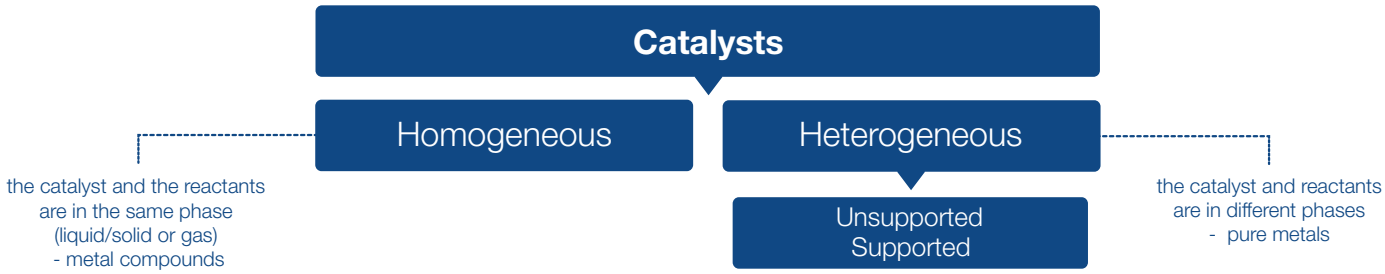
Alfa Aesar

Catalysts



Metal Catalysts

Metal catalysts are extensively being used in both research laboratory and industrial/manufacturing scale chemistry. Indeed, it will be exceptional, if you find any complex organic synthesis or industrial manufacturing process that does not, at some stage, utilize a metal catalyst. In other words, most of the commercially produced chemicals utilize metal catalysts at some stage in the process of their manufacturing processes.

Transition metals are an exceptional choice for catalyst in modern organic, organometallic and electro chemistries. They have the capability to be in a variety of oxidation states, interchange between states, form complexes with organic ligands and are a good source of electrons.

Precious Metal Catalysts

Catalytic processes in organic synthesis require “late transition metals” such as palladium, platinum, gold, ruthenium, rhodium, or iridium. Cross-coupling reactions, which have been widely used for several organic transformations, will be difficult to perform by a classical pathway without using metal catalysts such as palladium, platinum copper, nickel, ruthenium, and rhodium. Due to their high selectivity, precious metal chemicals are often the first choice as heterogeneous catalysts for a wide variety of research and industrial chemical applications.

The Alfa Aesar metal catalysts portfolio includes a range of homogeneous, heterogeneous, supported/unsupported, and electro catalysts. The catalysts are offered in a wide selection of purities and concentrations for a broad range of organic synthesis routes for the pharmaceutical industry. We offer a unique collection of chiral ligands for asymmetric hydrogenation, novel palladium coupling catalysts, platinum group metal (PGM)-based heterogeneous catalysts as well as sponge nickel catalysts.

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Our metal catalysts can provide shorter synthetic routes, efficient manufacturing processes, cost effective production and a safer environment.

Application Highlights

Organic Synthesis

Pure metals and metal compounds offer unique opportunities for an organic chemist due to their versatile properties and pronounced catalytic activities. Metal catalysts are extensively used in organic synthesis. Both homogeneous and heterogeneous catalysts are used in organic research laboratory. Homogeneous catalysis are excellent choice where highly specific reactions are desired including chiral transformations. Pt catalyzed hydrogenation of an unsaturated organic compound is an example for heterogeneous catalysis.

Bioactive Synthesis

Transition metal mediated cross-coupling reactions received great attention in recent years towards the synthesis of various biologically active molecules, natural products, nucleosides, nucleotides, and oligonucleotides. Palladium-catalyzed coupling reactions have been implicated in constructing carbon-carbon and carbon-hetero atom bonds. Such metal catalyzed reactions offer synthetic versality and efficiency to wide range of bioactive molecules.

Pharma Industry

Increasing focus has been on the environmental impact of manufacturing processes in pharmaceutical industry where there is a large amount of drug products manufactured globally. Various metal catalysts have been extensively used in pharma industry to enhance the sustainability of pharmaceutical products, leading to the shorter and very efficient synthetic routes. By facilitating selectivity, high yield, economic and environmental friendly processes, metal catalysts offer great profitable options for drug manufacturers.

Petroleum Refinery

Catalytic processes are very important in modern refineries and petrochemical industry. The leader in the petroleum industry is often dictated by the proper use of efficient catalysts. In petroleum refining, most of the processes beyond the crude unit is catalytic in nature. Metal catalysts plays a critical role in reducing the aromatic content and increasing fuel octane numbers through various organic transformations like hydrogenation, alkylation, isomerization. Heterogeneous catalysts have been widely used in many petroleum refining processes, such as fluid catalytic cracking (FCC), hydrocracking, and hydrotreating.

Fuel Cells

Redox reactions are important component of fuel cells in converting chemical energy into electricity. Electro catalysts enhance the rates of the half reactions (oxidation or reduction component of redox reaction) that comprise the fuel cell. Redox characteristics of the electro catalysts offer a great advantage for their use in fuel cells. Electro catalysts offer enhanced performance and durability of fuel cells. The next generation electro catalysts are now available with corrosion resistant carbon supports for automotive fuel cell applications.

Cleaner Environment

Catalysts play a very important role in protecting the environment. Catalysts play a major role in treating exhaust gases from motor vehicles, manufacturing facilities and power plants. The result is a cleaner environment. Catalysts are an essential component in emission control devices. Metal catalysts help convert over 90% of harmful elements like hydrocarbons, carbon monoxide, and oxides of nitrogen from gasoline engines into less harmful carbon dioxide, nitrogen and water vapor.

Homogeneous Catalysts

Stock No.	Description	Size
11046	Ammonium tetrachloroplatinate(II), 99.9% (metals basis), Pt 51% min	1g, 5g
11031	Dihydrogen hexachloroiridate(IV) hydrate, 99% (metals basis), Ir 38-42%	5g, 25g, 100g, 500g
11051	Dihydrogen hexachloroplatinate(IV) hydrate, 99.9% (metals basis)	5g, 50g, 100g, 250g
39741	Gold(I) sodium thiosulfate hydrate, 99.9% (metals basis)	1g, 5g, 25g, 50g
39742	Gold(III) acetate, 99.9% (metals basis)	0.5, 1g, 5g
12163	Gold(III) chloride, Au 64.4% min	0.25g, 1g, 5g, 10g
36400	Hydrogen tetrachloroaurate(III) trihydrate, ACS, 99.99% (metals basis), Au 49.0% min	1g, 10g, 25g, 50g
11030	Iridium(III) chloride hydrate, 99.8% (metals basis)	5g, 10g, 50g, 100g,
A17849	Iridium(IV) oxide powder, 99%	1g, 5g
12103	Osmium(VIII) oxide, 99.8% (metals basis), Os 74.4% min	5g, 10g, 50g, 100g
10516	Palladium(II) acetate, Pd 45.9-48.4%	10g, 100g, 250g, 500g
11034	Palladium(II) chloride, 99.9% (metals basis), Pd 59.0% min	10g, 100g, 250g, 500g
11035	Palladium(II) nitrate hydrate, 99.8% (metals basis), Pd 39% min	2g,10g, 25g, 50g
10526	Platinum(II) 2,4-pentanedionate, Pt 48.0% min	5g, 25g, 50g, 100g
11048	Potassium tetrachloroplatinate(II), 99.9% (metals basis), Pt 46.0% min	5g, 25g, 100g, 500g
11814	Rhodium(III) oxide, anhydrous, 99.9% (metals basis), Rh 80.6% min	1g, 2g, 5g, 10g
12175	Ruthenium(III) nitrosylnitrate, Ru 31.3% min	1g, 5g, 10g, 25g
A10816	Ruthenium(IV) oxide, anhydrous, 99.9%	1g, 5g, 10g, 25g
10548	Tetrakis(triphenylphosphine)palladium(0), 99.8% (metals basis), Pd 9% min	10g, 50g, 100g, 250g
12760	Tris(dibenzylideneacetone)dipalladium(0), Pd 21.5% min	10g, 50g, 100g, 250g

Heterogeneous Catalysts

Stock No.	Description	Size
38330	Iridium, 1% on activated carbon powder, reduced, nominally 50% water wet	5g, 25g, 100g
31276	Nickel on silica-alumina, catalyst	5g, 25g, 100g, 500g
89114	Palladium, 0.5% on 3.18mm (0.125in) alumina pellets, unreduced	25g, 100g, 250g, 500g
44696	Palladium, 10% on activated carbon powder, eggshell, reduced	50g
44350	Palladium, 10% on activated carbon powder, Type 58, standard, reduced, nominally 50% water wet	5g, 25g, 100g
A12012	Palladium, 10% on carbon, Type 487, dry	5g, 25g, 100g, 500g
11713	Palladium, 5% on γ alumina powder, reduced	5g, 25g, 100g, 500g
41825	Palladium, 5% on 3mm alumina pellets	5g, 25g, 100g
44142	Palladium, 5% on activated carbon powder, standard, reduced, acidic catalyst, nominally 50% water wet	10g, 50g, 250g
21162	Palladium, 5% on barium sulfate powder, unreduced	10g, 50g
11723	Palladium, 5% on calcium carbonate powder, reduced	5g, 25g, 100g, 500g
89106	Platinum, 0.5% on 2.7-3.3mm (0.11-0.13in) alumina pellets, reduced	10g, 50g, 100g, 500g
38343	Platinum, 1% on granular carbon, reduced, nominally 50% water wet	25g, 100g
44222	Platinum, 5% on alumina powder, reduced	5g, 25g, 100g
44863	Rhodium, 5% on activated carbon paste, C101023-5	2g, 10g
H36201	Rhodium, 5% on alumina powder, C301099-5	5g, 25g, 100g
11770	Rhodium, 5% on alumina powder, reduced	2g, 10g
44575	Ruthenium, 2% on 3.18mm (0.125in) alumina pellets	25g, 100g, 500g
11749	Ruthenium, 5% on alumina powder	5g, 25g, 100g

Full product listing is available online.

Electro Catalysts

Stock No.	Description	Size
47491	Iridium(IV) oxide 50%	1g, 5g
47400	Platinum 50% - iridium(IV) oxide 50%	1g, 5g
47380	Platinum 75% - iridium(IV) oxide 25%	1g, 5g
47357	Platinum, nominally 10% on carbon black	1g, 5g
47311	Platinum, nominally 13.5%, cobalt, nominally 1.5% on durable carbon support	1g, 5g
47337	Platinum, nominally 15% on durable carbon support	1g, 5g
47332	Platinum, nominally 18%, cobalt, nominally 1%, chromium, nominally 1% on durable carbon support	1g, 5g
47362	Platinum, nominally 18%, cobalt, nominally 1%, nickel, nominally 1% on durable carbon support	1g, 5g
47341	Platinum, nominally 20% on durable carbon support	1g, 5g
47312	Platinum, nominally 20%, Ruthenium, nominally 10% on Vulcan XC72 Carbon	1g, 5g
47301	Platinum, nominally 27%, cobalt, nominally 1.5%, chromium, nominally 1.5% on Vulcan XC72 Carbon	1g, 5g
47366	Platinum, nominally 27%, cobalt, nominally 1.5%, nickel, nominally 1.5% on Vulcan XC72 Carbon	1g, 5g
47346	Platinum, nominally 27%, cobalt, nominally 3% on durable carbon support	1g, 5g
47395	Platinum, nominally 27%, cobalt, nominally 3% on Vulcan XC72 Carbon	1g, 5g
47388	Platinum, nominally 40% on durable carbon support	1g, 5g
47379	Platinum, nominally 40%, Ruthenium, nominally 20% on carbon black	1g, 5g
47371	Platinum, nominally 50%, Ruthenium nominally 25% on high surface area advanced carbon support	1g, 5g
47334	Platinum, nominally 60% on high surface area advanced carbon support	1g, 5g
47310	Platinum, nominally 70% on high surface area advanced carbonsupport	1g, 5g
47399	Platinum-ruthenium black, 67:33	1g, 5g

Full product listing is available online.

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