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Our Website and Catalyst Guide

www.procat.in

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PROCAT grow...evolve...grow

neocat grow...evolve...grow

Catalyst Catalogue

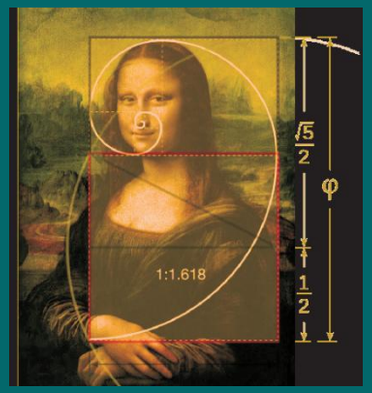
Offering a wide range of catalysts tailored for your specific reaction needs.

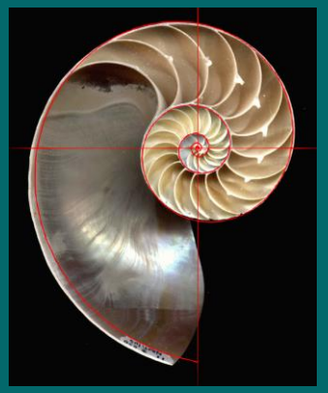
The Golden Ratio

This "golden" number, 1.61803399, represented by the Greek letter Phi, is known as the Golden Ratio, Golden Proportion, Golden Mean, Golden Section and Divine Proportion. It was written about by Euclid in "Elements" at around 300 B.C., by Luca Pacioli, a contemporary of Leonardo Da Vinci, in "De Divina Proportione" in 1509, by Johannes Kepler around 1600 and by Dan Brown in 2003 in his best-selling novel, "The Da Vinci Code". It is widely believed that one of the greatest western inventor 'Leonardo Da Vinci' named this ratio as 'Divine Proportion' which symbolizes ' beauty with balance' and found it to be present in the designs from DNA to that of Galaxies. This number is also represented by an equally fascinating 'Fibonnaci Series', which seems to be basis of design of many objects found in our universe.

The description of this number which is symbolised by Nautilus Shell, as Golden and Divine is fitting perhaps because it is seen by many to open the door to a deeper understanding of spirituality in life. That is an incredible role for a single number to play. But, then again, this one number has played an incredible role in human history and in the universe at large, thus inspiring us at PROCAT and NEOCAT to achieve the highest form of beauty, perfection and performance in our catalyst design.

And just the way the universe has evolved through various stages (growth of civilization, evolution of various species), we also take aspiration from this golden ratio to chart our journey of growth and inspire the evolution of humanity through our contribution!





At PROCAT & NEOCAT

We are working to develop highly selective catalysts and catalytic processes for various reactions such as alkylation, acylation, oxidation, hydroxylation, isomerization, nitration etc. The main focus of the organization is to work in collaboration with customers, ***be their partners in development*** *and make available these catalysts on commercial scale to help replace the conventional polluting, non-catalytic processes with environmentally sustainable and more efficient processes.*

Contents

- Skeletal Nickel Catalysts (Raney Nickel type)
- Precious Metal Catalysts
- Silica Alumina Catalysts
- Mixed Metal Oxide Catalysts

Skeletal Nickel Catalysts
(Raney Nickel-type)

Grade	Recommended Applications
SNC 1211	✓ Hydrogenation of C=C bond to alkanes ✓ Hydrogenation of Nitro to Amine ✓ Nitro-haloaromatics to corresponding amines with minimum dehalogenation e.g., Dichloro Nitrophenol To Dichloro Aminophenol ✓ Hydrogenation of Oximes to Amines Specific API use : Lisinopril, Sertraline, Mebevarine
SNC 2211	✓ Hydrogenation of Straight chain Aldehydes to Alcohols e.g., Butyraldehyde to Butanol. ✓ Nitro to Amino in neat conditions e.g. P-Nitro Cumene to P- Cumidiene
SNC 3211 SNC 3213 SNC 3214 SNC 3216	✓ Hydrogenation of Oxime to Amine ✓ Hydrogenation of Imine to Amine ✓ Hydrogenation of Aromatic compounds. e.g., Phenol to Cyclohexanol, Pyridine to Piperidine, Specific API use: Lisinopril, 4-TAC *Varied Grades available depending on Particle Size requirements of the process

Skeletal Nickel Catalysts
(Raney Nickel-type)

Grade	Recommended Applications
SNC 4211 SNC 4251	✓ Hydrogenation of Carbonyls to corresponding Alcohols e.g., Benzophenone to Benzhydrol ✓ Hydrogenation of Nitrile to primary Amine e.g., Benzonitrile to Benzylamine Specific API use: Venlafaxine, Atorvastatin, Verapamil, CHEA
SNC 6211 SNC 6214 SNC 6216 SNC 6231 SNC 6251	✓ Hydrogenation of Dextrose to Sorbitol ✓ Hydrogenation of Nitrile to amine e.g., Butanediol *Varied Grades available depending on Particle Size requirements of the process.
SNC 7211	✓ Dehydrogenation in Carbazole
SNC 8211	✓ Hydrogenation of Aromatic ring ✓ Hydrogenation of Aromatic Nitrile to Amine ✓ Hydrogenation of Carbonyls to Alcohol e.g., Substituted Phenols to Cyclohexanols & Cyclohexadienone. Specific API use: Octopamine HCl

Precious Metal Catalysts

Homogenous Palladium Catalysts

Grade	Catalyst	CAS No
NCAT 1001	Palladium (II) Oxide	1314-08-5
NCAT 1002	Palladium (II) Chloride	7647-10-1
NCAT 1003	Palladium (II) Nitrate solution	10102-05-3
NCAT 1004	Palladium (II) Acetate	3375-31-3
NCAT 1005	Trans- Dichlorobis (Triphenylphosphine) Palladium (II)	13965-03-2
NCAT 1006	Tetrakis (Triphenylphosphine) Palladium (0)	14221-01-3
NCAT 1007	Palladium Acetylacetonate	14024-61-4
NCAT 1008	Pddppf [1,1′Bis(diphenylphosphino)ferrocene] dichloropalladium(II)	72287-26-4
NCAT 1009	Pddppf.DCM complex [1,1′-Bis(diphenylphosphino)ferrocene] dichloropalladium(II) DCM complex	95464-05-4

Homogenous Platinum Catalysts

Grade	Catalyst	CAS No
NCAT 2001	Platinum (IV) Oxide	52785-06-5
NCAT 2002	Platinum (IV) Oxide Anhydrous	1314-15-4
NCAT 2003	Chloroplatinic Acid Di Hydrogen Hexachloro Platinate(IV) Hydrate	26023-84-7
NCAT 2004	Platinum Tetrachloride	13454-96-1
NCAT 2005	Tetra-ammine Platinum (II) Chloride solution "TPC Pt"	13933-32-9
NCAT 2006	Potassium Tetrachloro Platinate (II) [PTCP]	10025-99-7
NCAT 2007	Pt-A Salt Solution Bis (Ethanol Ammonium) Hexa Hydroxo Platinum	68133-90-4
NCAT 2008	Karstedt's Catalyst Divinyl Tetramethyl Disiloxane Pt (0)	68478-92-2

Precious Metal Catalysts

Precious Metal Catalysts

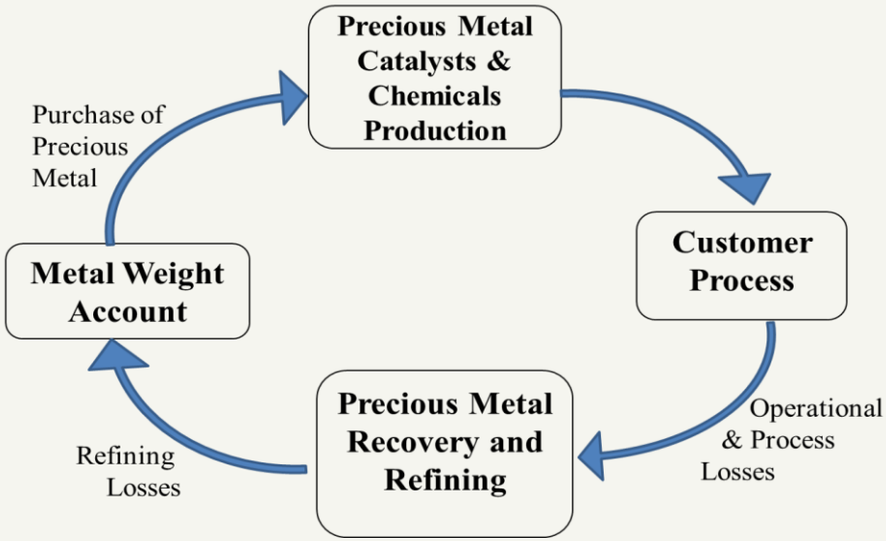
Homogenous Ruthenium Catalysts

Grade	Catalyst	CAS No
NCAT 3001	Ruthenium (III) Chloride Hydrate	14898-67-0
NCAT 3002	Ruthenium Acetylacetonate	14284-93-6
NCAT 3003	Triruthenium dodecacarbonyl	15243-33-1
NCAT 3004	Dichloro(1,5-cyclooctadiene)ruthenium(II), Polymer	50982-12-2
NCAT 3005	Ru Binap Complex Diacetato[(R)-(+)-2,2'-bis(diphenylphosphino)-1,1'-binaphthyl]ruthenium(II)	325146-81-4

Homogenous Rhodium Catalysts

Grade	Catalyst	CAS No
NCAT 4001	Rhodium(III) Chloride Hydrate	20765-98-4
NCAT 4002	Rhodium(II) Acetate Dimer	15956-28-2
NCAT 4003	Rhodium(II) Octanoate Dimer	73482-96-9

Precious Metal Recovery



We also recover Ruthenium spent catalysts!

Precious Metal Heterogenous Catalysts

Heterogeneous Palladium Catalysts

Description	Grades	Applications
1%Pd/C	NCAT 1121-1	Hydrogenation of ✓ Aromatic and Heteroaromatic Rings ✓ Aliphatic and Aromatic Nitro to Amine, ✓ Dehalogenation ✓ CC Triple Bond to Alkyls, (e.g. Sertraline HCl, INPA, Valacyclovir, Nebivolol) ✓ Cbz Deprotection ✓ Nitrile to Amine ✓ Hydrogenation of Heteroaromatic Ring ✓ Ketone to Alkyls (Hydrogenolysis) ✓ (e.g. Lisinopril, Tamsulosin) ✓ N, O-Debenzylation ✓ Hydrogenation of Imines to Amine
2%Pd/C	NCAT 1110-2, NCAT 1121-2	
2.5%Pd/C	NCAT 1230-2.5	
5%Pd/C	NCAT 1110-5, NCAT 1121-5, NCAT 1171-5, NCAT 1130-5, NCAT 1134-5, NCAT 1230, NCAT 1140-5, NCAT 1142-5, NCAT 1143-5	
10%Pd/C	NCAT 1110-10, NCAT 1121-10	
20%Pd/C (Pearlman's Catalyst)	NCAT 1110-20	
5%Pd/$CaCO_3$ (Including Lindlar Catalyst)	NCAT 1834-5, NCAT 1834L-5	✓ Acid Chloride to Aldehydes, Isomerization ✓ C-C Triple Bond to C-C Double Bond
0.3%Pd/Al	NCAT 1611-0.3	✓ Hydrogenation of C-C Double Bond, ✓ Aldehydes/Ketones to Alcohol, Dipentene to 3-p-Menthene, Isomerization
0.5%Pd/Al	NCAT 1611-0.5	
1%Pd/Al	NCAT 1611-1	
3%Pd/Al	NCAT 1611-3	
5%Pd/Al	NCAT 1611-5	

Precious Metal Heterogenous Catalysts

Heterogeneous Platinum Catalysts

Description	Grades	Applications
1%Pt/C	NCAT 2423-1, NCAT 8120-1	Hydrogenation of ✓ Aliphatic and Aromatic Nitro to Amine ✓ Selective Hydrogenation of Halogenated Nitro Compounds, ✓ Aromatic Nitro Phenol to Corresponding Aminophenol, ✓ Aromatic Nitro to Amine Without Dehalogenation ✓ CC Double Bonds, ✓ Aldehyde & Ketone to Alcohol, ✓ Reductive Alkylation (Imine Hydrogenation) ✓ Bamberger Rearrangement
3%Pt/C	NCAT 2241-3, NCAT 2323-3	
5%Pt/C	NCAT 2241-5, NCAT 2312-5	
Pd+Pt	NCAT 7541	✓ Selective Hydrogenation of Nitro to Amine
1%Pt/Alumina	NCAT 2622-1	✓ Aldehyde to Alcohol ✓ CC Double Bond Hydrogenation

Precious Metal Catalysts

Fuel Cell Catalysts

Description	Grades	Applications
20%Pt/C Black	NCAT FCb0P-Pt20	Fuel Cell Catalyst
40%Pt/C Black	NCAT FCb0P-Pt40	

Heterogenous Deoxo Catalysts

Description	Grades	Applications
0.3%Pd/Al_2O_3 (Spheres or Extrudates)	NCAT DA0E-Pd0.3, NCAT DA0S-Pd0.3	✓ Removal of Oxygen from Gases
0.5%Pd/Al_2O_3 (Spheres or Extrudates)	NCAT DA0E-Pd0.5, NCAT DA0S-Pd0.5	✓ Removal of Hydrogen from Gases

Precious Metal Catalysts

Heterogeneous Ruthenium Catalysts

Description	Grades	Applications
3%Ru/C	NCAT 3111-3	Hydrogenation of ✓ Substituted Aromatic Rings (e.g., Aniline to MCHA & DCHA, PTBP to TBCH, OTBT to OBCH)
5%Ru/C	NCAT 3111-5	
3%Ru/Al	NCAT 3611-3	✓ Aromatic rings to cyclohexenes ✓ Fused Aromatic Rings ✓ α-Pinene to cis-Pinane
5%Ru/Al	NCAT 3611-5	

Heterogeneous Rhodium Catalysts

Description	Grades	Applications
5%Rh/C	NCAT 4111-5	✓ Heteroaromatic Ring Hydrogenation

ZEOLITE CATALYSTS

Grade	Application	Examples
PROCAT™ ZB0P	Acylation	Acylation of anisole
	Nitration	Nitration of toluene
PROCAT™ ZM0E	Isomerization	Xylenes, Toluidine, Cresols
PROCAT™ ZMd0E	Alkylation	Alkylation of m-cresol to Thymol
PROCAT™ ZT0P	Hydroxylation	Anisole to MEHQ & Guaiacol Phenol to Hydroquinone & Catechol
	Epoxidation	Propylene to Propylene Oxide Styrene to Styrene Oxide
	Selective Opening of Epoxide ring	Styrene Oxide to Phenyl acetaldehyde (PAA)
PROCAT™ ZX2E	O-alkylation	PC to PCME Phenol to Anisole

ALUMINA CATALYSTS

Grade	Application	Examples
PROCAT™ AG0E	Dehydration	Dehydration of alcohol
PROCAT™ AP0E – 50	O-Alkylation	Catechol to Guaiacol
PROCAT™ AP0E - 30	Dehydration and ring formation	DEG to 1,4 Dioxane
	Dehydration	Dehydration of Alcohols to Ethers

SILICA ALUMINA CATALYSTS

SILICA CATALYSTS

Grade	Application	Examples
PROCAT™ ZS0P	Epoxidation	Styrene to Styrene Oxide
PROCAT™ SS0P	Nitration	Nitration of Benzene, Toluene
PROCAT™ SS11P PROCAT™ SS12P	Esterification	Ethanol to Ethyl Acetate

Note: Our catalysts are available in various shaped forms. In all the above trade names last Character represents form of the catalyst as follows;

Character	Form of catalyst
P	Powder
E	Extrudes
S	Spheres
T	Tablets

Mixed Metal Oxide Catalysts

Mixed Metal Oxide Catalysts

12 Mg Magnesium 24.30	13 Al Aluminium 26.98	22 Ti Titanium 47.90	23 V Vanadium 50.94	24 Cr Chromium 52.00	25 Mn Manganese 54.94	26 Fe Iron 55.85
27 Co Cobalt 58.93	29 Cu Copper 63.55	30 Zn Zinc 65.40	40 Zr Zirconium 91.22	42 Mo Molybdenum 95.95	55 Cs Cesium 132.9	56 Ba Barium 137.3

Grade	Application/Examples
PROCAT™ CA15T	Methanol Synthesis catalyst
PROCAT™ CR3P	Reduction / Fatty ester to fatty alcohol
PROCAT™ CR4P PROCAT™ CR4E PROCAT™ CR4T	Selective Hydrogenation / Hydrogenation of Menthone to Menthol
PROCAT™ CR15T	N-Alkylation / For Alkylation of Amine to produce mono alkylated product Aniline + methanol to $N(CH_3)_2$
PROCAT™ TiO_2	Isomerization / Alpha Pinene to Camphene
PROCAT™ CS0P	Selective hydrogenation / Hydrogenation of Ketone without affecting double bond CO=CHOH
PROCAT™ DHC0E PROCAT™ DHC0T	Decarboxylation Dehydration / Propionic acid to Diethyl Ketone

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Character	Form of catalyst
P	Powder
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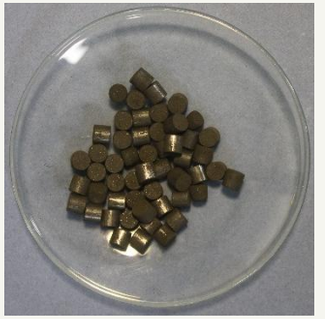

Our New Production Site:
NEOCAT PVT. LTD.

NEOCAT was born to further expand the existing products of Zeolites, Mixed Metal Oxides, Super Acids, Shaped Catalyst & Fuel Cell Catalyst. This greenfield project expansion at new site in additional Ambernath MIDC will have state-of-the-art production facilities to strengthen our quality assurance.

The New families of the catalyst to be produced at NEOCAT:

- SNC catalyst
- PMC catalyst

From Vision …

Our New Production Site:
NEOCAT PVT. LTD.

…To Reality