



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

CAS Registry Number: 18943-33-4

$[\text{Ru}(\text{NH}_3)_6]^{3(+)}$

Molecular Formula: $\text{H}_{18}\text{N}_6\text{Ru}^{3(+)}$

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. H_2O

pKa Value: $\text{p}K_a$ 12.4 (not certain)

Other Data: Basic solns. readily oxidised to give "ruthenium red". Acidic solns. are oxidised by HClO_4 to give nitrosyl derivs. Inert towards substitution reactions and to photosubstitution reactions. It readily undergoes deuteration (in D_2O), 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: $\text{Cl}_3\text{H}_{18}\text{N}_6\text{Ru}$

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. H_2O

Other Data: Classically paramagnetic. $\mu_{\text{eff}} = 2.14\mu_B$. Dec. on heating $\rightarrow [\text{Ru}(\text{NH}_3)_5\text{Cl}]\text{Cl}_2 + \text{NH}_3$

Aldrich: 26200-5

>>Derivative: Tribromide

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

CAS Registry Number: 16455-56-4

Molecular Formula: $\text{Br}_3\text{H}_{18}\text{N}_6\text{Ru}$

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 $\rightarrow [\text{Ru}(\text{NH}_3)_5\text{Br}]\text{Br}_2 + \text{NH}_3$. 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: $\text{H}_{18}\text{I}_3\text{N}_6\text{Ru}$

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 $\rightarrow [\text{Ru}(\text{NH}_3)_5\text{I}]\text{I}_2 + \text{NH}_3$

>>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 + $3\text{H}_2\text{O}$

Other Data: $\mu_{\text{eff}} = 2.18\mu_B$

>>Derivative: Deutero deriv., chloride salt

Molecular Formula: $\text{Cl}_3\text{D}_{18}\text{N}_6\text{Ru}$

Molecular Weight: 327.722

Use/Importance: Prepd. for vibrational analysis, by recryst. $[\text{Ru}(\text{NH}_3)_6]\text{Cl}_3$ from D_2O