

CAS number	Composition	Name	Technology complexity	Applicaion
Palladium				
14221-01-3	Pd(PPh ₃) ₄	C72 H60 P4 Pd Palladium, Palladium-tetrakis (triphenylphosphine)	1	Catalyst for palladium-catalyzed coupling reactions; Heck reaction, Suzuki coupling, Stille coupling, Sonogashira coupling, and Negishi coupling.
13965-03-2	Pd(PPh ₃) ₂ Cl ₂	C36 H30 Cl ₂ P ₂ Pd Palladium, dichlorobis(triphenylphosphine)	1	Catalyst for palladium-catalyzed coupling reactions; Heck reaction, Suzuki coupling, Stille coupling, Sonogashira coupling, and Negishi coupling.
72287-26-4	PdCl ₂ *dppf	C34 H28 Cl ₂ Fe P ₂ Pd Palladium, [1,1'-bis(diphenylphosphino-κP)ferrocene]dichloro-, (SP-4-2)-	1	
14592-56-4	Pd(CH ₃ CN) ₂ Cl ₂	C4 H ₆ Cl ₂ N ₂ Pd Palladium, bis(acetonitrile)dichloro-(8Cl,9Cl)	1	Reagent Cyclopropanation; Catalyzes the cleavage of TBDMS; lactamization 3- & 4-alkyic acids; lactamization; Catalyst for the cyclization of d-acetylenic carboxylic acids; aza-Michael; Silyl ether to aldehyde; Nazarov cyclization; Heck Catalyzes; Reactions Sonogashira Together with CuI; Suzuki Catalyst
52522-40-4	Pd ₂ (dba) ₃ *CHCl ₃	C51 H42 O ₃ Pd ₂ . C H Cl ₃ Palladium, tris[μ-[(1,2-η:4,5-η)-(1E,4E)-1,5-diphenyl-1,4-pentadien-3-one]]di-, compd. with trichloromethane (1:1)	2	
14220-64-5	Pd(PhCN) ₂ Cl ₂	C14 H10 Cl ₂ N ₂ Pd Palladium, bis(benzonitrile)dichloro-	1	Reagent Cyclopropanation; Catalyzes for cleavage of TBDMS; lactamization 3-& 4-alkyic acids; cyclization of d-acetylenic carboxylic acids; aza-Michael; Silyl ether to aldehyde; Nazarov cyclization; Heck Catalyzes; Reactions Sonogashira with CuI; Suzuki Catalyst
14024-61-4	Pd(acac) ₂	C10 H14 O ₄ Pd Palladium, bis(2,4-pentanedionato-κO ₂ ,κO ₄)-, (SP-4-1)-	1	Catalyst for carbene generation from diazo compounds, hydrogenolysis of allylic carbonate; reduction a phosphine; Carbene formation;
905459-27-0	IPrPdCl ₂ *3-CIPy (PEPPSI)	Bichloro-[1,3-Bis(Diisopropylphenyl)imidazolylidene]-(3-Chloropyridyl)Palladium(II)	2	Catalyst for Kumada-Tamao-Corriu; Negishi and Suzuki coupling reaction; Buchwald-Hartwig amination reaction;
12131-44-1	Pd(cinn)Cl	C18 H18 Cl ₂ Pd ₂ Palladium, di-μ-chlorobis[(1,2,3-η)-1-phenyl-2-propen-1-yl]di-	4	Hydrogenolysis of allylic carbonate Pd; source of Pd(0) by reduction with a suitable reagent; Catalyst for carbene generation
14588-08-0	[Pd(OAc) ₂ (PPh ₃) ₂]	Bis(triphenylphosphine)palladium(II) diacetate	2	Cyclization reactions to form 1,3- or 1,4-dienes; Precursor for the synthesis ; Homogeneous catalyst.
19978-61-1	[PdCl ₂ (dppe)]	[1,2-Bis(diphenylphosphino)ethane]dichloropalladium(II)	1	Palladium-catalyzed Cyanation of Aryl Halides
59831-02-6	[PdCl ₂ (dppp)]	[1,3-Bis(diphenylphosphino)propane]palladium(II) Dichloride	1	Cross-linking protocols in organic synthesis; Organometallic chemical catalyst; Coupling reactions;
12107-56-1	[PdCl ₂ (cod)]	Dichloro(1,5-cyclooctadiene)palladium(II)	2	Precursor for synthesis; Protector of hydroxyl group; catalyst for CC bond and CN formation in Heck and Suzuki cross-coupling , allylic substitution;

CAS number	Composition	Name	Technology complexity	Applicaion
Platinum				
12080-32-9	(COD)PtCl ₂	Dichloro(1,5-cyclooctadiene)platinum(II)	3	Preparation of platinum with a labile cyclooctadiene ligand;
14221-02-4	Pt(PPh ₃) ₄	Tetrakis(triphenylphosphine)platinum(0)	3	Hydrosilation and oxidation.
15170-57-7	Pt(acac) ₂	Bis(2,4-pentanedionato)platinum(II)	4	Photoactivated hydrosilylation reactions; deposition of platinum metal; preparation of platinum nanotubes; precursor for FePt superlattice magnetic nanoparticles, for nano-materials. High-boiling hydrocarbon solvents.
15604-36-1	Pt(PPh ₃) ₂ Cl ₂	C ₃₆ H ₃₀ Cl ₂ P ₂ Pt Platinum, dichlorobis(triphenylphosphine)-, (SP-4-2)-	2	Reagent for synthesis of platinum molecules and in platinum plating. Reaction of "cyclenphosphorane" with cis-dichlorobis
14873-63-3	Pt(PhCN) ₂ Cl ₂	C ₁₄ H ₁₀ Cl ₂ N ₂ Pt Platinum, bis(benzonitrile)dichloro-	2	Catalyst for asymmetric hydroformylation reactions, allylation reactions, cyclopropanation reactions, hydrosilylation reactions and carbene insertion
81032-58-8	Pt(dvtms) ₂	C ₁₆ H ₃₆ O ₂ PtSi ₄ Platinum, bis[1,3-bis(η ² -ethenyl)-1,1,3,3-tetramethyldisiloxane]-	3	
12145-48-1	[PtBr ₂ (cod)]	Dibromo(1,5-cyclooctadiene)platinum(II)	4	Reagent for synthesis of platinum organometallic complexes.
15442-57-6	[Pt(SEt ₂) ₂ Cl ₂]	cis-Dichlorobis(diethyl sulfide)platinum(II)	5	Hydrosilicon catalysts for the production of silicone polymers, Hydrogenation catalyts

CAS number	Composition	Name	Technology complexity	Application
Rhodium				
15956-28-2	Rh ₂ (OAc) ₄	C ₈ H ₁₂ O ₈ Rh ₂ Rhodium(II) acetate dimer	3	Catalyst for cyclopropanation of alkenes, oxidation of alcohols, cyclization reactions involving, insertion into C-H and X-H bonds and for ylide formation, functionalizing fullerenes into polymers, hydrogen transfer from 2-propanol to cyclohexanone
12092-47-6	(CODRhCl) ₂	C ₁₆ H ₂₄ Cl ₂ Rh ₂ Rhodium, di-μ-chlorobis[(1,2,5,6-η)-1,5-cyclooctadiene]di-	2	Precursor to homogeneous catalysts; chiral catalyst for asymmetrically hydrogenating prochiral alkenes; synthesis of metal ligands
14694-95-2	(Ph ₃ P) ₃ RhCl	C ₅₄ H ₄₅ ClP ₃ Rh Rhodium, chlorotris(triphenylphosphine)-, (SP-4-2)-	2	Homogeneous hydrogenation catalyst for selective hydrogenation of alkenes and alkynes
12354-85-7	(Cp*RhCl ₂) ₂	C ₂₀ H ₃₀ Cl ₄ Rh ₂ Pentamethylcyclopentadienylrhodium(III) chloride dimer	3	Amidation catalyst; reductive alkylation, hydrogenation, chiral hydrogenation reactions; for oxidative olefination reactions, C-C bond cleavage of secondary alcohols, oxidative annulation of pyridine and ortho C-H olefination of phenol derivatives.
13938-94-8	(PPh ₃) ₂ Rh(CO)Cl	C ₃₇ H ₃₀ ClOP ₂ Rh Carbonylbis(triphenylphosphine)-rhodium(I)Chloride	2	Cyclometallation
73482-96-9	Rh ₂ (C ₇ H ₁₅ CO ₂) ₄	C ₃₂ H ₆₀ O ₈ Rh ₂ Rhodium(II) Octanoate Dimer	3	Catalyst for synthesis of 1-methyl carbapenems
12257-42-0	[(NBD)RhCl] ₂	C ₁₄ H ₁₆ Cl ₂ Rh ₂ Norbornadiene Rhodium(I) Chloride Dimer	2	Olefin hydroformylation catalysts, hydrogenation, isomerization
14284-92-5	Rh(acac) ₃	Rhodium(III) 2,4-pentanedionate	2	Organic synthesis catalyst; hydrosilylation of an organic substrate; catalyst hydrogenation, ethanol steam reforming, CO oxidation, and NO _x reduction; reagent for monodisperse size/shape controlled Rh nanocrystals.
35138-22-8	[Rh(cod)] ₂ BF ₄	Bis(1,5-cyclooctadiene)rhodium(I) Tetrafluoroborate	3	Organic synthesis catalyst; hydrosilylation of an organic substrate; catalyst hydrogenation, ethanol steam reforming, CO oxidation, and NO _x reduction; reagent for monodisperse size/shape controlled Rh nanocrystals.
25470-96-6	[Rh(acac)(CO)(PPh ₃)]	Carbonyl-2,4-pentanedionato(triphenylphosphine)rhodium(I)	4	Hydroformylation catalyst
12245-39-5	[Rh(acac)(cod)]	Acetylacetonato(1,5-cyclooctadiene)rhodium(I)	3	Hydroformylation catalyst
14874-82-9	[Rh(acac)(CO) ₂]	(Acetylacetonato)dicarbonylrhodium(I)	2	Hydroformylation catalyst for molecular engineering; carbonylation reactions, silylcarbocyclizations, conjugate additions to enones, carbamoylstannation, and reduction of aromatic nitro compounds; Hydroformylation catalyst
65545-21-3		Rhodium, tetrakis[m-(2,2-dimethylpropanoato-kO:kO')]di-, (Rh-Rh)	5	Stereocontrolled synthesis of highly functionalised tetrahydrofurans
31126-95-1	[(CF ₃ COO) ₂ Rh] ₂	Rhodium(II) trifluoroacetate dimer	5	Used in the preparation of isomerically pure α,β-unsaturated carbonyl compounds and the preparation of building blocks for one-, two-, and three-dimensional molecular solids. Contains a trace amount of rhodium acetate
515876-71-8	Rh ₂ (S-TCPTTL) ₄ 2EtOAc	Tetrakis[N-tetrachlorophthaloyl-(S)-tert-leucinato]dirhodium Bis(ethyl Acetate)	5	Catalytic Enantioselective Intermolecular Cycloaddition of 2-Diazo-3,6-diketoester-Derived Carbonyl Ylides with Alkynes and Styrenes
819050-89-0	Rh ₂ (esp) ₂	Bis[rhodium(α,α,α',α'-tetramethyl-1,3-benzenedipropionic acid)]	4	Catalyst for an efficient intermolecular amination of tertiary, benzylic C-H bonds
62728-88-5	[(CH ₃) ₃ COO] ₂ Rh ₂	Rhodium(II) trimethylacetate, dimer	4	Evidence of anaerobic coupling reactions between reduced intermediates of 4-nitroanisole

142214-04-8	$3[\text{C}_{20}\text{H}_{15}\text{O}_2]\text{Rh}+3$	Tetrakis(triphenylacetato)dirhodium(II) Dichloromethane Adduct	3	Catalyst for: Amination of allene carbamates, Allene aziridination to stereoselectively prepare cyclic cabamates, C-H bond nitrene insertion, Enantioselective cyclopropanation, Preparation of cyclic oxonium ylides
17185-29-4	$[\text{RhH}(\text{CO})(\text{PPh}_3)_3]$	Carbonylhydridotris(triphenylphosphine)rhodium(I)	4	Homogeneous catalyst for ring-opening isomerization of methylenecyclopropanes to 1,3-dienes; Hydrogenation, hydrosilation, isomerization, carbonylation, hydroformylation, oxidation

CAS number	Composition	Name	Technology complexity	Applicaion
Iridium				
12112-67-3	[(COD)IrCl] ₂	C ₁₆ H ₂₄ Cl ₂ Ir ₂ Iridium, di-μ-chlorobis[(1,2,5,6-η)-1,5-cyclooctadiene]di-	2	Precursor to iridium complexes, Crabtree's catalyst; catalyst for homogeneous carbonylation, hydrosilylation, hydrofomylation, asymmetric allylic substitutions, metathesis and chiral catalysis reactions.
12148-71-9	[(COD)IrOMe] ₂	C ₁₈ H ₃₀ Ir ₂ O ₂ Iridium, bis[(1,2,5,6-η)-1,5-cyclooctadiene]di-μ-methoxydi-	3	Catalyst for indole ring systems and borylation and Suzuki-miyaura coupling; tetraborylation reactions, ortho-silylation of aryl ketone, benzaldehyde and benzyl alcohol derivatives through C-H activation.
94928-86-6	Ir(2-Ph-2-Py) ₃	C ₃₃ H ₂₄ Ir N ₃ Tris(2-phenylpyridinato)iridium(III)	4	Precursor for synthesis of electro-phosphorescent materials, for organic light emitting diodes (OLEDs).
12354-84-6	[Cp*IrCl ₂] ₂	C ₂₀ H ₃₀ Cl ₄ Ir ₂ Pentamethylcyclopentadienyliridium(III) chloride, dimer	3	Precursor to catalysts for the asymmetric transfer hydrogenation of ketones; catalyst for more ecological amine synthesis
14871-41-1	(PPh ₃) ₂ Ir(CO)Cl	C ₁₅ H ₂₁ Ir O ₆ Carbonylchlorobis(triphenylphosphine)iridium(I)	3	VASKA'S COMPLEX; raw material and intermediate for organic synthesis, pharmaceuticals, agrochemicals and dyestuffs.
15635-87-7	Ir(acac) ₃	Tris(2,4-pentanedionato)iridium(III)	2	Photoreducing agent; precursor for preparing Ir-C thin film; catalyst for hydrogenation of sulfur containing compounds, organic synthesis
337526-85-9	Ir(2-Ph-2-Py) ₂ (acac)	C ₂₇ H ₂₃ Ir N ₂ O ₂ Acetylacetonatobis(2-phenylpyridine)-iridium	3	Green phosphorescent OLED
376367-93-0	C ₂₈ H ₁₆ F ₄ IrN ₃ O ₂	Iridium, bis[3,5-difluoro-2-(2-pyridinyl-κN)phenyl-κC](2-pyridinecarboxylato-κN ¹ ,κO ²)-	4	Light blue heteroleptic triplet emitter
35138-23-9	[Ir(cod) ₂] ₂ BF ₄	bis(1,5-cyclooctadiene)iridium (i) tetrafluoroborate	3	Precursor (catalyst) in the enantioselective hydrogenation of imines (production of (S) -metolachlor); Halogenated compound for proteomics research; Intermediates in pharmaceuticals and chemical research.
64536-78-3	[Ir(cod)py(P(Cy))]-PF ₆	(1,5-Cyclooctadiene)(pyridine)(tricyclohexylphosphine) iridium(I)	4	Crabtree's catalyst; hydrogenation catalyst for sterically hindered olefins, hydrogenation of mono-, di-, tri-, and tetra-substituted substrates and the isomerization and hydroboration of alkenes; Isotope exchange reactions, direct exchange of a hydrogen atom with its isotopes deuterium and tritium.

CAS number	Composition	Name	Technology complexity	Applicaion
Ruthenium				
50982-12-2	(COD)RuCl ₂	C ₈ H ₁₂ Cl ₂ Ru Ruthenium, dichloro[(1,2,5,6-η)-1,5-cyclooctadiene]-	1	Catalyst for dehydrogenative coupling of alcohols and amines, Ruthenium catalyst precursor, Catalyst for more ecological amide bond formation by dehydrogenative coupling of amines and alcohols.
52462-29-0	(p-Cymene) ruthenium dichloride dimer	C ₂₀ H ₂₈ Cl ₄ Ru ₂ Ruthenium, di-μ-chlorodichlorobis[(1,2,3,4,5,6-η)-1-methyl-4-(1-methylethyl)benzene]di-	2	Hydrosilylation catalyst and pharmaceutical intermediate.
15529-49-4	(PPh ₃) ₃ RuCl ₂	C ₅₄ H ₄₅ Cl ₂ P ₃ Ru Ruthenium, dichlorotris(triphenylphosphine)-	4	Catalyst in a synthesis of furans from allenyl sulfides. C-H Activation Catalyst in a Ruthenium/Lewis Acid System. Homogeneous isomerization, reduction and oxidation catalyst. Catalyzes hydrogenation of aromatic nitro compounds to amines; selective reduction in the presence of halogen, ester, nitrile and even additional nitro groups. Catalyst for the reaction of N-alkylanilines with triethanolamine in dioxan
50525-27-4	Ru(bipy) ₃ Cl ₂ * 6H ₂ O	C ₃₀ H ₂₄ N ₆ Ru . 2 Cl . 6 H ₂ O Tris(2,2'-bipyridine)dichlororuthenium(II) hexahydrate	4	Catalyst in light-induced redox reactions; Catalyst photochemical water splitting; pharmaceutical research; photoelectrical chemical components, photovoltaic cells, smart biosensors.
32993-05-8	CpRuCl(PPh ₃) ₂	C ₄₁ H ₃₅ Cl P ₂ Ru Ruthenium, chloro(η ⁵ -2,4-cyclopentadien-1-yl)bis(triphenylphosphine)-	3	Transfer hydrogenation catalyst for formation of indoles, isoquinolines and quinolines.
246047-72-3	SiMesRuCl ₂ - (=CHPh)(PCy ₃)	Ruthenium, [1,3-bis(2,4,6-trimethylphenyl)-2-imidazolidinylidene]dichloro(phenylmethylene)(tricyclohexyl phosphine)-, (SP -5-41)-	5	Catalyst for ring-closing metathesis, cross metathesis and ROMP.
301224-40-8	SiMesRuCl ₂ (=CH-oiPrOPh)	C ₃₁ H ₃₈ Cl ₂ N ₂ O Ru Ruthenium, [1,3-bis(2,4,6-trimethylphenyl)-2-imidazolidinylidene]dichloro[[2-(1-methylethoxy-κO)phenyl]methylene-κC]-, (SP -5-41)	5	Grubbs 2nd Generation Catalyst for metathesis of electron deficient substrates including fluorinated olefins.
14284-93-6	Ru(acac) ₃	C ₁₅ H ₂₁ O ₆ Ru Ruthenium(III) acetylacetonate	1	Precursor for compounds of ruthenium; Recyclable catalyst for certain organic transformations: acetylation of phenols, alcohols, and amines. homogeneous catalyst for hydrolysis of sodium borohydride and regiospecific tritiation of aromatic carboxylic acids;enantioselective hydrogenation of aryl acrylic acid and aryl propenic acid.
14323-06-9	Ru(bipy) ₃ Cl ₂	C ₃₀ H ₂₄ N ₆ Ru . 2 Cl Tris(2,2'-bipyridine)ruthenium dichloride	4	Oxygen concentration in a microfluidic chip. Hybrid material for oxidase based biosensors was prepared by combining Wells–Dawson.
15746-57-3	(bipy) ₂ RuCl ₂	C ₂₀ H ₁₆ Cl ₂ N ₄ Ru Ruthenium, bis(2,2'-bipyridine-κN ¹ ,κN ^{1'})dichloro-	4	Preparation of [Ru(m-) 2,2'-bipyridine) ₃] ²⁺ (PF ₆) ₂ , intermediate for the development of nanocomposite junctions with gold nanoparticles.