

Precious Metals & Catalysts



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Coupling catalysts



For your convenience, we have collected a selection of our most popular coupling catalysts. Please refer to our *Precious Metal Compounds - Homogenous Catalalysts* section for all our homogenous catalysts.

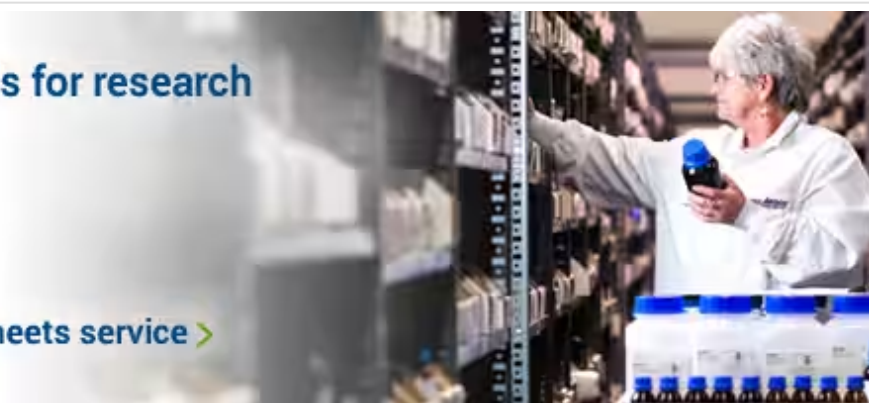
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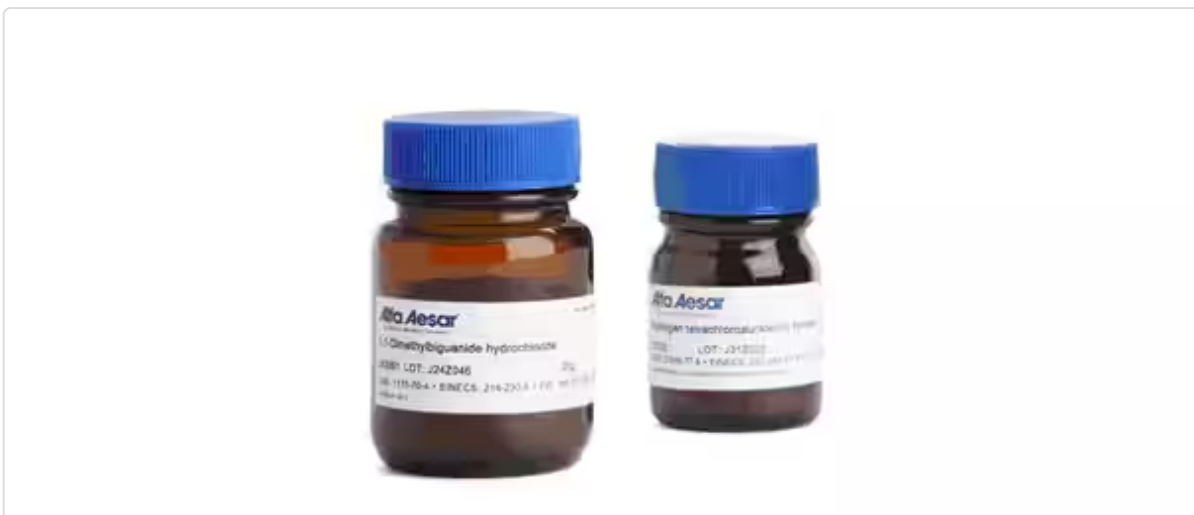


	42057	1,5-Cyclooctadiene(pyridine)(tricyclohexylphosphine)iridium(I) hexafluorophosphate, 99%
	45913	Bis[1,2,3,4,5-pentaphenyl-1'-(di-tert-butylphosphino)ferrocene]palladium(0)
	10002	Bis(acetonitrile)dichloropalladium(II), Pd 40.5%
	12764	Bis(dibenzylideneacetone)palladium(0)
	46000	Bis[di-tert-butyl(4-dimethylaminophenyl)phosphine]palladium(0), Pd 16.7%
	45853	Bis(di-tert-butyl-phenylphosphine)palladium(0), 98%
	39288	Bis(ethylene)(2,4-pentanedionato)rhodium(I), Rh 39.9% min
	45792	Bis(tricyclohexylphosphine)palladium(0), 97% min
	45814	Bis(tri-o-tolylphosphine)palladium(0), Pd 14.9%
	44845	Bis(tri-tert-butylphosphine)palladium(0)
	40524	Carbonyldihydridotris(triphenylphosphine)ruthenium(II), 99%
	12749	Chloro(1,5-cyclooctadiene)iridium(I) dimer, Ir 57.2%
	10466	Chloro(1,5-cyclooctadiene)rhodium(I) dimer
	10468	Chlorotris(triphenylphosphine)rhodium(I), 97%
	A16203	Copper(II) acetate monohydrate, 98+%
	44980	Dibromo[1,1'-bis(diphenylphosphino)ferrocene]palladium(II), Pd 12.9%
	44446	Di- μ -bromobis(tri-tert-butylphosphine)dipalladium(I)
	39295	Dicarbonyl(2,4-pentanedionato)rhodium(I), 97%
	41225	Dichloro[1,1'-bis(diphenylphosphino)ferrocene]palladium(II), complex with dichloromethane (1:1), Pd 13%

	44829	Dichloro[1,1'-bis(di-tert-butylphosphino)ferrocene]palladium(II), Pd 16.3%
	30167	Dichloro[bis(1,3-diphenylphosphino)propane]nickel(II)
	44971	Dichloro[bis(1,4-diphenylphosphino)butane]palladium(II), Pd 17.6%
	44977	Dichloro[bis(diphenylphosphinophenyl)ether]palladium(II), Pd 13% min
	45511	Dichlorobis[di-tert-butyl(4-dimethylaminophenyl)phosphine]palladium(II), Pd 15%
	44844	Dichlorobis(tricyclohexylphosphine)palladium(II)
	44976	Dichlorobis(tri-o-tolylphosphine)palladium(II), 95%
	13930	Dichlorobis(triphenylphosphine)nickel(II), 98%
	38304	Palladium, 10% on activated carbon powder, standard, reduced, nominally 50% water wet
	38305	Palladium, 10% on activated carbon powder, standard, unreduced, nominally 50% water wet
	A12012	Palladium, 10% on carbon, Type 487, dry
	38300	Palladium, 5% on activated carbon paste, A102023-5
	38301	Palladium, 5% on activated carbon powder, standard, unreduced, nominally 50% water wet
	A12623	Palladium, 5% on carbon, Type 87L, dry
	44111	Palladium anchored homogeneous catalyst, FibreCat□ 1001
	44730	Palladium anchored homogeneous catalyst, FibreCat□ 1032
	10517	Palladium(II) 2,4-pentanedionate, Pd 34.7%
	10516	Palladium(II) acetate, Pd 45.9-48.4%

	11034	Palladium(II) chloride, 99.9% (metals basis), Pd 59.0% min
	11886	Sodium tetrachloropalladate(II) hydrate, 99.95% (metals basis), Pd 30%
	10548	Tetrakis(triphenylphosphine)palladium(0), 99.8% (metals basis), Pd 9% min
	10549	Tetrakis(triphenylphosphine)platinum(0), Pt 15.2% min
	10006	trans-Bis(benzonitrile)dichloropalladium(II), Pd 27.1%
	10491	trans-Dichlorobis(triphenylphosphine)palladium(II), Pd 14.0% min
	12760	Tris(dibenzylideneacetone)dipalladium(0), Pd 21.5% min

Iridium Unsupported Catalysts



It is sometimes beneficial to use a platinum group metal in an unsupported form, particularly where the support could cause side reactions or product retention by absorption. For example, a reaction may only proceed in the desired direction in the absence of support, perhaps owing to the larger crystallite size of the finely divided metal in the unsupported form.

The range of unsupported catalysts produced by Johnson Matthey includes a range of platinum oxides as well as the oxides of the other platinum group metals, and a number of metal blacks.

Precious metals and catalysts

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12071 Iridium black, 99.8% (metals basis)












43051 Iridium(IV) oxide dihydrate, Premion®, 99.99% (metals basis), Ir 73% min

Ruthenium Unsupported Catalysts



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	H26891	Bis(2-methylallyl)(1,5-cyclooctadiene)ruthenium(II)
	46803	Chloro(1,5-cyclooctadiene)(pentamethylcyclopentadienyl)ruthenium(II)
	46430	Chloro(cyclopentadienyl)bis(triphenylphosphine)ruthenium(II) ethanol adduct
	H30264	Chloro(p-cymene)-N-(p-toluenesulfonyl)-(R,R)-1,2-cyclohexanediamineruthenium(I), 97%
	45607	Dichloro(mesitylene)ruthenium(II) dimer, Ru 34.6%
	L00373	Dichlorotris(triphenylphosphine)ruthenium(II), 97%
	H35605	DPPF RuCl ₂ AMPY
	H37993	[(R,R)-TsDPEN-Ru(mesitylene)Cl]
	12354	Ruthenium black, 99.9% (metals basis)
	11804	Ruthenium(IV) oxide, anhydrous, Premion®, 99.95% (metals basis), Ru 75.2% min
	43403	Ruthenium(IV) oxide hydrate, Premion®, 99.99% (metals basis), Ru 54-60%
	11803	Ruthenium(IV) oxide hydrate, Ru 54% min
	H35726	[(S,S)-Teth-MsDPEN-RuCl], Ru 18.5%

Palladium Unsupported Catalysts




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	46747	Allyl(chloro)[1,2,3,4,5-pentaphenyl-1'-(di-tert-butylphosphino)ferrocene]palladium(II)
	46332	Allyl(chloro)[di-tert-butyl(4-dimethylaminophenyl)phosphine]palladium(II)
	46639	Chloro(crotyl)[1,2,3,4,5-pentaphenyl-1'-(di-tert-butylphosphino)ferrocene]palladium(II)
	46962	Chloro(crotyl)(tri-tert-butylphosphine)palladium(II)
	46370	Diacetato[1,3-bis(diphenylphosphino)propane]palladium(II), Pd 16.7%
	H61853	Diacetatobis(triphenylphosphine)palladium(II), Pd 14.2%
	46696	Dibromo[1,1'-bis(diisopropylphosphino)ferrocene]palladium(II)
	46669	Dibromo[1,1'-bis(di-tert-butylphosphino)ferrocene]palladium(II)
	46492	Dibromo(1,5-cyclooctadiene)palladium(II), Pd 28.4%
	46383	Dichloro[1,1'-bis(dicyclohexylphosphino)ferrocene]palladium(II), Pd 14.1%
	44978	Dichloro[1,1'-bis(diisopropylphosphino)ferrocene]palladium(II), 98%
	46503	Dichloro[1,1'-bis(diphenylphosphino)ferrocene]palladium(II), Pd 13.5-15.5%
	46588	Dichloro[2,2'-bis(diphenylphosphino)-1,1'-binaphthyl]palladium(II)
	46665	Dichloro[9,9-dimethyl-4,5-bis(diphenylphosphino)xanthene]palladium(II), Pd 12.1%

	H26897	Dichloro[bis(1,3-diphenylphosphino)propane]palladium(II)
	46872	Dichloro[bis(dicyclohexylphosphinophenyl)ether]palladium(II), 98% min
	46780	Dichloro[bis(dicyclohexylphosphino)propane]palladium(II)
	B20663	Dichlorobis(pyridine)palladium(II), 98%
	H27809	Dichloro[(R)-(+)-2,2'-bis(diphenylphosphino)-1,1'-binaphthyl]palladium(II), 99%
	H27752	Dichlorotetrakis[2-(2-pyridyl)phenyl]diiridium(III)
	11040	Palladium(II) oxide, anhydrous, 99.9% (metals basis), Pd 85% min
	11041	Palladium(II) oxide monohydrate, 99.9% (metals basis), Pd 73% min

Platinum Unsupported Catalysts









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	39280	Dichlorobis(ethylenediamine)platinum(II), Pt 50%
	12076	Platinum black
	43838	Platinum black, high surface area, HiSPEC®
	12755	Platinum black, HiSPEC® 1000
	11049	Platinum(IV) oxide hydrate, 99.9% (metals basis), Pt 71-75%
	12278	Platinum(IV) oxide monohydrate, Adams Catalyst, Pt 75% min
	41171	Platinum Ruthenium black, nominally Pt 50%, Ru 50% (Atomic wt%), HiSPEC® 6000

Rhodium Unsupported Catalysts



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The range of unsupported catalysts produced by Johnson Matthey includes a range of platinum oxides as well as the oxides of the other platinum group metals, and a number of metal blacks.



44832 Cataxa/Rh(COD)/(S,S-Dipamp)



12353 Rhodium black, 99.9% (metals basis)

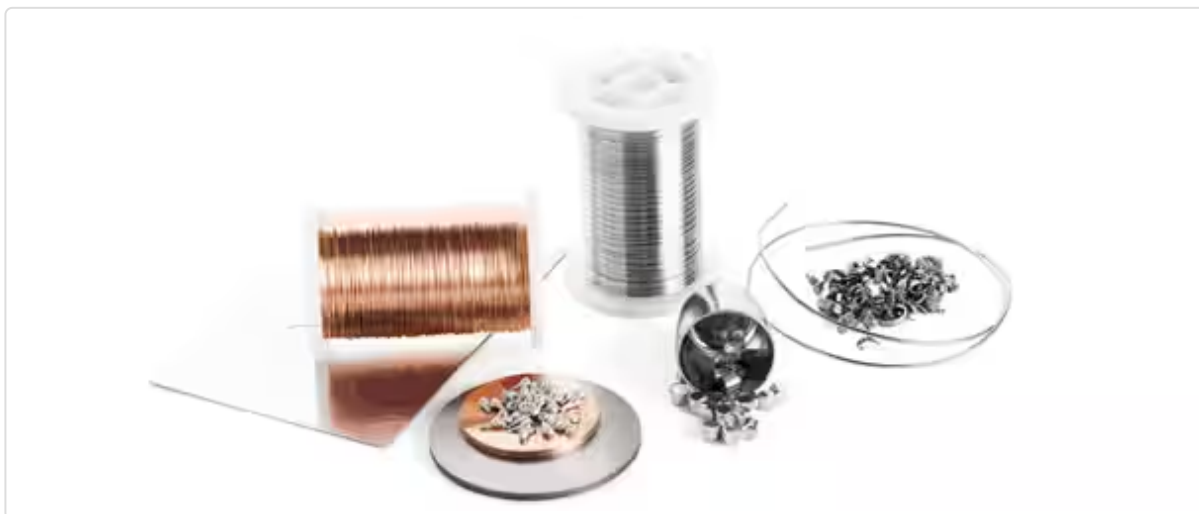


11814 Rhodium(III) oxide, anhydrous, 99.9% (metals basis), Rh 80.6% min



12667 Rhodium(III) oxide pentahydrate, Premion®, 99.99% (metals basis), Rh 59% min

Ligands

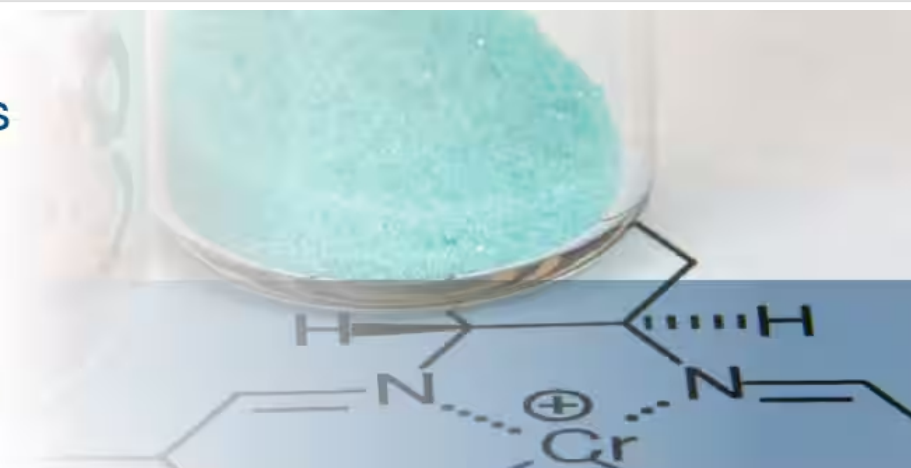


Alfa Aesar is proud to offer a whole range of the ligands most commonly used in the synthesis of organometallic catalysts and for many applications, such as:

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	H27057	1,1'-Bis(diisopropylphosphino)ferrocene, 98%
	B21166	1,1'-Bis(diphenylphosphino)ferrocene, 97%
	L19759	1,1'-Bis(di-tert-butylphosphino)ferrocene, 98%
	H60470	(-)-1,2-Bis[(2R,5R)-2,5-diethyl-1-phospholanyl]benzene, 97+%
	H60447	(+)-1,2-Bis[(2R,5R)-2,5-diethyl-1-phospholanyl]ethane, 97+%
	H60227	1,2-Bis[(2R,5R)-2,5-diisopropyl-1-phospholanyl]benzene, 97+%
	H60071	1,2-Bis[(2R,5R)-2,5-dimethyl-1-phospholanyl]ethane, 97+%
	H60046	(-)-1,2-Bis((2R,5R)-2,5-diphenylphospholano)ethane, 95%
	H60981	(+)-1,2-Bis[(2S,5S)-2,5-diethyl-1-phospholanyl]benzene, 97+%
	H60407	1,2-Bis[(2S,5S)-2,5-diisopropyl-1-phospholanyl]benzene, 97+%
	H60017	1,2-Bis[(2S,5S)-2,5-diisopropyl-1-phospholanyl]ethane, 97+%
	H60647	1,2-Bis[(2S,5S)-2,5-dimethyl-1-phospholanyl]benzene, 97+%
	H60265	1,2-Bis[(2S,5S)-2,5-dimethyl-1-phospholanyl]ethane, 97+%
	H60766	1,2-Bis[(2S,5S)-2,5-diphenyl-1-phospholanyl]ethane, 97+%
















	H27150	1,3-Bis(2,6-diisopropylphenyl)imidazolium chloride, 97%
	A12931	1,3-Bis(diphenylphosphino)propane, 97%
	H27535	1,3-Dimesitylimidazolium chloride, 95%
	B21122	1,4-Bis(diphenylphosphino)butane, 97%
	A14003	1,4-Diazabicyclo[2.2.2]octane, 98%
	H60084	(1R,2R)-(-)-2-(Diphenylphosphino)cyclohexylamine, 97+%
	H63445	(1S,2S)-N,N'-Bis[2-(diphenylphosphino)benzyl]cyclohexane-1,2-diamine, 97%
	H60423	2-[(11bR)-3H-Binaphtho[2,1-c:1',2'-e]phosphepin-4(5H)-yl]ethylamine, 97+%
	H26226	(±)-2,2'-Bis(diphenylphosphino)-1,1'-binaphthyl, 97+%
	H31306	2,2'-Bis(diphenylphosphino)biphenyl, 98%
	H27585	(±)-2,2'-Bis(di-p-tolylphosphino)-1,1'-binaphthyl, 98%
	H63980	2-[Bis(3,5-di-tert-butyl-4-methoxyphenyl)phosphino]benzaldehyde, 97%
	H27742	2-(Di-tert-butylphosphino)-2'-methylbiphenyl, 99%
	H63420	(2R,5R)-1-[2-(1,3-Dioxolan-2-yl)phenyl]-2,5-dimethylphospholane, 97%
	H60834	(2R,5R)-1-(2-[(2R,5R)-2,5-Dimethylphospholan-1-yl]phenyl)-2,5-dimethylphospholane 1-oxide, 97+%
	H27321	(2S,4S)-1-Boc-4-diphenylphosphino-2-(diphenylphosphinomethyl)pyrrolidine
	33668	(2S,4S)-(-)-2,4-Bis(diphenylphosphino)pentane, 99%
	H60788	(2S,5S)-1-(2-[(2S,5S)-2,5-Diethyl-1-phospholanyl]phenyl)-2,5-diethylphospholane 1-oxide, 97+%
	L04941	(+)-alpha-Pinene, 98%

	L18481	Bis[(2-diphenylphosphino)phenyl] ether, 98%
	44506	μ -Chloro- μ -methylenebis(cyclopentadienyl)titaniumdimethylaluminum, 0.5M in toluene
	H55020	Dichloro[bis(1,2-diphenylphosphino)ethane]cobalt(II), 97%
	13932	Dichloro[bis(1,2-diphenylphosphino)ethane]nickel(II), 98%
	L19477	Diphenylmethylphosphine, polymer-supported, 0.9-1.4 mmol/g on polystyrene
	H60401	(R)-(-)-1,1'-Bi(2-naphthol) bis(trifluoromethanesulfonate), 97%
	H60173	(R)-(+)-1-[2-(Diphenylphosphino)phenyl]ethylamine, 97+%
	44613	(R)-(+)-2,2',6,6'-Tetramethoxy-4,4'-bis(di(3,5-xylyl)phosphino)-3,3'-bipyridine
	H60112	(R)-2,2'-Bis[bis(3,5-di-tert-butyl-4-methoxyphenyl)phosphino]-4,4',6,6'-tetramethoxybiphenyl, 97+%
	H60561	(R)-2,2'-Bis[bis(3,5-trifluoromethylphenyl)phosphino]-4,4',6,6'-tetramethoxybiphenyl, 97+%
	H60684	(R)-2,2'-Bis[bis(4-methoxy-3,5-dimethylphenyl)phosphino]-4,4',6,6'-tetramethoxybiphenyl, 97+%
	H27680	(R)-(+)-2,2'-Bis(di-3,5-xylylphosphino)-1,1'-binaphthyl, 98%
	B23785	(R)-(+)-2,2'-Bis(diphenylphosphino)-1,1'-binaphthyl, 98%
	42119	(R)-(+)-2,2'-Bis(di-p-tolylphosphino)-1,1'-binaphthyl, 98%
	H31791	(R)-(+)-2,2'-Bis(methoxymethoxy)-1,1'-binaphthyl, 97%
	44620	(R)-(+)-2,2'-Bis(N-diphenylphosphinoamino)-5,5',6,6',7,7',8,8'-octahydro-1,1'-binaphthyl, CTH-(R)-BINAM, 95%
	H60508	(R)-2-Amino-1-diphenylphosphino-3,3-dimethylbutane, 97+%

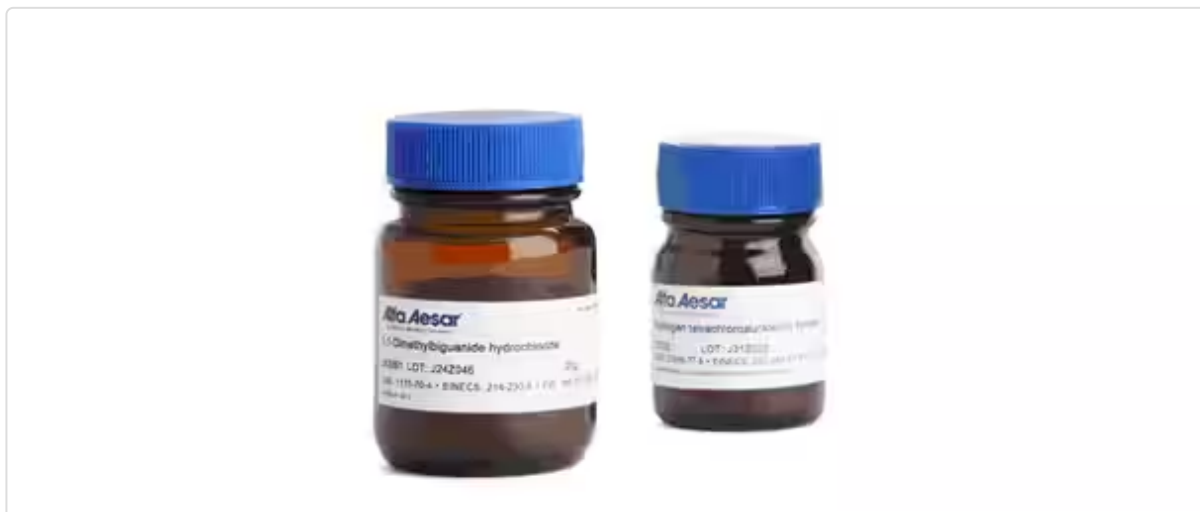
	H60004	(R)-2-Amino-1-diphenylphosphino-3-methylbutane, 97+%
	H27032	(R)-(+)-2'-Diphenylphosphino-1,1'-binaphth-2-ol, 96%
	L14582	(R)-2-Methyl-CBS-oxazaborolidine, 1M soln. in toluene
	L09230	(R)-2-Methyl-CBS-oxazaborolidine monohydrate, 94%
	H31557	(R)-3,3'-Dibromo-2,2'-bis(methoxymethoxy)-1,1'-binaphthyl, 97%
	47278	(R)-(4,4',5,5',6,6'-Hexamethoxybiphenyl-2,2'-diyl)bis(bis[3,5-dimethylphenyl]phosphine), 97%
	47207	(R)-(4,4',5,5',6,6'-Hexamethoxybiphenyl-2,2'-diyl)bis(diphenylphosphine), 97%
	H31076	(R)-4,4'-Bis(di-3,5-xylylphosphinoyl)-2,2',6,6'-tetramethoxy-3,3'-bipyridine
	H36142	(R)-(+)-5,5',6,6',7,7',8,8'-Octahydro-1,1'-bi-2-naphthol, 98%
	H60538	(R)-(-)-8-Diphenylphosphino-1,2,3,4-tetrahydro-1-naphthylamine, 97+%
	H25977	(R,R)-(+)-1,2-Bis(2,3,4,5,6-pentafluorophenyl)-1,2-ethanediamine dihydrochloride (cont. 10-20wt% mono HCl), 95%, ee 99%
	H25991	(R,R)-1,2-Bis(2,4,6-trimethoxyphenyl)-1,2-ethanediamine dihydrochloride, 95%, ee 99%
	H25988	(R,R)-1,2-Bis(2,4,6-trimethylphenyl)-1,2-ethanediamine dihydrochloride, 95%, ee 99%
	H25975	(R,R)-1,2-Bis(4-cyanophenyl)-1,2-ethanediamine dihydrochloride, 95%, ee 99%
	H25976	(R,R)-1,2-Bis(4-fluorophenyl)-1,2-ethanediamine dihydrochloride, 95%, ee 99%
	H25996	(R,R)-1,2-Bis(4-nitrophenyl)-1,2-ethanediamine dihydrochloride, 95%, ee 99%
	H25989	(R,R)-1,2-Di(1-naphthyl)-1,2-ethanediamine dihydrochloride, 95%, ee 99%
	H25974	(R,R)-1,2-Di(2-pyridyl)-1,2-ethanediamine dihydrochloride, 95%, ee 99%

	H25969	(R,R)-1,2-Di(3-pyridyl)-1,2-ethanediamine tetrahydrochloride, 95%, ee 99%
	H60639	(R,R)-(-)-2-Amino-1-phenylpropyldiphenylphosphine, 97+%
	H28374	(R,R)-DIPAMP, 90%
	H33177	(R,R)-N-(2,4,6-Triisopropylbenzenesulfonyl)-1,2-diphenylethanediamine, 98%
	H60122	(S)-(-)-1-[2-(Diphenylphosphino)phenyl]ethylamine, 97+%
	44614	(S)-(-)-2,2',6,6'-Tetramethoxy-4,4'-bis(di(3,5-xylyl)phosphino)-3,3'-bipyridine
	H60865	(S)-2,2'-Bis[bis(3,5-dimethylphenyl)phosphino]-4,4',6,6'-tetramethoxybiphenyl, 97+%
	H60315	(S)-2,2'-Bis[bis(3,5-di-tert-butyl-4-methoxyphenyl)phosphino]-4,4',6,6'-tetramethoxybiphenyl, 97+%
	H60604	(S)-2,2'-Bis[bis(3,5-trifluoromethylphenyl)phosphino]-4,4',6,6'-tetramethoxybiphenyl, 97+%
	H60832	(S)-2,2'-Bis[bis(4-methoxy-3,5-dimethylphenyl)phosphino]-4,4',6,6'-tetramethoxybiphenyl, 97+%
	H26970	(S)-(-)-2,2'-Bis(di-3,5-xylylphosphino)-1,1'-binaphthyl, 98%
	B23872	(S)-(-)-2,2'-Bis(diphenylphosphino)-1,1'-binaphthyl, 97%
	42120	(S)-(-)-2,2'-Bis(di-p-tolylphosphino)-1,1'-binaphthyl, 98%
	H60921	(S)-2,2'-Bis(di-p-tolylphosphino)-4,4',6,6'-tetramethoxybiphenyl, 97+%
	H32889	(S)-(-)-2,2'-Bis(methoxymethoxy)-1,1'-binaphthyl, 97%
	44619	(S)-(-)-2,2'-Bis(N-diphenylphosphinoamino)-5,5',6,6',7,7',8,8'-octahydro-1,1'-binaphthyl, CTH-(S)-BINAM, 95%
	H60980	(S)-2-Amino-1-diphenylphosphino-3-methylbutane, 97+%
	H60404	(S)-2-Diphenylphosphino-1-phenylethylamine, 97+%

	L14583	(S)-2-Methyl-CBS-oxazaborolidine, 1M soln. in toluene
	L09219	(S)-2-Methyl-CBS-oxazaborolidine monohydrate, 94%
	H31783	(S)-3,3'-Dibromo-2,2'-bis(methoxymethoxy)-1,1'-binaphthyl, 97%
	47218	(S)-(4,4',5,5',6,6'-Hexamethoxybiphenyl-2,2'-diyl)bis(bis[3,5-dimethylphenyl]phosphine), 97%
	47270	(S)-(4,4',5,5',6,6'-Hexamethoxybiphenyl-2,2'-diyl)bis(diphenylphosphine), 97%
	H31485	(S)-4,4'-Bis(di-3,5-xylylphosphinoyl)-2,2',6,6'-tetramethoxy-3,3'-bipyridine
	H37716	(S)-(-)-5,5',6,6',7,7',8,8'-Octahydro-1,1'-bi-2-naphthol, 98%, 99+% ee
	L19414	(S)-(-)-N-Methoxymethyl-N-(trimethylsilyl)methyl-1-phenylethylamine, tech. 85%
	H25981	(S,S)-(-)-1,2-Bis(2,3,4,5,6-pentafluorophenyl)-1,2-ethanediamine dihydrochloride, 95%, ee 99%
	H25995	(S,S)-1,2-Bis(2,4,6-trimethoxyphenyl)-1,2-ethanediamine dihydrochloride, 95%, ee 99%
	H25992	(S,S)-1,2-Bis(2,4,6-trimethylphenyl)-1,2-ethanediamine dihydrochloride, 95%, ee 99%
	H25986	(S,S)-1,2-Bis(4-acetamidophenyl)-1,2-ethanediamine dihydrochloride, 95%, ee 99%
	H25970	(S,S)-1,2-Bis(4-nitrophenyl)-1,2-ethanediamine dihydrochloride, 95%, ee 99%
	H25978	(S,S)-1,2-Di(2-pyridyl)-1,2-ethanediamine dihydrochloride, 95%, ee 99%

	H25973	(S,S)-1,2-Di(3-pyridyl)-1,2-ethanediamine tetrahydrochloride, 95%, ee 99%
	H60331	(S,S)-(+)-2-Amino-1-phenylpropyldiphenylphosphine, 97+%
	H28037	(S,S)-DIPAMP, 97%
	H33303	(S,S)-N-(2,4,6-Triisopropylbenzenesulfonyl)-1,2-diphenylethanediamine, 98%
	L13329	Tri(2-furyl)phosphine, 97%
	30386	Tricyclohexylphosphine, 96%
	41952	Tricyclohexylphosphine, 98%
	H27428	Tricyclohexylphosphonium tetrafluoroborate, 99%
	A12093	Tri(o-tolyl)phosphine, 98+%
	L03616	Triphenylarsine, 97%
	A14089	Triphenylphosphine, flake, 99%
	L19478	Triphenylphosphine, polymer-supported, 1.4-2.0 mmol/g on polystyrene
	L02502	Triphenylphosphine, powder, 99%
	10178	Tri-tert-butylphosphine, 98%
	L19752	Tri-tert-butylphosphonium tetrafluoroborate, 97%

Gold Precious Metal Compounds



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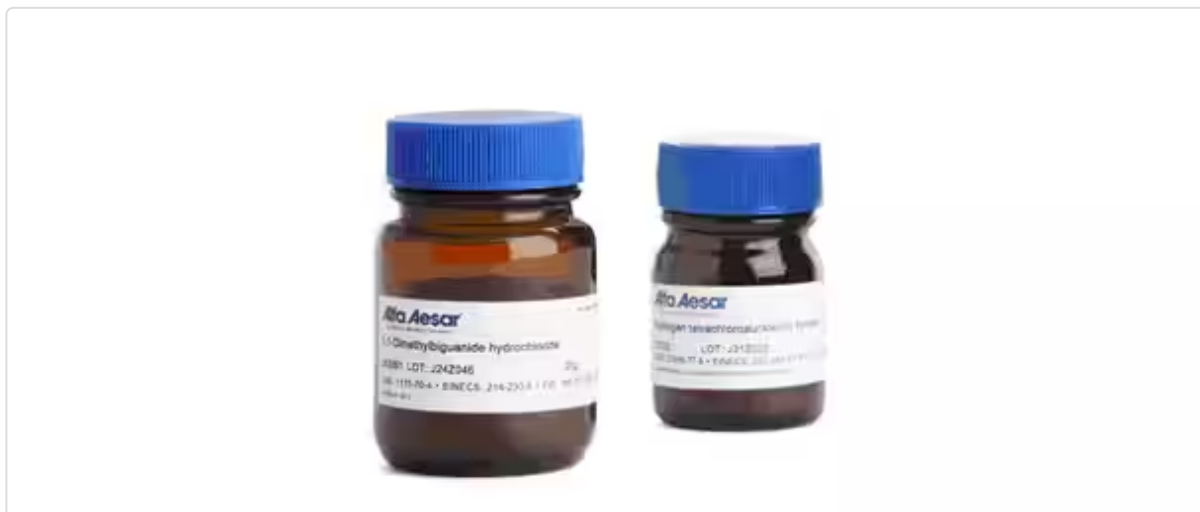
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	40434	Ammonium tetrachloroaurate(III) hydrate, Premion®, 99.99% (metals basis)
	41002	Bromo(triphenylphosphine)gold(I), Premion®, 99.99% (metals basis)
	41007	Chloro(triphenylphosphine)gold(I), Premion®, 99.99% (metals basis), Au 39.3% min
	43365	Gold(I) chloride, 99.9% (metals basis)
	40432	Gold(I) chloride, Premion®, 99.99% (metals basis), Au 84.2% min
	39742	Gold(III) acetate, 99.9% (metals basis)
	12162	Gold(III) bromide, Premion®, 99.99% (metals basis), Au 44.6% min
	12163	Gold(III) chloride, Au 64.4% min

	43360	Gold(III) chloride, Premion®, 99.99% (metals basis), Au 64.4% min
	12159	Gold(III) hydroxide, Au 79% min
	12161	Gold(III) oxide, Premion®, 99.99% (metals basis), Au 88.6% min
	16617	Gold(I) iodide, 99%
	12552	Gold(I) potassium cyanide, Premion®, 99.96% (metals basis), Au 67.6% min
	39741	Gold(I) sodium thiosulfate hydrate, 99.9% (metals basis)
	40433	Hydrogen tetrabromoaurate(III) hydrate, Premion®, 99.99% (metals basis), Au 32% min
	12325	Hydrogen tetrachloroaurate(III) hydrate, 99.9% (metals basis), Au 49% min
	42803	Hydrogen tetrachloroaurate(III) hydrate, Premion®, 99.995% (metals basis), Au 49% min
	44744	Hydrogen tetrachloroaurate(III), solution, Au 40-44% w/w (cont. Au)
	36400	Hydrogen tetrachloroaurate(III) trihydrate, ACS, 99.99% (metals basis), Au 49.0% min
	40431	Hydrogen tetranitratoaurate(III) hydrate, Premion®, 99.99% (metals basis), Au 38.9-40.1%
	40429	Lithium tetrachloroaurate(III) hydrate, Premion®, 99.99% (metals basis)
	12664	Potassium tetrabromoaurate(III) dihydrate, Premion®, 99.99% (metals basis), Au 33% min
	12150	Potassium tetrachloroaurate(III) hydrate, Premion®, 99.99% (metals basis), Au 49% min
	39740	Sodium aurothiomalate(I), 99.9% (metals basis)
	40428	Sodium tetrabromoaurate(III) hydrate, Premion®, 99.99% (metals basis)
	12148	Sodium tetrachloroaurate(III) dihydrate, Premion®, 99.99% (metals basis), Au 49-50%

Platinum Precious Metal Compounds



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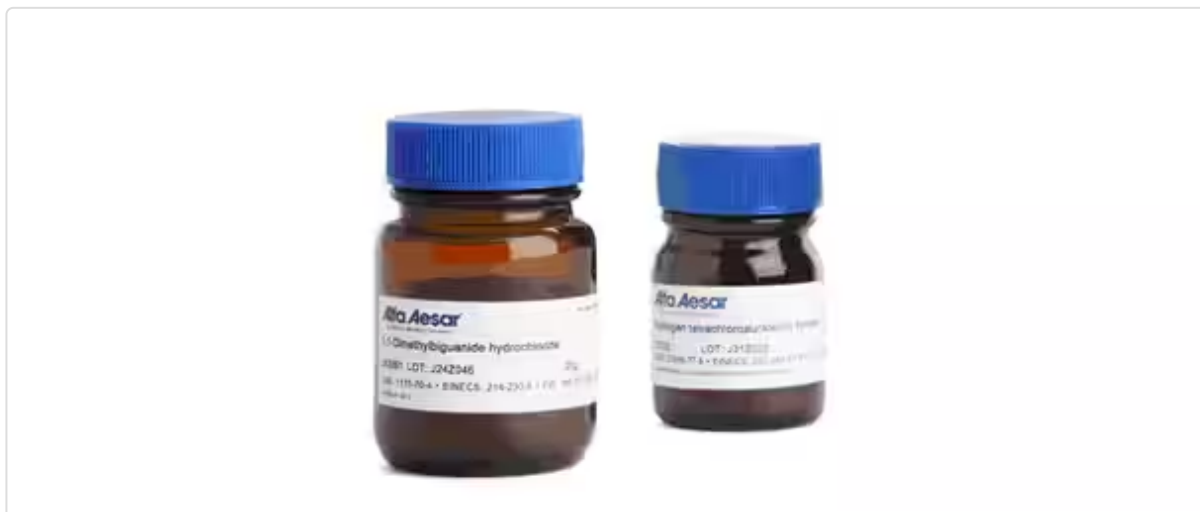


	44041	(1,5-Cyclooctadiene)diiodoplatinum(II)
	12619	Ammonium hexabromoplatinate(IV), 99.9% (metals basis), Pt 28%
	12882	Ammonium hexachloroplatinate(IV), Pt 43.4% min
	11046	Ammonium tetrachloroplatinate(II), 99.9% (metals basis), Pt 51% min
	39463	Barium tetracyanoplatinate(II) tetrahydrate, 99+%
	10004	Bis(benzonitrile)dichloroplatinum(II), Pt 40% min
	10471	cis-Diamminedichloroplatinum(II), Pt 64.5% min
	10482	cis-Dichlorobis(diethylsulfide)platinum(II), Pt 43.0% min
	39284	cis-Dichlorobis(triethylphosphine)platinum(II)
	41008	cis-Dichlorobis(triphenylphosphine)platinum(II), Premion®, 99.95% (metals basis), Pt 24.2% min
	10492	cis-Dichlorobis(triphenylphosphine)platinum(II), Pt 24.2% min
	39282	Dibromo(1,5-cyclooctadiene)platinum(II), Pt 41.6% min
	12739	Dichloro(1,5-cyclooctadiene)platinum(II), Pt 51.6-52.6%

	39285	Di- μ -chlorodichlorobis(ethylene)diplatinum(II), 97%
	10497	Dichloro(ethylenediamine)platinum(II), Pt 59.7% min
	12627	Dihydrogen dinitrosulfatoplatinate(II) solution, Pt 4-6% (cont. Pt)
	12617	Dihydrogen hexabromoplatinate(IV) nonahydrate, 99.9% (metals basis), Pt 23.7% min
	36259	Dihydrogen hexachloroplatinate(IV) hexahydrate, ACS, Premion®, 99.95% (metals basis), Pt 37.5% min
	42815	Dihydrogen hexachloroplatinate(IV) hexahydrate, low nitrate, Premion®, 99.95% (metals basis), Pt 37.5% min
	11051	Dihydrogen hexachloroplatinate(IV) hydrate, 99.9% (metals basis)
	43696	Dihydrogen hexachloroplatinate(IV) hydrate, Premion®, 99.999% (metals basis)
	40177	Dihydrogen hexachloroplatinate(IV) solution, Pt 20% (cont. Pt)
	11052	Dihydrogen hexahydroxyplatinate(IV), 99.9% (metals basis), Pt 61.0% min
	44039	Diphenyl(1,5-cyclooctadiene)platinum(II)
	39286	Iodotrimethylplatinum(IV)
	41508	Platinum (0)-1,3-divinyl-1,1,3,3-tetramethyldisiloxane complex, soln. in vinyl terminated polydimethylsiloxane
	10526	Platinum(II) 2,4-pentanedionate, Pt 48.0% min
	12172	Platinum(II) bromide, 99.9% (metals basis), Pt 54.5% min
	11044	Platinum(II) chloride, 99.9% (metals basis), Pt 73% min
	43090	Platinum(II) chloride, Premion®, 99.99+% (metals basis), Pt 73% min
	12170	Platinum(II) iodide, Premion®, 99.99% (metals basis), Pt 43.0% min

	12171	Platinum(IV) bromide, 99.99% (metals basis), Pt 37.1% min
	11045	Platinum(IV) chloride, 99.9% (metals basis), Pt 57% min
	44503	Platinum(IV) chloride, Premion®, 99.99+% (metals basis), Pt 57% min
	43703	Platinum(IV) chloride, Premion®, 99.99+% (metals basis), Pt 57% min
	40401	Platinum(IV) iodide, Premion®, 99.95% (metals basis), Pt 27.3% min
	40402	Platinum(IV) oxide, anhydrous, Premion®, 99.95% (metals basis), Pt 84.4% min
	11049	Platinum(IV) oxide hydrate, 99.9% (metals basis), Pt 71-75%
	12278	Platinum(IV) oxide monohydrate, Adams Catalyst, Pt 75% min
	13992	Platinum(IV) sulfide, Pt 74.8% min
	12169	Potassium hexachloroplatinate(IV), Pt 39.6%
	12678	Potassium hexacyanoplatinate(IV)
	41014	Potassium hexahydroxyplatinate(IV), Premion®, 99.95% (metals basis), Pt 51.5% min
	12642	Potassium hexaiodoplatinate(IV), Pt 18.2% min
	11048	Potassium tetrachloroplatinate(II), 99.9% (metals basis), Pt 46.0% min
	43946	Potassium tetrachloroplatinate(II), Premion®, 99.99% (metals basis), Pt 46.4% min
	10536	Potassium tetracyanoplatinate(II) trihydrate, 99.9% (metals basis), Pt 44.9% min
	10538	Potassium tetranitroplatinate(II), Pt 42.6% min
	39433	Potassium trichloroammineplatinate(II)

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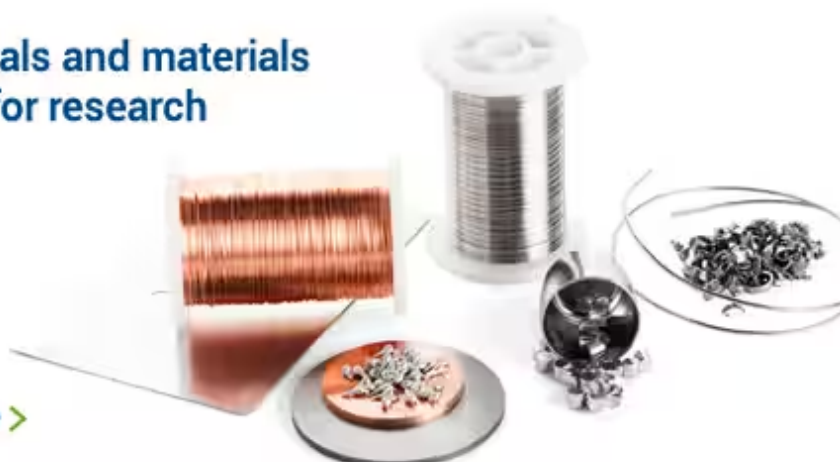
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	88966	Sodium hexabromoplatinate(IV) hexahydrate
	11047	Sodium hexachloroplatinate(IV) hexahydrate
	12620	Sodium hexahydroxyplatinate(IV), 99.9% (metals basis)
	44043	Sodium hexahydroxyplatinate(IV) solution, Pt 7-10% w/v (cont. Pt)
	12168	Sodium tetrachloroplatinate(II) hydrate, Premion®, 99.95% (metals basis), Pt 42.4% min
	40400	Sodium tetracyanoplatinate(II) hydrate, Premion®, 99.95% (metals basis), Pt 48.4% min
	10544	Tetraammineplatinum(II) chloride monohydrate
	10836	Tetraammineplatinum(II) chloride monohydrate, Premion®, 99.995% (metals basis)
	44045	Tetraammineplatinum(II) chloride solution, Pt 9-11% w/w (cont. Pt)
	44042	Tetraammineplatinum(II) hydrogen carbonate
	44076	Tetraammineplatinum(II) hydrogen phosphate solution, Pt 0.5% w/w (cont. Pt)
	44047	Tetraammineplatinum(II) hydrogen phosphate solution, Pt 2% w/w (cont. Pt)
	42918	Tetraammineplatinum(II) hydroxide solution, Pt 8-11% w/w (cont. Pt)

 88960	Tetraammineplatinum(II) nitrate
 12167	Tetraammineplatinum(II) nitrate solution, Pt 3-4% w/w (cont. Pt)
 39444	Tetraammineplatinum(II) tetrachloroplatinate(II)
 10549	Tetrakis(triphenylphosphine)platinum(0), Pt 15.2% min
 10472	trans-Diamminedichloroplatinum(II), Pt 64.5% min
 10484	trans-Dichlorobis(diethylsulfide)platinum(II), Pt 43.7%
 98158	Trimethyl(methylcyclopentadienyl)platinum(IV)

Iridium Precious Metal Compounds



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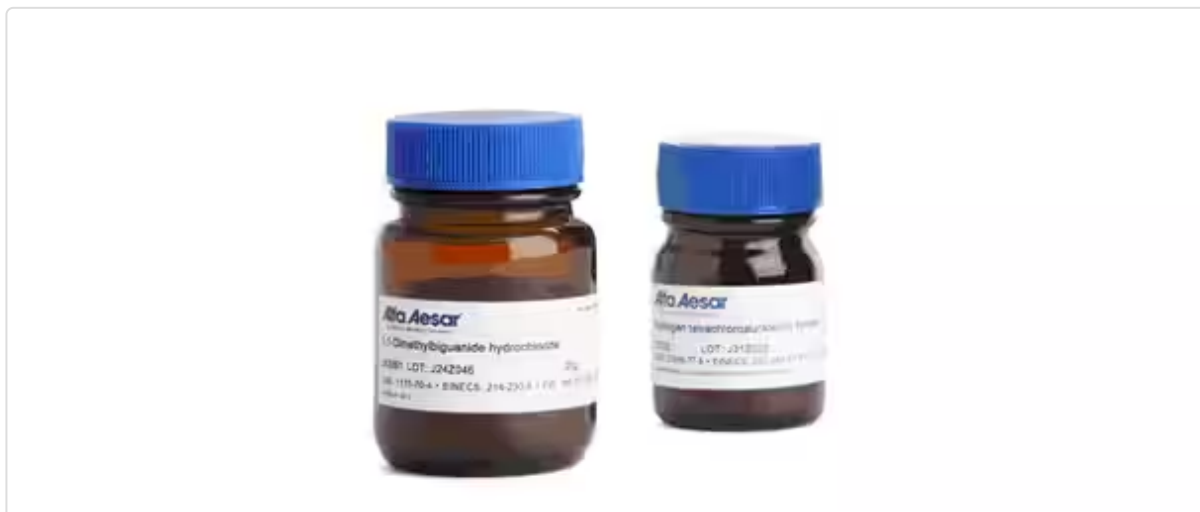


	18809	1,5-Cyclooctadienebis(methyldiphenylphosphine)iridium(I) hexafluorophosphate
	42057	1,5-Cyclooctadiene(pyridine)(tricyclohexylphosphine)iridium(I) hexafluorophosphate, 99%
	12632	Ammonium hexachloroiridate(III) hydrate
	10713	Ammonium hexachloroiridate(III) hydrate, Premion®, 99.99% (metals basis)
	12326	Ammonium hexachloroiridate(IV), 99% (metals basis), Ir 43% min
	10712	Ammonium hexachloroiridate(IV), Premion®, 99.994% (metals basis), Ir 41% min
	H66412	Bis(acetonitrile)(1,5-cyclooctadiene)iridium(I) tetrafluoroborate, 97+%
	39413	Carbonylchlorobis(triphenylphosphine)iridium(I)

	41005	Carbonylhydridotris(triphenylphosphine)iridium(I), Ir 18.6% min
	12749	Chloro(1,5-cyclooctadiene)iridium(I) dimer, Ir 57.2%
	44966	Chlorobis(cyclooctene)iridium(I) dimer, Ir nominally 42.9%
	41006	Chloropentaammineiridium(III) chloride, 99.9% (metals basis), Ir 49.6% min
	39411	Dicarbonyl(2,4-pentanedionato)iridium(I)
	45565	Dichloro(pentamethylcyclopentadienyl)iridium(III) dimer
	41009	Dihydrogen hexabromoiridate(IV) hexahydrate, 99.9% (metals basis), Ir 24.1% min
	11031	Dihydrogen hexachloroiridate(IV) hydrate, 99% (metals basis), Ir 38-42%
	10514	Iridium(III) 2,4-pentanedionate, Ir 37.5% min
	12212	Iridium(III) bromide hydrate, Ir 35.9% min
	12158	Iridium(III) chloride, anhydrous, Ir 62% min
	43380	Iridium(III) chloride, anhydrous, Premion®, 99.99% (metals basis), Ir 63.9% min
	11030	Iridium(III) chloride hydrate, 99.8% (metals basis)
	39493	Iridium(IV) bromide, Premion®, 99.99% (metals basis), Ir 37.1% min
	12184	Iridium(IV) chloride, 99.95% (metals basis), Ir 56.5 min
	40424	Iridium(IV) iodide, Premion®, 99.95% (metals basis), Ir 27.0% min
	43051	Iridium(IV) oxide dihydrate, Premion®, 99.99% (metals basis), Ir 73% min
	43396	Iridium(IV) oxide, Premion®, 99.99% (metals basis), Ir 84.5% min
	44967	Methoxy(cyclooctadiene)iridium(I) dimer, Ir nominally 58%

	41012	Potassium hexabromoiridate(IV), 99.9% (metals basis), Ir 25.2% min
	12651	Potassium hexabromoiridate(IV), Ir 25.4% min
	11887	Potassium hexachloroiridate(III) hydrate, Ir 32.8% min
	11888	Potassium hexachloroiridate(IV), Ir 39% min
	10528	Potassium hexanitroiridate(III), Ir 32.3% min
	12649	Sodium hexabromoiridate(IV), Ir 24.1% min
	11889	Sodium hexachloroiridate(III) hydrate, Ir 31.5% min
	11890	Sodium hexachloroiridate(IV) hexahydrate, Ir 33.9% min

Rhodium Precious Metal Compounds



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12645 Ammonium aquopentachlororhodate(III), Rh 30% min



10849 Ammonium hexachlororhodate(III) hydrate, Premion®, 99.995% (metals basis)



11812 Ammonium hexachlororhodate(III) hydrate, Premion®, 99.99% (metals basis)



44031 Bis(1,5-cyclooctadiene)rhodium(I) tetrafluoroborate



39289 Bis(1,5-cyclooctadiene)rhodium(I) trifluoromethanesulfonate




















H66191 Bis(acetonitrile)(1,5-cyclooctadiene)rhodium(I) tetrafluoroborate, 97+%

















39288 Bis(ethylene)(2,4-pentanedionato)rhodium(I), Rh 39.9% min



44036 Bis(norbornadiene)rhodium(I) tetrafluoroborate

	39821	Bromotris(triphenylphosphine)rhodium(I), 99.95% (metals basis), Rh 10.1% min
	10458	Carbonyl-2,4-pentanedionato(triphenylphosphine)rhodium(I), Rh 20%
	41004	Carbonylbromobis(triphenylphosphine)rhodium(I), Premion®, 99.95% (metals basis), Rh 13.5% min
	39822	Carbonylchlorobis(triphenylphosphine)rhodium(I), Rh 14.9% min
	10016	Carbonylhydridotris(triphenylphosphine)rhodium(I), Rh 10.0% min
	10466	Chloro(1,5-cyclooctadiene)rhodium(I) dimer
	39291	Chlorobis(ethylene)rhodium(I) dimer, 99%
	10519	Chloropentaamminerhodium(III) chloride, Rh 34.5% min
	10468	Chlorotris(triphenylphosphine)rhodium(I), 97%
	39295	Dicarbonyl(2,4-pentanedionato)rhodium(I), 97%
	10467	Di- μ -chlorobis(norbornadiene)dirhodium(I), Rh 44% min
	33657	Dichloro(pentamethylcyclopentadienyl)rhodium(III) dimer, 99%
	44030	Hydridotetrakis(triphenylphosphine)rhodium(I), Rh 8.9% min
	41013	Potassium hexachlororhodate(III), Premion®, 99.99% (metals basis), Rh 23.3% min
	40409	Potassium pentachlororhodate(III), Premion®, 99.99% (metals basis), Rh 28.2% min
	L15152	Rhodium(II) acetate, dimer, 98+%
	10560	Rhodium(II) acetate, dimer, Premion®, 99.99% (metals basis), Rh 46.2% min
	10561	Rhodium(III) 2,4-pentanedionate, Premion®, 99.99% (metals basis), Rh 25.2% min
	11816	Rhodium(III) bromide hydrate

	11815	Rhodium(III) chloride, anhydrous, 99.9% (metals basis), Rh 48.7% min
	43702	Rhodium(III) chloride hydrate, Premion®, 99.99% (metals basis)
	11032	Rhodium(III) chloride hydrate, Rh 38.0-45.5%
	11029	Rhodium(III) iodide, 99.9% (metals basis), Rh 20.8% min
	12633	Rhodium(III) nitrate solution, Rh 10-15% w/w (cont. Rh)
	11814	Rhodium(III) oxide, anhydrous, 99.9% (metals basis), Rh 80.6% min
	12667	Rhodium(III) oxide pentahydrate, Premion®, 99.99% (metals basis), Rh 59% min
	12635	Rhodium(III) sulfate, bright plating solution, Rh 5% (cont. Rh)
	41016	Rhodium(III) sulfate tetrahydrate, Premion®, 99.99% (metals basis), Rh 35.9% min
	39825	Rhodium(II) octanoate dimer
	40408	Sodium hexabromorhodate(III) hydrate, Premion®, 99.99% (metals basis), Rh 11.4% min
	11809	Sodium hexachlororhodate(III) dodecahydrate, Rh 17.1%
	10547	Tetracarbonyldi- μ -chlorodirhodium(I), Rh 50.1-52.9%
	10553	Tris(ethylenediamine)rhodium(III) chloride trihydrate, Rh 23.2%

Osmium Precious Metal Compounds



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Although platinum group metals are more expensive in initial cost than base metal catalysts, they often prove to be more reactive and selective, and require less severe reaction conditions. In addition, the spent catalyst can be recovered and the precious metal reprocessed into fresh catalyst.

Johnson Matthey has served the platinum group metals industry for over 200 years. With our considerable experience and expertise in the manufacture of catalysts and in catalyst technology, we welcome the opportunity to help develop new catalysts to meet your unique requirements and improve your processing.

Homogenous Catalysts

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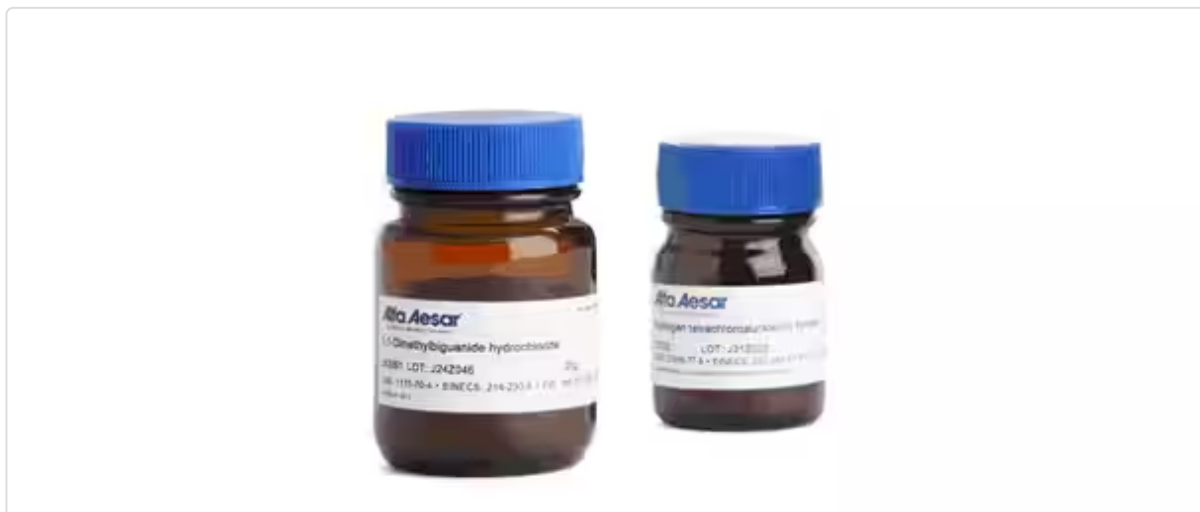
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	12648	Ammonium hexabromoosmate(IV), 99.9% (metals basis), Os 26.5 % min
	42874	Ammonium hexachloroosmate(IV), 99.9% (metals basis), Os 42.5% min
	10823	Ammonium hexachloroosmate(IV), Premion®, 99.99% (metals basis), Os 42.8% min
	39235	Bis(cyclopentadienyl)osmium
	42527	Dihydrogen hexabromoosmate(IV) hydrate, 99.9% (metals basis)
	12178	Dihydrogen hexachloroosmate(IV) hydrate, Premion®, 99.95% (metals basis), Os 37% min
	13038	Dodecacarbonyltri-osmium, 99%
	33480	Osmium(III) chloride trihydrate, Premion®, 99.99% (metals basis), Os 52-56%

	39497	Osmium(IV) oxide, Os 83% min
	45384	Osmium(VIII) oxide, 2% aq. soln.
	45385	Osmium(VIII) oxide, 4% aq. soln.
	12103	Osmium(VIII) oxide, 99.8% (metals basis), Os 74.4% min
	12177	Potassium hexachloroosmate(IV), Os 38.7% min
	12647	Potassium osmium(VI) oxide dihydrate, 98+%
	40412	Sodium hexabromoosmate(IV), Premion®, 99.95% (metals basis), Os 26.1% min
	12176	Sodium hexachloroosmate(IV) dihydrate, Os 38.7% min

Ruthenium Precious Metal Compounds



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11874 Ammonium hexachlororuthenate(IV), Ru 28.4% min



12781 Bis(cyclopentadienyl)ruthenium, Ru 43.2% min



40524 Carbonyldihydridotris(triphenylphosphine)ruthenium(II), 99%



10520 Chloropentaammineruthenium(III) chloride, Ru 33.5% min



12778 cis-Bis(2,2'-bipyridine)dichlororuthenium(II) dihydrate, Ru 19% min














10494 Dichloro(1,5-cyclooctadiene)ruthenium(II), polymer

















L19126 Dichloro(p-cymene)ruthenium(II) dimer, 98%



10504 Dichlorotris(triphenylphosphine)ruthenium(II), Premion®, 99.95% (metals basis), Ru 10.2% min

	46886	Diiodo(p-cymene)ruthenium(II) dimer
	10507	Dodecacarbonyltriruthenium, 99%
	10511	Hexaammineruthenium(III) chloride, Ru 32.1% min
	41716	Potassium aquapentachlororuthenate(III), Premion®, 99.99% (metals basis), Ru 26.4% min
	44547	Potassium hexachlororuthenate(III), Premion®, 99.99% (metals basis), Ru 23% min
	40399	Potassium hexachlororuthenate(IV), Premion®, 99.95% (metal basis), Ru 25.3% min
	11876	Potassium hexacyanoruthenate(II) hydrate, Ru 23.0% min
	10534	Potassium pentachloronitrosylruthenate(II), Ru 25.8%
	12173	Potassium pentachlororuthenate(III) hydrate, 99.95% (metals basis), Ru 25.4% min
	11877	Potassium perruthenate(VII), 97%
	10568	Ruthenium(III) 2,4-pentanedionate, Ru 24% min
	12628	Ruthenium(III) bromide hydrate, Ru 25% min
	11807	Ruthenium(III) bromide, Ru 29% min
	11043	Ruthenium(III) chloride hydrate, 99.9% (PGM basis), Ru 38% min
	43364	Ruthenium(III) chloride hydrate, Premion®, 99.99% (metals basis)
	11806	Ruthenium(III) chloride oxide, ammoniated
	11805	Ruthenium(III) iodide, anhydrous, Ru 20.5% min
	43435	Ruthenium(III) nitrosylacetate, Premion®, 99.99% (metals basis)
	43089	Ruthenium(III) nitrosylchloride hydrate

	16622	Ruthenium(III) nitrosylchloride, Ru 42.1% min
	12175	Ruthenium(III) nitrosylnitrate, Ru 31.3% min
	12630	Ruthenium(III) nitrosylnitrate solution, Ru 1.5% w/v
	43436	Ruthenium(III) nitrosylsulfate, Premion®, 99.99% (metals basis)
	11804	Ruthenium(IV) oxide, anhydrous, Premion®, 99.95% (metals basis), Ru 75.2% min
	40336	Ruthenium(IV) oxide, Electronic Grade, Premion®, 99.95% (metals basis), Ru typically 74%
	43403	Ruthenium(IV) oxide hydrate, Premion®, 99.99% (metals basis), Ru 54-60%
	11803	Ruthenium(IV) oxide hydrate, Ru 54% min
	43098	Ruthenium(IV) sulfide, 99.9% (metals basis)
	B24511	Tetra-n-propylammonium perruthenate(VII), 98%
	10503	Tricarbonyldichlororuthenium(II) dimer
	44006	Tris(2,2,6,6-tetramethyl-3,5-heptanedionato)ruthenium(III), 99%
	12783	Tris(2,2'-bipyridine)dichlororuthenium(II) hexahydrate, 98+%
	47214	Tris(acetonitrile)cyclopentadienylruthenium(II) hexafluorophosphate

Palladium Precious Metal Compounds



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10005 Allylpalladium(II) chloride dimer, Pd 56.0% min



44046 Allylpalladium(II) trifluoroacetate, dimer



43475 Ammonium bis(oxalato)palladium(II) dihydrate, Premion®, 99.99% (metals basis)



11042 Ammonium hexachloropalladate(IV), 99.9% (metals basis), Pd 29%



11882 Ammonium tetrachloropalladate(II), Pd 36% min















10824 Ammonium tetrachloropalladate(II), Premion®, 99.998% (metals basis), Pd 37%








































39233 Bis[1,2-bis(diphenylphosphino)ethane]palladium(0)















10002 Bis(acetonitrile)dichloropalladium(II), Pd 40.5%

	12764	Bis(dibenzylideneacetone)palladium(0)
	46000	Bis[di-tert-butyl(4-dimethylaminophenyl)phosphine]palladium(0), Pd 16.7%
	45853	Bis(di-tert-butyl-phenylphosphine)palladium(0), 98%
	45792	Bis(tricyclohexylphosphine)palladium(0), 97% min
	45814	Bis(tri-o-tolylphosphine)palladium(0), Pd 14.9%
	44845	Bis(tri-tert-butylphosphine)palladium(0)
	47250	BrettPhos Palladacycle 3rd Generation, 98%
	11038	Diamminepalladium(II) nitrite solution, Pd 8-10% w/w (cont. Pd)
	44980	Dibromo[1,1'-bis(diphenylphosphino)ferrocene]palladium(II), Pd 12.9%
	44446	Di- μ -bromobis(tri-tert-butylphosphine)dipalladium(I)
	41225	Dichloro[1,1'-bis(diphenylphosphino)ferrocene]palladium(II), complex with dichloromethane (1:1), Pd 13%
	44829	Dichloro[1,1'-bis(di-tert-butylphosphino)ferrocene]palladium(II), Pd 16.3%
	10493	Dichloro(1,5-cyclooctadiene)palladium(II), Pd 36.7%
	44971	Dichloro[bis(1,4-diphenylphosphino)butane]palladium(II), Pd 17.6%
	44977	Dichloro[bis(diphenylphosphinophenyl)ether]palladium(II), Pd 13% min
	45511	Dichlorobis[di-tert-butyl(4-dimethylaminophenyl)phosphine]palladium(II), Pd 15%
	45453	Dichlorobis(di-tert-butylphenylphosphine)palladium(II), Pd 17.1%
	44844	Dichlorobis(tricyclohexylphosphine)palladium(II)
	44976	Dichlorobis(tri-o-tolylphosphine)palladium(II), 95%

	10496	Dichloro(ethylenediamine)palladium(II), Pd 44.8%
	17316	Lithium tetrachloropalladate(II)
	39496	Palladium hydroxide, 99%
	42578	Palladium hydroxide, Pd 20% on carbon, nominally 50% water, Pearlman's Catalyst
	45576	Palladium hydroxide, Pd 5% on carbon powder, Type A403002-5, nominally 50% water
	10517	Palladium(II) 2,4-pentanedionate, Pd 34.7%
	10516	Palladium(II) acetate, Pd 45.9-48.4%
	43086	Palladium(II) acetate, trimer, 99.98% (metals basis), Pd 47% min
	43697	Palladium(II) bromide, Premion®, 99.998% (metals basis), Pd 39.5% min
	11878	Palladium(II) bromide, Premion®, 99.99% (metals basis), Pd 39.5% min
	11034	Palladium(II) chloride, 99.9% (metals basis), Pd 59.0% min
	43085	Palladium(II) chloride, Premion®, 99.999% (metals basis), Pd 59.5% min
	40019	Palladium(II) chloride, solution, Pd 20-25% w/w (cont. Pd)
	12623	Palladium(II) chloride, solution, Pd 9.0-11.0% w/w (cont. Pd)
	11881	Palladium(II) iodide, 99.9% (metals basis), Pd 28% min
	43084	Palladium(II) iodide, Premion®, 99.998% (metals basis), Pd 29% min
	11035	Palladium(II) nitrate hydrate, 99.8% (metals basis), Pd 39% min
	12621	Palladium(II) nitrate, solution, Pd 10% w/w (cont. Pd)
	41647	Palladium(II) nitrate, solution, Pd 12-16% w/w (cont. Pd)

	12165	Palladium(II) sulfate dihydrate, Premion®, 99.95% (metals basis), Pd 44.1% min
	43698	Palladium(II) sulfate dihydrate, Premion®, 99.995% (metals basis)
	12622	Palladium(II) sulfate, solution, Pd 6% w/w (cont. Pd)
	12674	Palladium(II) sulfide, 99% (metals basis), Pd 72% min
	39448	Palladium(II) trifluoroacetate, 97%
	12629	Potassium dinitrosulfatopalladate(II), solution, Pd 5% (cont. Pd)
	43947	Potassium hexabromopalladate(IV), Premion®, 99.999% (metals basis), Pd 15.5% min
	11884	Potassium hexachloropalladate(IV), Pd 26.3% min
	11883	Potassium tetrabromopalladate(II), Pd 20.0%
	11885	Potassium tetrachloropalladate(II), Premion®, 99.99% (metals basis), Pd 32.2% min
	10535	Potassium tetracyanopalladate(II) hydrate
	10537	Potassium tetranitropalladate(II), Pd 28.3% min
	11039	Sodium hexachloropalladate(IV) hydrate, 99.9% (metals basis)
	40407	Sodium tetrabromopalladate(II), Premion®, 99.95% (metals basis), Pd 22.0% min
	11886	Sodium tetrachloropalladate(II) hydrate, 99.95% (metals basis), Pd 30%
	43945	Sodium tetrachloropalladate(II) hydrate, Premion®, 99.999% (metals basis), Pd 30% min
	41021	Tetraamminepalladium(II) bromide, Premion®, 99.95% (metals basis), Pd 31.3% min
	11036	Tetraamminepalladium(II) chloride monohydrate, 99.9% (metals basis), Pd 39% min

	44956	Tetraamminepalladium(II) sulfate, 99.9% (metals basis), Pd 37.4% min
	39446	Tetrakis(acetonitrile)palladium(II) tetrafluoroborate, Pd 23.5%
	10548	Tetrakis(triphenylphosphine)palladium(0), 99.8% (metals basis), Pd 9% min
	10006	trans-Bis(benzonitrile)dichloropalladium(II), Pd 27.1%
	39249	trans-Diamminedibromopalladium(II), Premion®, 99.99% (metals basis), Pd 34.7% min
	11037	trans-Diamminedichloropalladium(II), Premion®, 99.95% (metals basis), Pd 49.9% min
	13704	trans-Dibromobis(triphenylphosphine)palladium(II), Pd 13.4%
	39823	trans-Dichlorobis(triethylphosphine)palladium(II)
	10491	trans-Dichlorobis(triphenylphosphine)palladium(II), Pd 14.0% min
	41245	trans-Dichlorobis(triphenylphosphine)palladium(II), Premion®, 99.95% (metals basis), Pd 14.7% min
	44969	Tris(dibenzylideneacetone)dipalladium(0), complex with chloroform, Pd 20.6%
	12760	Tris(dibenzylideneacetone)dipalladium(0), Pd 21.5% min

Silver Precious Metal Compounds



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Silver compounds from Alfa Aesar are used in a multitude of applications, ranging from pharmaceutical and chemical to energy, medical and many more.

Chemical

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39306 Mercury(II) silver iodide



12551 Potassium silver cyanide, 99.9% (metals basis), Ag 54.2%



11660 Silver acetate, anhydrous, 99%



44228 Silver arsenate, 99.99% (metals basis)



11896 Silver benzoate hydrate




















11425 Silver bromide, 99.5%




























12110 Silver bromide, Premion®, 99.998% (metals basis)











11420 Silver carbonate, 99.5% (metals basis)

	18202	Silver carbonate on Celite, ≈ 0.7 mmole $\text{Ag}_2\text{CO}_3/\text{g}$ reagent
	87342	Silver chloride, 95%
	11421	Silver chloride, 99.9% (metals basis)
	10857	Silver chloride, Premion®, 99.997% (metals basis)
	35715	Silver chloride, ultra dry, 99.997% (metals basis)
	40107	Silver chromate, 99% min
	11424	Silver cyanide, 99%
	11898	Silver diethyldithiocarbamate, ACS
	11538	Silver hexafluoroantimonate, 99%
	11608	Silver hexafluoroarsenate, 98+ %
	11873	Silver hexafluorophosphate, 98%
	40129	Silver hydrogen fluoride, 99% min
	45494	Silver(I) behenate
	45495	Silver(I) chromate, 96%
	45496	Silver(I) citrate hydrate
	11609	Silver(I) fluoride, 98%
	11610	Silver(II) fluoride, 98+%

	22695	Silver(II) oxide, 98%
	40187	Silver(II) oxide, 99.9% (metals basis), Ag 86.6% min
	40109	Silver iodate, 98%
	11419	Silver iodide, 99.9% (metals basis)
	12111	Silver iodide, Premion®, 99.999% (metals basis)
	42577	Silver(I) oxide, 99.99% (metals basis)
	11407	Silver(I) oxide, 99+% (metals basis)
	43268	Silver(I) oxide, Electrical Grade
	20835	Silver lactate
	44858	Silver lactate solution, Ag 4-5% w/w (cont. Ag)
	18641	Silver methanesulfonate
	39650	Silver molybdenum oxide, 99%
	A13854	Silver nitrate, 99+%
	11414	Silver nitrate, ACS, 99.9+% (metals basis)
	43087	Silver nitrate, Premion®, 99.995% (metals basis), Ag 63% min
	10858	Silver nitrate, Premion®, 99.9995% (metals basis)
	11418	Silver nitrite, 99% (metals basis)
	45034	Silver on alumina, 3%-4% Ag
	42209	Silver perchlorate, anhydrous

	11624	Silver perchlorate monohydrate, 99.9% (metals basis)
	44480	Silver perrhenate, 99.99% (metals basis)
	11415	Silver phosphate, 99% (metals basis)
	11417	Silver sulfate, ACS, 98% min
	12112	Silver sulfate, Premion®, 99.999% (metals basis)
	41443	Silver sulfate, Premion®, 99.99% (metals basis), Ag 68.9% min

	11416	Silver sulfide, 99%
	89473	Silver sulfide, 99.9+% (metals basis)
	12113	Silver sulfide, Premion®, 99.995% (metals basis)
	11539	Silver tetrafluoroborate, 99%
	11897	Silver thiocyanate
	13933	Silver trifluoroacetate, 98%
	88722	Silver trifluoromethanesulfonate, 98%
	39661	Silver tungsten oxide, 99% (metals basis)

Iridium Heterogeneous Catalysts



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Heterogenous Catalysts

The major factors affecting the properties of a heterogenous catalyst are the selection of the most appropriate support material and the location of the metal within the pore structure of the support. The most common types of powdered and particulate supports are:

- Activated carbon
- Alumina
- Calcium carbonate
- Barium sulfate
- Alumina
- Carbon



38327

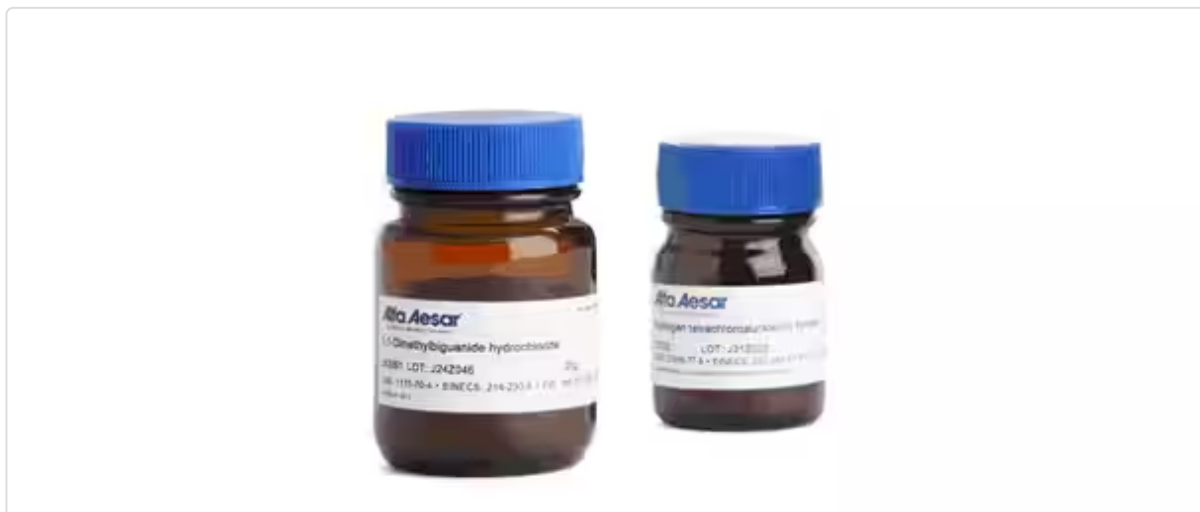
Iridium, 0.5% on activated carbon powder, reduced, nominally 50% water wet



38330

Iridium, 1% on activated carbon powder, reduced, nominally 50% water wet

Ruthenium Heterogeneous Catalysts



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- Alumina
- Carbon

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H36065 0.5R146, 0.5% Ruthenium on Alumina Pellets Type 146



42206 Palladium, 0.12%, Ruthenium, 0.12%; on 3mm alumina tablets



43048 Ruthenium, 0.5% on 3 mm alumina tablets



38332 Ruthenium, 0.5% on granular carbon



11757 Ruthenium, 10% on activated carbon powder, reduced



47296 Ruthenium, 1% on granular carbon

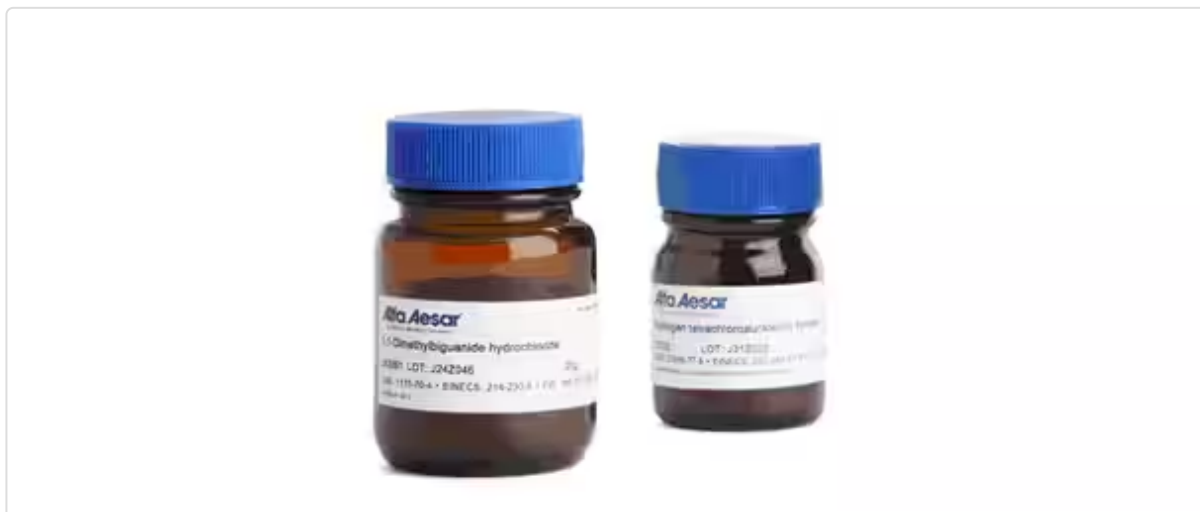


44575 Ruthenium, 2% on 3.18mm (0.125in) alumina pellets



44593 Ruthenium, 4% on 6.35mm (0.25in) alumina rings

Palladium Heterogeneous Catalysts



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- Carbon

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42206 Palladium, 0.12%, Ruthenium, 0.12%; on 3mm alumina tablets



44919 Palladium, 0.3% on granular carbon, reduced



41383 Palladium, 0.5% on 2-4 mm alumina spheres



38786 Palladium, 0.5% on 3.18mm (0.125in) alumina pellets, reduced



89114 Palladium, 0.5% on 3.18mm (0.125in) alumina pellets, unreduced






















38289 Palladium, 0.5% on granular carbon, reduced
































45558 Palladium, 10% on activated carbon paste, 10R394



H37431 Palladium, 10% on activated carbon paste, Type 39

	44696	Palladium, 10% on activated carbon powder, eggshell, reduced
	38304	Palladium, 10% on activated carbon powder, standard, reduced, nominally 50% water wet
	38305	Palladium, 10% on activated carbon powder, standard, unreduced, nominally 50% water wet
	44350	Palladium, 10% on activated carbon powder, Type 58, standard, reduced, nominally 50% water wet
	45924	Palladium, 10% on activated carbon powder, Type 87L, standard, reduced, nominally 50% water wet
	46789	Palladium, 10% on activated carbon powder, Type A402023-10, nominally 50% water wet
	H34200	Palladium, 10% on carbon, Type 487, nominally 50% water wet
	44833	Palladium, 1%, Copper, 0.3% on 2 mm alumina sphere, reduced
	44872	Palladium, 1%, Copper, 0.3% on alumina granules, reduced
	38527	Palladium, 1% on activated carbon powder, eggshell, reduced, nominally 50% water wet
	38292	Palladium, 1% on activated carbon powder, standard, reduced, nominally 50% water wet
	38293	Palladium, 1% on activated carbon powder, standard, unreduced, nominally 50% water wet
	11711	Palladium, 1% on alumina powder, reduced
	46462	Palladium, 1% on granular carbon, reduced
	38306	Palladium, 20% on activated carbon powder, eggshell, reduced, nominally 50% water wet
	38307	Palladium, 20% on activated carbon powder, eggshell, unreduced, nominally 50% water wet
	38308	Palladium, 20% on activated carbon powder, standard, reduced, nominally 50% water wet
	38309	Palladium, 20% on activated carbon powder, standard, unreduced, nominally 50% water wet
	H36548	Palladium, 2.5% Platinum, 2.5% on carbon paste, Type 122

	38295	Palladium, 3% on activated carbon powder, eggshell, unreduced, nominally 50% water wet
	38296	Palladium, 3% on activated carbon powder, standard, reduced, nominally 50% water wet
	38297	Palladium, 3% on activated carbon powder, standard, unreduced, nominally 50% water wet
	H37169	Palladium, 4.5% Rhodium, 0.5% on carbon paste, F101023-4.5/0.5
	H37009	Palladium, 4% Platinum, 1% on carbon paste E101023-4/1
	41825	Palladium, 5% on 3mm alumina pellets
	44337	Palladium, 5% on activated carbon paste, 5R39
	45921	Palladium, 5% on activated carbon paste, 5R394
	H33537	Palladium, 5% on activated carbon paste, 5R437
	45132	Palladium, 5% on activated carbon paste, 5R58
	38300	Palladium, 5% on activated carbon paste, A102023-5
	45499	Palladium, 5% on activated carbon paste, A405032-5
	11694	Palladium, 5% on activated carbon paste, A503023-5
	45497	Palladium, 5% on activated carbon paste, sulfided, A103038-5
	H37443	Palladium, 5% on activated carbon paste, Type 452
	44142	Palladium, 5% on activated carbon powder, standard, reduced, acidic catalyst, nominally 50% water wet
	38301	Palladium, 5% on activated carbon powder, standard, unreduced, nominally 50% water wet
	H37587	Palladium, 5% on activated carbon powder, Type 487

 H36186 Palladium, 5% on calcium carbonate, lead poisoned, A305060-5
 11723 Palladium, 5% on calcium carbonate powder, reduced
 43172 Palladium, 5% on calcium carbonate, Type A306060-5, lead poisoned
 H36996 Palladium, 5% on carbon paste, A405028-5
 H37526 Palladium, 5% on carbon paste, Type 761
 H33217 Palladium, 5% on carbon powder, Type 490
 H33434 Palladium, 5% on carbon, Type 87L, nominally 50% water wet
 H36938 Palladium, 5% on charcoal paste, Type 487
 11713 Palladium, 5% on gamma alumina powder, reduced
 39819 Palladium, 5% on strontium carbonate powder, reduced
 42208 Palladium, 8%, Platinum, 2%; on activated carbon powder, nominally 50% water wet

Platinum Heterogeneous Catalysts



Platinum group metal catalysts are widely used in chemical processes for reactions ranging from gas phase oxidation through selective hydrogenation of chemical, petrochemical, and pharmaceutical feedstocks to fuel cell power generation. All six of the platinum group elements have significant catalytic properties; however, platinum, palladium, rhodium, and ruthenium are the most widely used.

Although platinum group metals are more expensive in initial cost than base metal catalysts, they often prove to be more reactive and selective, and require less severe reaction conditions. In addition, the spent catalyst can be recovered and the precious metal reprocessed into fresh catalyst.

Johnson Matthey has served the platinum group metals industry for over 200 years. With our considerable experience and expertise in the manufacture of catalysts and in catalyst technology, we welcome the opportunity to help develop new catalysts to meet your unique requirements and improve your processing.

Heterogenous Catalysts

The major factors affecting the properties of a heterogenous catalyst are the selection of the most appropriate support material and the location of the metal within the pore structure of the support. The most common types of powdered and particulate supports are:

- Activated carbon
- Alumina
- Calcium carbonate
- Barium sulfate
- Alumina
- Carbon

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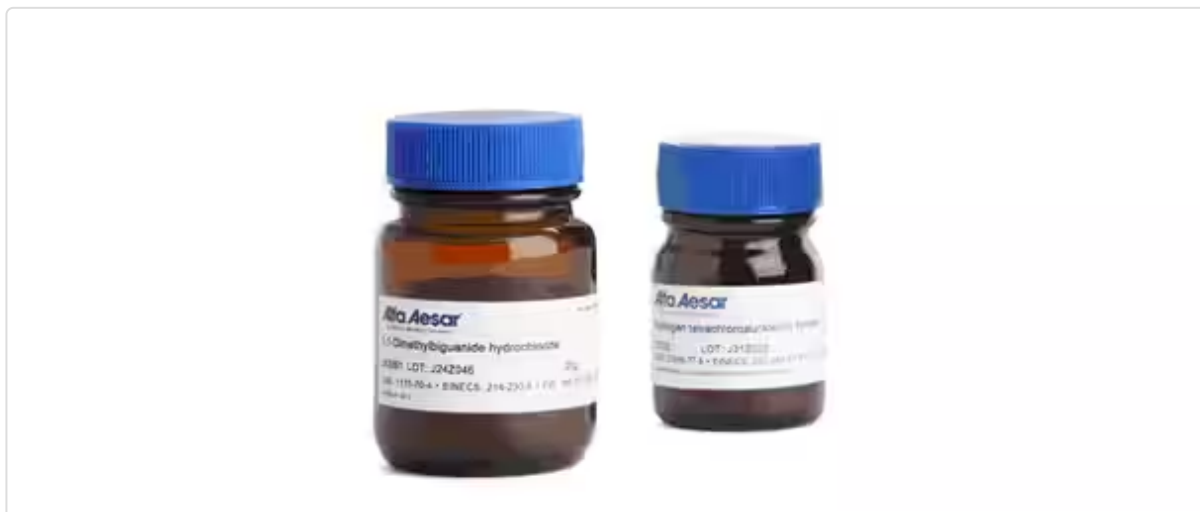


	42205	Platinum, 0.1% on 2-4mm alumina spheres
	39826	Platinum, 0.3% on 2.7-3.3mm (0.11-0.13in) alumina pellets, reduced
	89106	Platinum, 0.5% on 2.7-3.3mm (0.11-0.13in) alumina pellets, reduced
	38344	Platinum, 0.5% on granular carbon, reduced
	H36044	Platinum, 10% on activated carbon paste, Type 128M
	38325	Platinum, 10% on activated carbon powder, standard, reduced, nominally 50% water wet
	38326	Platinum, 10% on activated carbon powder, standard, unreduced, nominally 50% water wet
	44494	Platinum, 10% on alumina, reduced

	L00469	Platinum, 10% on carbon, dry
	45519	Platinum, 1% on activated carbon paste, 1R18MA
	H36839	Platinum, 1% on activated carbon paste, Type 163
	38312	Platinum, 1% on activated carbon powder, standard, reduced, nominally 50% water wet
	38313	Platinum, 1% on activated carbon powder, standard, unreduced, nominally 50% water wet
	11797	Platinum, 1% on gamma alumina powder, reduced
	38343	Platinum, 1% on granular carbon, reduced, nominally 50% water wet
	43407	Platinum, 1% on polyethyleneimine/SiO ₂
	43408	Platinum, 1% on polyethyleneimine/SiO ₂ powder
	45778	Platinum, 2% on 2.5mm alumina trilobes
	38316	Platinum, 3% on activated carbon powder, standard, reduced, nominally 50% water wet
	38317	Platinum, 3% on activated carbon powder, standard, unreduced, nominally 50% water wet
	45445	Platinum, 5% on activated carbon paste, B103032-5
	H37641	Platinum, 5% on activated carbon paste, Type 128M
	43905	Platinum, 5% on activated carbon powder, sulfided, 0.5% S (as sulfide)
	46306	Platinum, 5% on activated carbon powder, Type B105022-5, standard, reduced, nominally 50% water wet
	45443	Platinum, 5% on activated carbon powder, Type B109032-5, standard, reduced, nominally 60% water wet, sulfided
	38318	Platinum, 5% on alumina paste, 5R94
	44222	Platinum, 5% on alumina powder, reduced

	A11186	Platinum, 5% on carbon, dry
	H36310	Platinum, 5% on carbon paste, B501018-5
	H36798	Platinum, 5% on carbon paste, B501032-5
	H36544	Platinum, 5% on carbon, sulfided, B106032-5, nominally 50% water wet
	44365	Platinum, 5% on graphite, Type 286
	47210	Platinum, 5% on graphite, Type 287
	H37737	Platinum(IV) nitrate, solution, Pt 15% w/w
	43876	Platinum, nominally 10% on carbon black, HiSPEC® 2000
	35849	Platinum, nominally 20% on carbon black, HiSPEC® 3000
	42204	Platinum, nominally 40% on carbon black, HiSPEC® 4000
	44172	Platinum, nominally 40%, Ruthenium, nominally 20% on carbon black, HiSPEC® 10000

Rhodium Heterogeneous Catalysts



Platinum group metal catalysts are widely used in chemical processes for reactions ranging from gas phase oxidation through selective hydrogenation of chemical, petrochemical, and pharmaceutical feedstocks to fuel cell power generation. All six of the platinum group elements have significant catalytic properties; however, platinum, palladium, rhodium, and ruthenium are the most widely used.









Although platinum group metals are more expensive in initial cost than base metal catalysts, they often prove to be more reactive and selective, and require less severe reaction conditions. In addition, the spent catalyst can be recovered and the precious metal reprocessed into fresh catalyst.







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Heterogenous Catalysts

The major factors affecting the properties of a heterogenous catalyst are the selection of the most appropriate support material and the location of the metal within the pore structure of the support. The most common types of powdered and particulate supports are:

- Activated carbon
- Alumina
- Calcium carbonate
- Barium sulfate
- Alumina
- Carbon

	45639	Rhodium, 0.5% on 1mm (0.040in) alumina spheres
	42507	Rhodium, 0.5% on 3mm (0.12in) alumina pellets
	44124	Rhodium 10%, Palladium 1% on activated carbon powder
	11769	Rhodium, 1% on alumina powder, reduced
	43410	Rhodium, 1% on Polyethyleneimine/SiO ₂
	43409	Rhodium, 1% on Polyethyleneimine/SiO ₂ powder
	44863	Rhodium, 5% on activated carbon paste, C101023-5
	45425	Rhodium, 5% on activated carbon powder, Type C101023-5, standard, reduced, nominally 50% water wet

	11761	Rhodium, 5% on activated carbon powder, Type C101038-5, reduced, nominally 50% water wet
	H36201	Rhodium, 5% on alumina powder, C301099-5
	11770	Rhodium, 5% on alumina powder, reduced
	47120	Rhodium, 5% on alumina powder, Type 526, reduced
	A15965	Rhodium, 5% on carbon, dry
	H37410	Rhodium, 5% on carbon paste, Type 594

Ruthenium Heterogeneous Catalysts



Platinum group metal catalysts are widely used in chemical processes for reactions ranging from gas phase oxidation through selective hydrogenation of chemical, petrochemical, and pharmaceutical feedstocks to fuel cell power generation. All six of the platinum group elements have significant catalytic properties; however, platinum, palladium, rhodium, and ruthenium are the most widely used.

Although platinum group metals are more expensive in initial cost than base metal catalysts, they often prove to be more reactive and selective, and require less severe reaction conditions. In addition, the spent catalyst can be recovered and the precious metal reprocessed into fresh catalyst.

Johnson Matthey has served the platinum group metals industry for over 200 years. With our considerable experience and expertise in the manufacture of catalysts and in catalyst technology, we welcome the opportunity to help develop new catalysts to meet your unique requirements and improve your processing.

Heterogenous Catalysts

The major factors affecting the properties of a heterogenous catalyst are the selection of the most appropriate support material and the location of the metal within the pore structure of the support. The most common types of powdered and particulate supports are:

- Activated carbon
- Alumina
- Calcium carbonate
- Barium sulfate
- Alumina
- Carbon

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H36065 0.5R146, 0.5% Ruthenium on Alumina Pellets Type 146



42206 Palladium, 0.12%, Ruthenium, 0.12%; on 3mm alumina tablets



43048 Ruthenium, 0.5% on 3 mm alumina tablets



38332 Ruthenium, 0.5% on granular carbon



11757 Ruthenium, 10% on activated carbon powder, reduced









47296 Ruthenium, 1% on granular carbon



44575 Ruthenium, 2% on 3.18mm (0.125in) alumina pellets



44593 Ruthenium, 4% on 6.35mm (0.25in) alumina rings

	H36004	Ruthenium, 5% on activated carbon paste, Type 619
	11748	Ruthenium, 5% on activated carbon powder, reduced
	44338	Ruthenium, 5% on activated carbon powder, reduced, nominally 50% water wet
	45439	Ruthenium, 5% on activated carbon powder, Type D101023-5, standard, reduced, nominally 50% water wet
	11749	Ruthenium, 5% on alumina powder
	H37300	Ruthenium, 5% Palladium, 0.25% on activated carbon paste, Type 611

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