*) bromide. Ruthenium(*III*) bromide hexaammoniate

CAS Registry Number: 16455-56-4

Molecular Formula: Br₃H₁₈N₆Ru

Molecular Weight: 442.964

Accurate Mass: 440.87865

Percentage Composition: Br 54.12%; H 4.10%; N 18.97%; Ru 22.82%

Physical Description: Yellow cryst.

Other Data: Dec. on heating → [Ru(NH₃)₅Br]Br₂ + NH₃. Reacts with aldehydes under basic conditions to give ruthenium(*II*) nitrile complexes

>>Derivative: Triiodide

Synonym(s): Hexaammineruthenium(*III*) iodide. Ruthenium(*III*) iodide hexaammoniate

CAS Registry Number: 16446-62-1

Molecular Formula: H₁₈I₃N₆Ru

Molecular Weight: 583.966

Accurate Mass: 584.777061

Percentage Composition: H 3.11%; I 65.19%; N 14.39%; Ru 17.31%

Physical Description: Purple-brown solid

Other Data: Dec. on heating → [Ru(NH₃)₅I]I₂ + NH₃

>>Derivative: Tris-tetrafluoroborate

CAS Registry Number: 16455-57-5

Physical Description: Colourless cryst.

Other Data: Ru-N 210.4 pm

>>Derivative: Trinitrate

Physical Description: Solid + 3H₂O

Other Data: μ_{eff} = 2.18μ_B

>>Derivative: Deutero deriv., chloride salt

Molecular Formula: Cl₃D₁₈N₆Ru

Molecular Weight: 327.722

Use/Importance: Prepd. for vibrational analysis, by recryst. [Ru(NH₃)₆]Cl₃ from D₂O