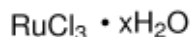


Certificate of Analysis

Product Name:

Ruthenium(III) chloride hydrate - 99.98% trace metals basis

Product Number: 463779
Batch Number: MKCM9321
Brand: ALDRICH
CAS Number: 14898-67-0
MDL Number: MFCD00149844
Formula: Cl₃Ru · xH₂O
Formula Weight: 207.43 g/mol
Quality Release Date: 04 AUG 2020



Test	Specification	Result
Appearance (Color)	Dark Grey to Black	Black
Appearance (Form)	Conforms to Requirements	Powder
Powder or Crystalline Powder and/or Chunks		
Gravimetric Analysis (% Ru)		41.8 %
Typically 40% - 50% Ru After Reduction With Magnesium		
ICP Major Analysis	Confirmed	Conforms
Confirms Ru Component		
Purity	Meets Requirements	Meets Requirements
99.98% Based On Trace Metals Analysis		
Trace Metal Analysis	≤ 250.0 ppm	73.0 ppm
Aluminum (Al)		1.8 ppm
Boron (B)		11.2 ppm
Barium (Ba)		4.8 ppm
Cadmium (Cd)		1.4 ppm
Chromium (Cr)		1.5 ppm
Iron (Fe)		5.0 ppm
Magnesium (Mg)		1.8 ppm
Manganese (Mn)		2.6 ppm
Molybdenum (Mo)		4.1 ppm
Lead (Pb)		4.5 ppm
Antimony (Sb)		12.7 ppm

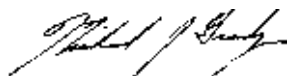
Sigma-Aldrich warrants, that at the time of the quality release or subsequent retest date this product conformed to the information contained in this publication. The current Specification sheet may be available at Sigma-Aldrich.com. For further inquiries, please contact Technical Service. Purchaser must determine the suitability of the product for its particular use. See reverse side of invoice or packing slip for additional terms and conditions of sale.



Certificate of Analysis

Product Number: 463779
Batch Number: MKCM9321

Test	Specification	Result
Vanadium (V)		3.3 ppm
Zirconium (Zr)		18.3 ppm



Michael Grady, Manager
Quality Control
Milwaukee, WI US

Sigma-Aldrich warrants, that at the time of the quality release or subsequent retest date this product conformed to the information contained in this publication. The current Specification sheet may be available at Sigma-Aldrich.com. For further inquiries, please contact Technical Service. Purchaser must determine the suitability of the product for its particular use. See reverse side of invoice or packing slip for additional terms and conditions of sale.

