Molecular mass: 101.07

Atomic number: 44

Melting point: 2310° C

Ruthenium

Ruthenium – Electronic Resistors by Thick-Film Technology

Compound	Formula	Product Code	Metal Contained	CAS	Molecular Mass	Color
Ammonium hexachlororuthenate(IV)	$(NH_4)_2[RuCl_6]$	89.700.008	appr. 31 %	18746-63-9	349.87	brown
Ammonium µ-nitrido-bis-[aquatetrachlororuthenate(IV)]	$(NH_4)_3[\{RuCl_4(H_2O)\}_2(\mu\text{-}N)]$	89.700.012	appr. 34 %	27316-90-1	589.92	red
Carbonyldihydridotris-(triphenylphosphane)ruthenium(II)	$[Ru(H)_2(CO)(PPh_3)_3]$	89.720.016	appr. 11 %	25360-32-1	917.98	cream
Di-µ-chloro-bis[chloro(*p*-cymene)-ruthenium(II)]	$[\{RuCl(C_{10}H_{14})\}_2(\mu\text{-}Cl)_2]$	89.880.048	appr. 33 %	52462-29-0	612.39	reddish brown
Dichloro(cycloocta-1.5-diene)-ruthenium(II)	$[RuCl_2(cod)]_n$	89.700.018	appr. 35 %	50982-12-2	280.16	brown
Dichlorotris(triphenylphosphane)-ruthenium(II)	$[RuCl_2(PPh_3)_3]$	89.700.026	appr. 10 %	15529-49-4	958.86	reddish brown
Ruthenium acetate	"$Ru(OAc)_x$"	89.700.017	appr. 47 %	72196-32-8		black
Ruthenium(III) chloride	$RuCl_3$	89.700.010	appr. 49 %	10049-08-8	207.43	brown
Ruthenium(III) chloride hydrate	$RuCl_3 \cdot n\ H_2O$	89.700.002	appr. 40 %	14898-67-0	207.43 a.c.	brownish black
Ruthenium(III) chloride *solution*	$RuCl_3$	89.700.020	up to appr. 20 %	10049-08-8		brown
Ruthenium(IV) oxide	RuO_2	89.700.004	appr. 75 %	12036-10-1	133.07	black
Ruthenium(IV) oxide hydrate	$RuO_2 \cdot n\ H_2O$	89.700.005	appr. 62 %	32740-79-7	133.07 a.c.	black
Tetradecaammine-di-µ-oxo-triruthenium(III,IV) hexachloride hydrate; "Ruthenium Red"	$[(NH_3)_5Ru^{III}(\mu\text{-}O)Ru^{IV}(NH_3)_4(\mu\text{-}O)Ru^{III}(NH_3)_5]Cl_6 \cdot n\ H_2O$	89.700.009	appr. 35 %	25125-46-6	786.35 a.c.	violet
Trinitratonitrosylruthenium(II) *solution*	$[Ru(NO_3)_3(NO)]$	89.700.021	appr. 15 %	34513-98-9		wine-red
Trinitratonitrosylruthenium(II) *technical solution*	$[Ru(NO_3)_3(NO)]$	89.700.028	appr. 15 %	34513-98-9		brown
Tris(acetylacetonato)ruthenium(III) "Ruthenium Acetylacetonate"	$[Ru(acac)_3]$	89.700.013	appr. 25 %	14284-93-6	398.40	red

Ruthenium plays a significant part in the coating of dimensionally stable anodes for industrial electrolysis (cf. iridium). Here ruthenium(III) chloride hydrate is the most important starting material.

Ruthenium(III) chloride solution and trinitratonitrosylruthenium(II) solution are mainly used to impregnate supporting materials for processing catalysts. A typical application is the hydrogenation of aromatic compounds.

Homogeneous catalysis is a growing branch of chemistry, for which ruthenium chemicals with low chlorine content are gaining more and more importance: Ruthenium acetate and tris(acetylacetonato)ruthenium(III) are two examples offered by Heraeus.

In the presence of oxidizing agents, ruthenium(III) chloride hydrate performs the oxidative splitting of alkenes into ketones.

The pharmaceutical and fine chemical industries apply especially organo-ruthenium compounds as catalysts to asymmetric hydrogenations of C=O groups. Heraeus is able to manufacture the precatalyst di-µ-chloro-bis[chloro-(*p*-cymene)ruthenium(II)] on a commercial scale.

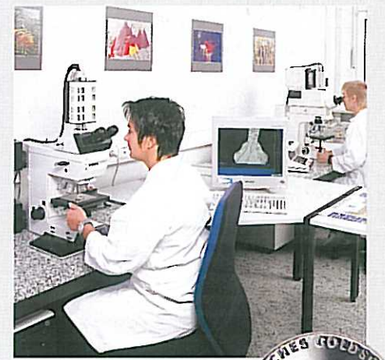
Ruthenium(IV) oxide is a usual conducting pigment for the manufacture of printed electronic resistors.

The plating industry makes use of ruthenium in the form of electrolytes in order to ensure technical surfaces under strain. Ru electrolytes can be based on ammonium µ-nitrido-bis[aquatetrachlororuthenate(IV)].

"Ruthenium Red" is a selective histological stain for microscopy.

Since Ru oxides are black, some ruthenium compounds play a special part in coloring tiles with jet-black patterns.

Using "Ruthenium Red" for medical microscopy.



Medals plated with Ru are very durable and show a blackish luster.