

Kits



ETREM

Kits



Strem Chemicals has been providing metal catalysts for research and fine chemical production for over fifty years. Our product categories include, metal catalysts and ligands for organic synthesis, heterogeneous catalysts, biocatalysts and more. We have grouped related products into kits for those customers interested in screening experiments. This booklet focuses on the kits we have available.

At Strem, we also offer a wide variety of nanomaterials and CVD/ALD precursors. Most of our products are of high purity, typically at 99%, while some are as high as 99.9999% metals purity. As an effort to expand our product line, we continually seek to provide new technologies from around the globe. We have licensing agreements with industry and academia, which allow easier access to these patent-protected products for our customers. We look forward to continued growth in order to best serve our customers' needs with the quality and service they can trust from Strem.

As part of our ongoing commitment to quality, we have achieved ISO 9001 certification for the Quality Management System (QMS) at our corporate headquarters in Newburyport, Massachusetts.

In addition, custom synthesis services are provided on a contract basis. For pharmaceutical applications, manufacturing is conducted under current Good Manufacturing Practices (cGMP) in FDA inspected kilo-lab suites. Complete documentation is available, including validation and stability studies. Active Drug Master Files (DMF's) are maintained in North America and Europe.

Our other booklets, which focus on applications and product classes, are available in print per request and also on our website. Below is a list of current booklet titles that are available. Please also check our Product Resources section online to find additional literature offerings, such as the Strem Chemiker, our technical publication, and product literature sheets.

- Buchwald Ligands and Precatalysts
- Gold Elements & Compounds
- Heterogeneous Catalysts
- Kits
- Materials for Energy Applications
- Metal Catalysts for Organic Synthesis
- MOCVD, CVD & ALD Precursors
- Nanomaterials
- New Products
- Other Ligands
- Phosphorous Ligands and Compounds
- PURATREM: High Purity Inorganics

Ephraim S. Honig, Ph.D., M.B.A.
Chief Executive Officer



KITS 07/17

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Glossary of Terms

[α]_D		Specific rotation
AAS		Atomic Absorption Standard
ACS		Conforms to American Chemical Society specifications
air sensitive		Product may chemically react with atmospheric oxygen or carbon dioxide at ambient conditions. Handle and store under an inert atmosphere of nitrogen or argon.
amp		Ampouled
b.p.		Boiling point in °C at 760mm, unless otherwise noted
d.		Density
dec.		Decomposes
elec. gr.		Electronic Grade, suitable for electronic applications
f.p.		Flash point in °F
gran.		Granular
heat sensitive		Product may chemically degrade if stored for prolonged periods of time at ambient temperatures or higher. Store at 5°C or lower.
hydrate		Unspecified water content which may vary slightly from lot to lot
hygroscopic		Product may absorb water if exposed to the atmosphere for prolonged periods of time (dependent on humidity and temperature). Handle and store under an inert atmosphere of nitrogen or argon.
light sensitive		Product may chemically degrade if exposed to light
liq.		Liquid
m.p.		Melting point in °C
moisture sensitive		Product may chemically react with water. Handle and store under an inert atmosphere of nitrogen or argon.
NMR grade		Suitable as a Nuclear Magnetic Resonance reference standard
optical grade		For optical applications
pwdr.		Powder
primary standard		Used to prepare reference standards and standardize volumetric solutions
PURATREM		Product has a minimum purity of 99.99% (metals basis)
purified		A grade higher than technical, often used where there are no official standards
P. Vol.		Pore volume
pyrophoric		Product may spontaneously ignite if exposed to air at ambient conditions
reagent		High purity material, generally used in the laboratory for detecting, measuring, examining or analyzing other substances
REO		Rare Earth Oxides. Purity of a specific rare-earth metal expressed as a percentage of total rare-earths oxides.
SA		Surface area
store cold		Product should be stored at -18°C or 4°C, unless otherwise noted (see product details)
subl.		Sublimes
superconductor grade		A high purity, analyzed grade, suitable for preparing superconductors
tech. gr.		Technical grade for general industrial use
TLC		Suitable for Thin Layer Chromatography
v.p.		Vapor pressure mm of Hg
xtl.		Crystalline

About Purity

Chemical purity		is reported after the chemical name, e.g. Ruthenium carbonyl, 99%
Metals purity		is reported in parentheses with the respective element, e.g. Gallium (III) bromide, anhydrous, granular (99.999%-Ga) PURATREM where 100% minus the metal purity is equal to the maximum allowable percentage of trace metal impurity

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BIOCATALYST KITS - CalB immo KIT™ - Immobilized enzyme**96-4050****NEW****CalB immo KIT™ - Immobilized enzyme**

Store in dry conditions (2-8°C). Do not freeze. Shelf Life: 1 year;
 Sold in collaboration with Purolite for research purposes only.
 Components also available for individual sale.
 Contains the following:

07-3130	CalB immo Plus™ - Immobilized enzyme	10g
07-3142	CalB immo 8285™ - Immobilized enzyme	10g
07-3148	CalB immo 8806™ - Immobilized enzyme	10g
07-3152	CalB immo 5587™ - Immobilized enzyme	10g
07-3155	CalB immo 1090™ - Immobilized enzyme	10g
07-3159	CalB immo 5872™ - Immobilized enzyme	10g

Item #	Immobilized on	Immobilization	Enzyme activity (PLU/g dry)
07-3130	DVB/methacrylate	Adsorption	>9,000
07-3142	Epoxy/butyl methacrylate	Covelent	>10,000
07-3148	Octadecyl methacrylate	Adsorption	>10,000
07-3152	Styrene/DVB copolymer	Adsorption	>4,000
07-3155	Macroporous styrene/DVB	Adsorption	>8,000
07-3159	Styrene/DVB	Adsorption	>3,500

Appearance: White to slightly yellow spherical beads, free from foreign matter

Principal Applications: Screening of immobilized lipases for process development, Esterifications (regio- and stereo-selective), Transesterification, Amidation, Fats and oils modification

Advantages: Fast screening in process development, Wide selection of enzyme carriers for different applications

BIOCATALYST KITS - Lipase immo Kit - Immobilized Enzymes**96-4065****NEW****Lipase immo Kit - Immobilized enzymes**

The KIT contains 10g of each of the following:

- CalB immo Plus™ (Lipase from *Candida antarctica* B)*07-3130*
- CalA immo (Lipase from *Candida antarctica* A)
- TL immo (Lipase from *Thermomyces lanuginosa*)
- RM immo (Lipase from *Rhizomucor miehei*)
- CR immo (Lipase from *Candida rugosa*)
- PS immo (Lipase from *Pseudomonas cepacia*)

A selection of immobilized lipases on different Lifetech™ ECR enzyme carrier resins for screening purposes.

Store in dry conditions (2-8°C). Do not freeze.

Sold in collaboration with Purolite for research purposes only.

Principal Applications: Esterifications (regio - and stereo-selective), Transesterification, Kinetic resolution of racemic alcohols, amines, esters and triacylglycerides, Fats and oils modification, Hydrolysis of esters

Advantages: Fast screening in process development, Wide selection of immobilized lipases, Optimal for all applications in organic solvents.

BIOCATALYST KITS - Novozymes Endoprotease Screening Kit**96-0224****NEW****Novozymes Endoprotease Screening Kit (contains 6 endoprotease enzymes)**

Store at 0-10°C. DO NOT FREEZE. Sold in collaboration with Novozymes A/S. Novozymes does not promote nor support the use of enzymes as Active Pharmaceutical Ingredients or excipients. www.strem.com/novozymes
 Components also available for individual sale.
 Contains the following:

06-3110	Alcalase® 2.4 L FG (9014-01-1)	10g
06-3112	Alcalase® 2.5 L (9014-01-1)	10g
06-3115	Esperase® 8.0 L (9014-01-1)	10g
06-3137	Savinase® 12 T (9014-01-1)	10g
06-3150	Savinase® 16 L (9014-01-1)	10g
06-3160	Neutrase® 0.8 L (9080-56-2)	10g

Item#	Density	Activity	Formulation	Optimal Conditions	Substrate Specificity
06-3110	1.17	2.4 AU-A/g	Liquid	30-65°C, pH 7-9	Serine endopeptidase
06-3112	1.08	2.5 AU-A/g	Liquid	30-65°C, pH 7-10	Serine endopeptidase
06-3115	1.07	8 KNPU-E/g	Liquid	pH 8-12.5	Serine endopeptidase
06-3137	1.13	12 KNPU S/g	Granulate	30-70°C, pH 8-10	Serine endopeptidase
06-3150	1.16	16 KNPU S/g	Liquid	30-70°C, pH 8-10	Serine endopeptidase
06-3160	1.26	0.8 AU/g	Liquid	40-50°C, pH 7	Metalloprotease

Optimal storage is 0-10°C/32-50°F. If stored above 25°C/77°F the samples should be used within 3 months.

BIOCATALYST KITS - Novozymes Lipase Screening Kit**96-0220****NEW****Novozymes Lipase Screening Kit (contains 9 lipase enzymes)**

Store at 0-10°C. DO NOT FREEZE. Sold in collaboration with Novozymes A/S. Novozymes does not promote nor support the use of enzymes as Active Pharmaceutical Ingredients or excipients. www.strem.com/novozymes
 Components also available for individual sale.
 Contains the following:

06-3100	NovoCor® AD L (9001-62-1)	10g
06-3105	Lipozyme® CALB L (9001-62-1)	10g
06-3118	Palatase® 20000 L (9001-62-1)	5g
06-3120	Novozym® 40086 (9001-62-1)	5g
06-3123	Novozym® 435 (9001-62-1)	5g
06-3125	Resinase® HT (9001-62-1)	10g
06-3135	Novozym® 51032 (9001-62-1)	10g
06-3140	Lipozyme® TL 100 L (9001-62-1)	10g
06-3155	Lipozyme® TL IM (9001-62-1)	10g

Item#	Density	Activity	Formulation	Optimal Conditions	Substrate Specificity
06-3100	1.17	6000 LU/g	Liquid	30-60°C, pH 5-9	Sterically hindered esters
06-3105	1.20	5000 LU/g	Liquid	30-60°C, pH 5-9	Esters and alcohols
06-3118	1.19	20000 LU/g	Liquid	30-50°C, pH 7-10	Esters
06-3120	0.33	275 IUN/g	Immobilized Granulate	30-50°C, pH 7-10	Esters
06-3123	0.40	10000 PLU/g	Immobilized Granulate	30-60°C, pH 5-9	Esters and alcohols
06-3125	1.05	50 KLU/g	Liquid	up to 90°C, pH 5-8	Esters
06-3135	1.04	15 KLU/g	Liquid	35-70°C, pH 7-10	Esters
06-3140	1.05	100 KLU/g	Liquid	20-50°C, pH 7-10	Esters and diesters
06-3155	0.40	250 IUN/g	Immobilized Granulate	50-75°C, pH 6-8	Esters

Optimal storage is 0-10°C/32-50°F. If stored above 25°C/77°F the samples should be used within 3 months.

BIOCATALYST KITS - Provivi Carbene/Nitrene Transferase Screening Kit

96-1580

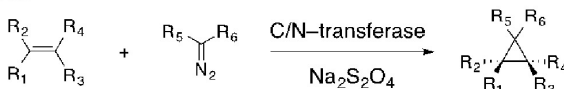
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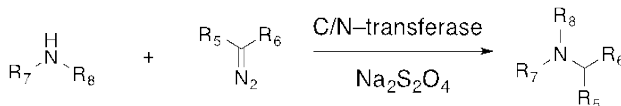
Provivi Carbene/Nitrene Transferase Screening Kit

Store dry at -20°C. Sold under license from Provivi for research purposes only.

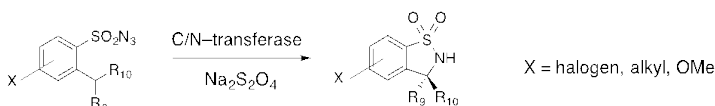
Contains the following:

1. Reactions Catalyzed

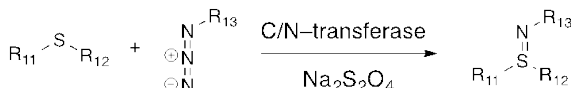
Synthesis of cyclopropanes via carbene transfer catalyzed by carbene/nitrene transferases.



Synthesis of substituted amines via carbene transfer catalyzed by carbene/nitrene transferases.



Synthesis of substituted benzosultams via nitrene transfer catalyzed by carbene/nitrene transferases.



Synthesis of sulfimides via nitrene transfer catalyzed by carbene/nitrene transferases.

2. Provivi C/N Transferase Screening Kit General Information

Provivi's proprietary enzymes can efficiently activate diazo and azide compounds to generate iron-carbenoids and iron-nitrenoids, respectively, through a mode of activation that has never been observed in nature. These intermediates can then react with a variety of substrates such as olefins, N-H bonds, C-H bonds, and sulfides, offering wide synthetic utility. After identifying initial activity on a reaction of interest, these enzymes can be further engineered and optimized (e.g. via directed evolution) to achieve high activity and stereoselectivity for a reaction of interest.

All reactions are best performed under anaerobic conditions. Cyclopropanes are synthesized by the reaction of a diazo carbene precursor (e.g. ethyl diazoacetate) with an olefin in the presence of a carbene/nitrene transferase as catalyst. The cyclopropanation instructions described in this technical note can be readily adapted for the other carbene and nitrene transfer reactions outlined above.

3. Provivi C/N Transferase Screening Kit Contents

- 24 vials (2 vials of each of 12 different enzymes, containing 50 nMoles of enzyme, enough for two screens) packed as lyophilized powders containing potassium phosphate in 2 ml screwcap vials
- 2 x 20 ml bottles containing 0.12 mMoles (25 mg) of 85% sodium dithionite (sodium hydrosulfite)

Each kit contains 12 different carbene/nitrene transfer enzymes as lyophilized powders together with potassium phosphate buffer. When reconstituted by the addition of deionized water and sodium dithionite as specified in the Screening Protocol in Section 4, each enzyme will be ready for immediate use under the desired reaction screening conditions: 50 nM/ml enzyme in 50mM potassium phosphate buffer, 10 mM sodium dithionite, pH 7.

Enzymes	PRVV-009	PRVV-010	PRVV-011	PRVV-013	PRVV-019	PRVV-032
	PRVV-034	PRVV-036	PRVV-040	PRVV-041	PRVV-042	PRVV-043

The enzymes should be stored dry at -20°C, and should be stable for more than 1 year under these conditions. We recommend that solutions of the enzymes be used the same day as they are prepared and not stored for extended periods of time. If storage of enzyme solutions is needed, we recommend storage at 4°C for periods of 1-2 days. For longer periods we recommend flash freezing the solutions and storage at -20°C.

BIOCATALYST KITS - Provivi Carbene/Nitrene Transferase Screening Kit

4. Screening Protocol

1. Add 12ml of deionized (DI) water to the bottle containing sodium sithionite and dissolve by inversion.
2. Purge the sodium dithionite solution with nitrogen or argon by bubbling for 5 minutes. Sodium dithionite solutions should be made immediately prior to use and kept anaerobic, as sodium dithionite undergoes air oxidation over time.
3. Add 1 ml of purged dithionite solution to each enzyme vial.
4. Add alkene (either neat or dissolved as 20% w/v in methanol or ethanol) to achieve a 1% w/v final concentration (50 microliters of a 20% methanol/ethanol solution; final concentration of 10 mg alkene per ~1 ml reaction mixture). Do not worry if the alkene is not completely soluble. The reaction should still take place.
5. Add the diazo compound last (either neat or dissolved as 20% w/v in methanol or ethanol; ethyl diazoacetate is the most common choice and recommended as a positive control if another carbene precursor is used) to achieve 0.5% w/v final concentration (25 microliters of a 20% methanol/ethanol solution; 5mg diazo compound per ~1 ml reaction mixture) to initiate the reaction.
6. Allow reaction to proceed with mixing by shaking up to 800 rpm, taking samples at regular time points to analyze for product formation starting at 30 minutes. The reaction should be largely complete within 1-2 hours.
7. Samples may be quenched by the addition of each time point sample to an equal volume of extraction solvent (dichloromethane, hexane, and similar are recommended) for analysis by GC or HPLC. For a 1 ml reaction volume, samples of 0.2 ml can be withdrawn and diluted into 0.2 ml extraction solvent. If the product is water soluble, and/or if analysis will be by HPLC, quenching can be done by dilution of the sample into an equal volume of acetonitrile.

For tech support and questions: enzymes@provivi.com

5. Recommended Literature

Farwell, C.C., McIntosh, J.A., Hyster, T.K., Wang, Z.J. & Arnold, F.H., Enantioselective Imidation of Sulfides via Enzyme-Catalyzed Intermolecular Nitrogen-Atom Transfer *Journal of the American Chemical Society* **136**, 8766-8771 (2014).

Wang, Z.J., Renata, H., Peck, N.E., Farwell, C.C., Coelho, P.S. & Arnold, F.H., Improved Cyclopropanation Activity of Histidine-Ligated Cytochrome P450 Enables the Enantioselective Formal Synthesis of Levomilnacipran. *Angewandte Chemie Int Ed.* **126**, 6928-6931 (2014).

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Coelho, P.S., Wang, Z.J., Ener, M.E., Baril, S.A., Kannan, A., Arnold, F.H. & Brustad, E.M., A serine-substituted P450 catalyzes highly efficient carbene transfer to olefins in vivo. *Nature Chemical Biology* **9**, 485-487 (2013).

McIntosh J. A., Coelho, P.S., Farwell, C.C., Wang, Z.J., Lewis, J.C., Brown, T.R. & Arnold, F.H., Enantioselective intramolecular C-H amination catalyzed by engineered cytochrome P450 enzymes in vitro and in vivo. *Angewandte Chemie (International ed. in English)* **52**, 9309-9312 (2013).

BIOCATALYST KITS - Apeiron Ruthenium Metathesis Catalyst Kit

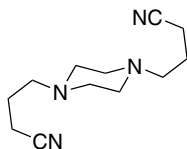
96-0400

NEW**Apeiron Ruthenium Metathesis Catalyst Kit**

Sold in collaboration with Apeiron Synthesis, Inc.

Components also available for individual sale.

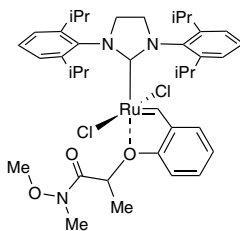
Contains the following:



07-2203

1g

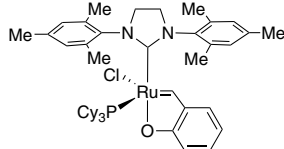
SnatchCat Metal Scavenger



44-0750

100mg

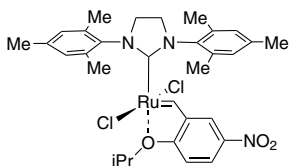
GreenCat



44-0753

100mg

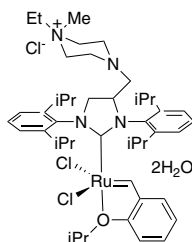
LatMet



44-0758

100mg

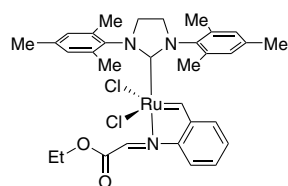
nitro-Grela



44-0759

100mg

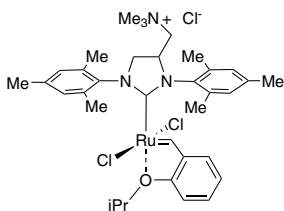
FixCat



44-0760

100mg

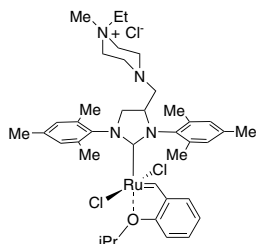
HeatMet



44-0765

100mg

StickyCat Cl



44-0768

100mg

AquaMet

CATALYST & ORGANOCATALYST KITS - BASF Blocking Group Removal Catalyst Kit**96-6715****BASF Blocking Group Removal Catalyst Kit**

Sold in collaboration with BASF for research purposes only.

Components also available for individual sale.

Contains the following:

46-1905	Palladium, 10% on activated wood carbon, reduced, 50% water wet (Escat™ 1931) (7440-05-3)	10g
46-1906	Palladium, 10% on activated wood carbon, unreduced, 50% water wet (Escat™ 1921) (7440-05-3)	10g
46-1907	Palladium, 3% on activated carbon, reduced, 50% water wet paste (Escat™ 1911) (7440-05-3)	10g
46-1908	Palladium, 5% on activated carbon, reduced, 50% water wet paste (Escat™ 1941) (7440-05-3)	10g
46-1909	Palladium, 5% on activated carbon, reduced, 50% water wet paste (Escat™ 1961) (7440-05-3)	10g
46-1911	Palladium, 5% on activated carbon, reduced, 50% water wet paste (Escat™ 1971) (7440-05-3)	10g

CATALYST & ORGANOCATALYST KITS - BASF Heterogeneous Catalyst Kit**96-6717****BASF Heterogeneous Catalyst Kit**

HAZ

Product offered is commercial grade, sold in collaboration with BASF for research purposes only.

Components also available for individual sale. Contains the following:

44-4065	Ruthenium, 5% on activated carbon, reduced, 50% water wet paste (Escat™ 4401) (7440-18-8)	5g
45-1875	Rhodium, 5% on activated wood carbon, reduced, 50% water wet paste (Escat™ 3401) (7440-16-6)	1g
46-1707	Palladium, 20% on activated carbon (Pearlman's catalyst), unreduced, 50% water wet paste (Escat™ 1951) (7440-05-3)	5g
46-1710	Palladium, 0.6% on activated carbon, 50% water-wet paste (NanoSelect LF 100) (7440-05-3)	5g
46-1901	Palladium, 5% on activated peat carbon, reduced, 50% water wet paste (Escat™ 1621) (7440-05-3)	10g
46-1902	Palladium, 5% on activated wood carbon, reduced, dry (Escat™ 1431) (7440-05-3)	10g
46-1903	Palladium, 5% on activated wood carbon, reduced, 50% water wet paste (Escat™ 1421) (7440-05-3)	10g
46-1904	Palladium, 5% on activated wood carbon, unreduced, 50% water wet paste (Escat™ 1471) (7440-05-3)	10g
46-1905	Palladium, 10% on activated wood carbon, reduced, 50% water wet (Escat™ 1931) (7440-05-3)	10g
46-1951	Palladium, 5% on alumina powder, reduced, dry (Escat™ 1241) (7440-05-3)	5g
78-1611	Platinum, 5% on activated wood carbon, reduced, dry (Escat™ 2431) (7440-06-4)	5g
78-1612	Platinum, 5% on activated wood carbon, reduced, 50% water wet paste (Escat™ 2421) (7440-06-4)	5g
78-1613	Platinum, 5% on activated carbon, unreduced, 50% water wet paste (Escat™ 2441) (7440-06-4)	5g

CATALYST & ORGANOCATALYST KITS - BASF Palladium Catalyst Kit**96-6719**

HAZ

BASF Palladium Catalyst Kit

Product offered is commercial grade, sold in collaboration with BASF for research purposes only.

Components also available for individual sale. Contains the following:

46-1707	Palladium, 20% on activated carbon (Pearlman's catalyst), unreduced, 50% water wet paste (Escat™ 1951) (7440-05-3)	5g
46-1710	Palladium, 0.6% on activated carbon, 50% water-wet paste (NanoSelect LF 100) (7440-05-3)	5g
46-1901	Palladium, 5% on activated peat carbon, reduced, 50% water wet paste (Escat™ 1621) (7440-05-3)	10g
46-1902	Palladium, 5% on activated wood carbon, reduced, dry (Escat™ 1431) (7440-05-3)	10g
46-1903	Palladium, 5% on activated wood carbon, reduced, 50% water wet paste (Escat™ 1421) (7440-05-3)	10g
46-1904	Palladium, 5% on activated wood carbon, unreduced, 50% water wet paste (Escat™ 1471) (7440-05-3)	10g
46-1905	Palladium, 10% on activated wood carbon, reduced, 50% water wet (Escat™ 1931) (7440-05-3)	10g
46-1906	Palladium, 10% on activated wood carbon, unreduced, 50% water wet (Escat™ 1921) (7440-05-3)	10g
46-1951	Palladium, 5% on alumina powder, reduced, dry (Escat™ 1241) (7440-05-3)	5g

CATALYST & ORGANOCATALYST KITS - BASF Platinum Catalyst Kit**96-6721**

HAZ

BASF Platinum Catalyst Kit

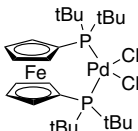
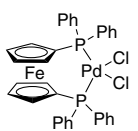
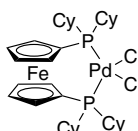
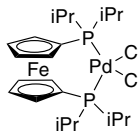
Product offered is commercial grade, sold in collaboration with BASF for research purposes only.

Components also available for individual sale. Contains the following:

78-1611	Platinum, 5% on activated wood carbon, reduced, dry (Escat™ 2431) (7440-06-4)	5g
78-1612	Platinum, 5% on activated wood carbon, reduced, 50% water wet paste (Escat™ 2421) (7440-06-4)	5g
78-1613	Platinum, 5% on activated carbon, unreduced, 50% water wet paste (Escat™ 2441) (7440-06-4)	5g
78-1614	Platinum, 3% on activated wood carbon, reduced, 70% water wet paste (Escat™ 2931) (7440-06-4)	5g
78-1661	Platinum, 5% on alumina powder, reduced, dry (Escat™ 2941) (7440-06-4)	5g
78-1892	Platinum(IV) oxide hydrate (~80-82% Pt) (99.95+%-Pt) ADAMS' CATALYST [BASF C7018] (52785-06-5)	1g

CATALYST & ORGANOCATALYST KITS - [1,1'-Bis(dialkyl/diarylphosphino)ferrocene]palladium (II) dichloro Catalyst Kit**96-3735****[1,1'-Bis(dialkyl/diarylphosphino)ferrocene]palladium(II) dichloro Catalyst Kit**

Components also available for individual sale. Contains the following:

	46-0445	500mg		46-0450	1g		46-0455	250mg		46-0460	500mg
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CATALYST & ORGANOCATALYST KITS - Buchwald Palladacycle Precatalyst Kit 1

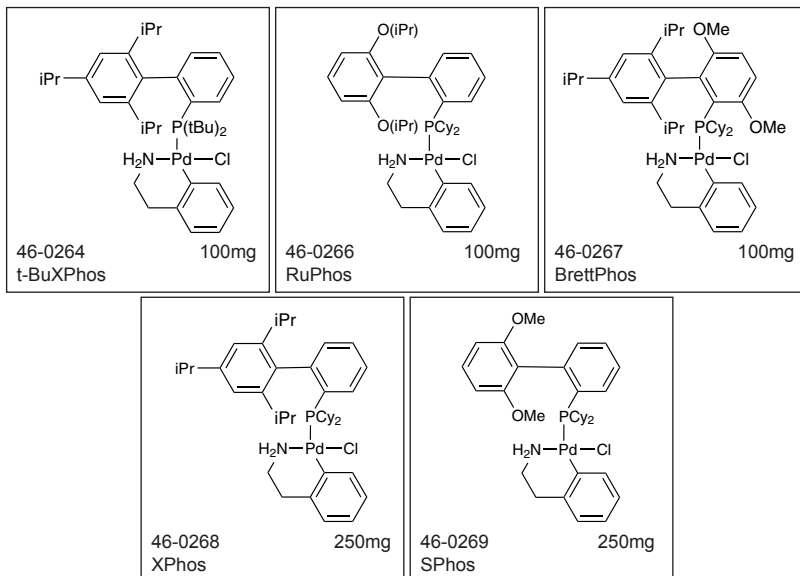
96-5503

Buchwald Palladacycle Precatalyst Kit 1

(Chloro-2-aminoethylphenyl- Palladacycles Gen. 1)

Patents US 6,395,916, US 6,307,087.

Components also available for individual sale. Contains the following:



CATALYST & ORGANOCATALYST KITS - Buchwald Palladacycle Precatalyst Kit 3

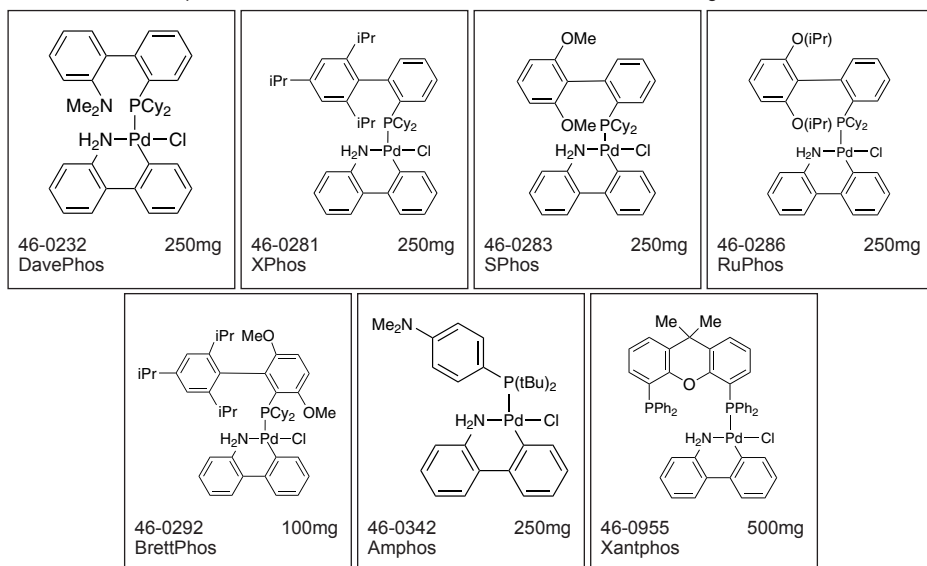
96-5508

Buchwald Palladacycle Precatalyst Kit 3

(Chloro- 2'-amino-1,1'-biphenyl-2-yl - Palladacycles Gen. 2)

Patents: US 6,395,916, US 6,307,087.

Components also available for individual sale. Contains the following:



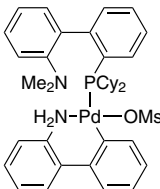
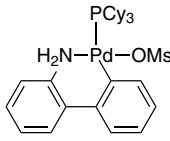
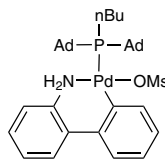
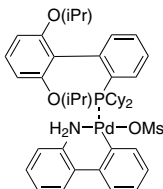
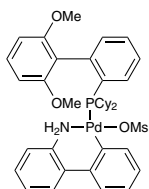
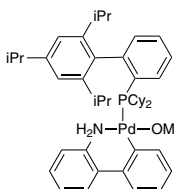
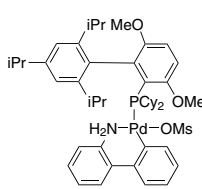
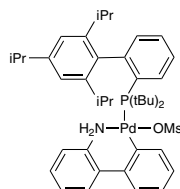
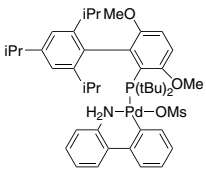
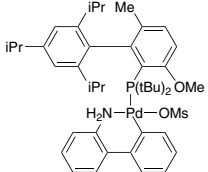
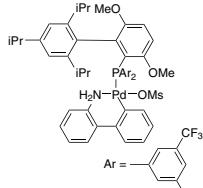
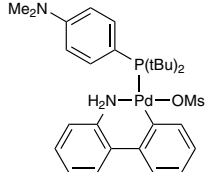
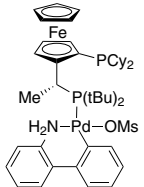
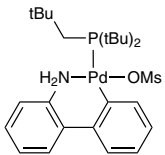
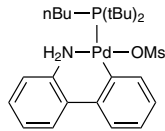
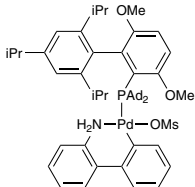
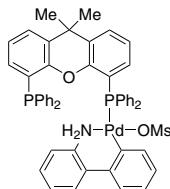
CATALYST & ORGANOCATALYST KITS - Buchwald Palladacycle Precatalyst Kit 2a

96-5505

Buchwald Palladacycle Precatalyst Kit 2a**(Methanesulfonato-2'-amino-1,1'-biphenyl-2-yl)- Palladacycles Gen. 3)**

Patents: US 6,395,916, US 6,307,087.

Components also available for individual sale. Contains the following:

 46-0237 250mg DavePhos	 46-0239 250mg PCy3	 46-0278 250mg cataCXium® A	 46-0314 250mg RuPhos
 46-0318 250mg SPhos	 46-0320 250mg XPhos	 46-0322 100mg BrettPhos	 46-0323 250mg t-BuXPhos
 46-0325 100mg t-BuBrettPhos	 46-0335 100mg RockPhos	 46-0340 100mg JackiePhos	 46-0345 250mg Amphos
 46-0353 100mg Josiphos	 46-0358 250mg DTBNpP	 46-0365 250mg P(t-Bu)2(n-Bu)	 46-0480 50mg AdBrettPhos
 46-0957 500mg Xantphos			

CATALYST & ORGANOCATALYST KITS - Buchwald Palladacycle Precatalyst Kit 2b

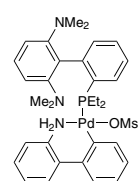
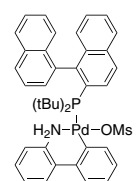
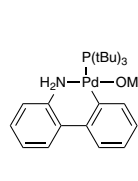
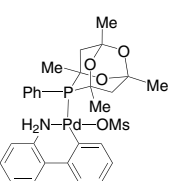
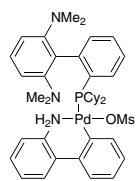
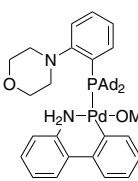
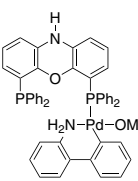
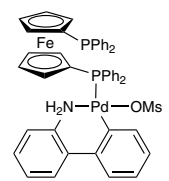
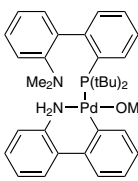
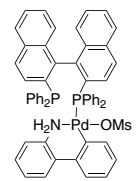
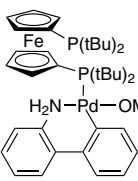
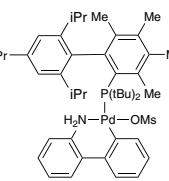
96-5506

NEW**Buchwald Palladacycle Precatalyst Kit 2b****(Methanesulfonato-2'-amino-1,1'-biphenyl-2-yl- Palladacycles Gen. 3)**

Patents: US 6,395,916, US 6,307,087.

Components also available for individual sale.

Contains the following:

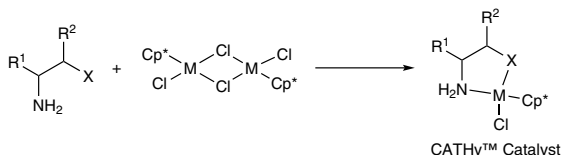
 46-0348 EtCPhos 50mg	 46-0357 TrixiePhos 100mg	 46-0387 P(t-Bu)₃ 50mg	 46-0392 MeCgPPH 500mg
 46-0487 CPhos 100mg	 46-0935 Mor-DalPhos 50mg	 46-0959 NiXantphos 100mg	 46-2128 DPPF 250mg
 46-2135 t-BuDavePhos 250mg	 46-2153 BINAP 250mg	 46-2158 DTBPF 250mg	 46-2163 Me4 t-ButylXPhos 100mg

CATALYST & ORGANOCATALYST KITS - CATHy™ Catalyst Kit

96-7650

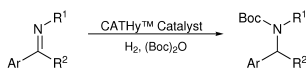
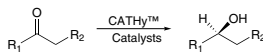
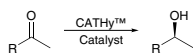
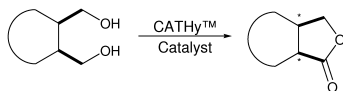
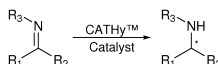
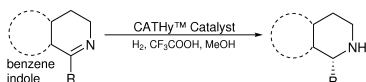
CATHy™ Catalyst Kit for Asymmetric Transfer Hydrogenation of Ketones and Imines
(continued)

Catalyst Preparation



Technical Notes:

1. Catalyst for asymmetric ketone reduction in organic and aqueous media
2. Catalyst for asymmetric imine reduction in organic and aqueous media
3. Catalyst for asymmetric oxidative lactonizations of meso-diols
4. Catalyst for asymmetric transfer hydrogenation of quinolines

**Tech. Note (1)**
Ref. (1-7)**Tech. Note (2)**
Ref. (1, 8-10)**Tech. Note (3)**
Ref. (11)**Tech. Note (4)**
Ref. (12-13)

References:

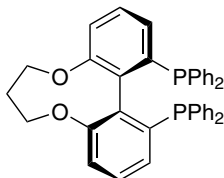
1. Blacker A.J., Mellor B.J. WO9842643A1, filed 26/03/97, Avecia Ltd.; Blacker A.J. Conf. Proceedings: The Scale up of Chemical Processes. Jersey 1998 ISBN 0953399400;
2. *Tetrahedron*, **2006**, 62, 1864
3. *Org. Lett.*, **2007**, 9, 2565
4. *Chem. Eur. J.* **2008**, 14, 2209
5. *J. Org. Chem.* **2010**, 75, 2981
6. *J. Org. Chem.* **2015**, 80, 4419
7. *J. Organometal. Chem.* **2016**, 810, 12
8. *Chem. Eur. J.* **2011**, 17, 1109
9. *Org. Lett.* **2015**, 17, 2878
10. *Chem. Commun.*, **2016**, 52, 362
11. *Organometallics* **2002**, 21, 3493
12. *Org. Lett.*, **2008**, 10, 5265
13. *Angew. Chem. Int. Ed.* **2009**, 48, 6524

CATALYST & ORGANOCATALYST KITS - Chiral Quest Catalyst & Ligand Toolbox Kit

96-5900

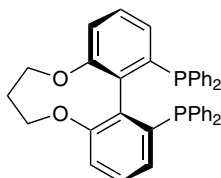
Chiral Quest Catalyst and Ligand Toolbox Kit for Asymmetric Hydrogenation

Components also available for individual sale. Contains the following:



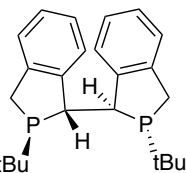
15-0175
(R)-C₃-TUNEPHOS

100mg



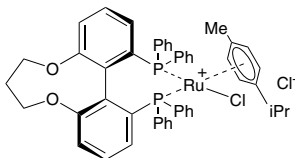
15-0176
(S)-C₃-TUNEPHOS

100mg



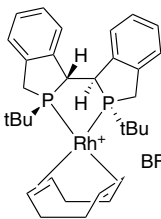
15-1060
(R,R,S,S)-DUANPHOS

100mg



44-0109
(R)-C₃-TUNEPHOS-Ru

100mg



45-0663
(R,R,S,S)-DUANPHOS-Rh

100mg

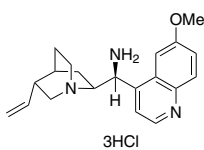
CATALYST & ORGANOCATALYST KITS - Cinchona Alkaloid-Derived Organocatalyst Kit

96-1575

Cinchona Alkaloid-Derived Organocatalyst Kit -

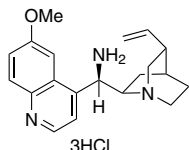
(enantiopure primary amines) for Iminium-Enamine Activation

Components also available for individual sale. Contains the following:



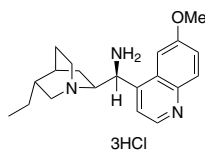
07-1710

100mg



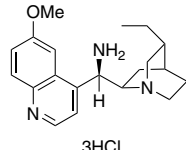
07-1715

100mg



07-1718

100mg

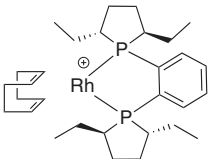
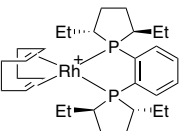
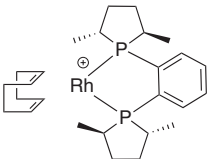
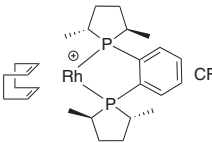
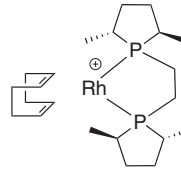
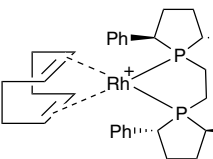
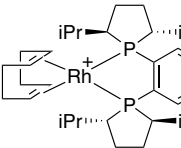


07-1722

100mg

CATALYST & ORGANOCATALYST KITS - (R,R)-Duphos & BPE Rhodium Catalyst Kit**96-4730 (R,R)-Duphos and BPE Rhodium Catalyst Kit for Asymmetric Hydrogenation**

Components also available for individual sale. Contains the following:

 45-0148 (R,R)-Et-DUPHOS-Rh 100mg	 45-0150 (R,R)-Et-DUPHOS-Rh 100mg	 45-0158 (R,R)-Me-DUPHOS-Rh 100mg
 45-0160 (R,R)-Me-DUPHOS-Rh 100mg	 45-0168 (R,R)-Me-BPE-Rh 100mg	 45-0201 (R,R)-Ph-BPE-Rh 100mg
 45-0210 (R,R)-i-Pr-DUPHOS-Rh 100mg		

CATALYST & ORGANOCATALYST KITS - (S,S)-Duphos & BPE Rhodium Catalyst Kit**96-4731 (S,S)-Duphos and BPE Rhodium Catalyst Kit for Asymmetric Hydrogenation**

Components also available for individual sale. Contains the following:

45-0149	(+)-1,2-Bis((2S,5S)-2,5-diethylphospholano)benzene(1,5-cyclooctadiene) rhodium(I) tetrafluoroborate, 98+% (S,S)-Et-DUPHOS-Rh (213343-64-7)	100mg
45-0151	(+)-1,2-Bis((2S,5S)-2,5-diethylphospholano)benzene(1,5-cyclooctadiene)rhodium(I) trifluoromethanesulfonate, 98+% (S,S)-Et-DUPHOS-Rh (142184-30-3)	100mg
45-0159	(+)-1,2-Bis((2S,5S)-2,5-dimethylphospholano)benzene(1,5-cyclooctadiene) rhodium(I) tetrafluoroborate, 98+% (S,S)-Me-DUPHOS-Rh (205064-10-4)	100mg
45-0161	(+)-1,2-Bis((2S,5S)-2,5-dimethylphospholano)benzene(1,5-cyclooctadiene) rhodium(I) trifluoromethanesulfonate, 98+% (S,S)-Me-DUPHOS-Rh (136705-75-4)	100mg
45-0169	(-)-1,2-Bis((2S,5S)-2,5-dimethylphospholano)ethane(1,5-cyclooctadiene) rhodium(I) tetrafluoroborate, 98+% (S,S)-Me-BPE-Rh (213343-65-8)	100mg
45-0202	(+)-1,2-Bis((2S,5S)-2,5-diphenylphospholano)ethane(1,5-cyclooctadiene) rhodium(I) tetrafluoroborate, min. 98% (S,S)-Ph-BPE-Rh (849950-53-4)	100mg
45-0211	(-)-1,2-Bis((2S,5S)-2,5-di-i-propylphospholano)benzene(1,5-cyclooctadiene) rhodium(I) tetrafluoroborate, min. 98% (S,S)-i-Pr-DUPHOS-Rh	100mg

CATALYST & ORGANOCATALYST KITS - Enantitech BIMA Ru BINAP Catalyst Kit

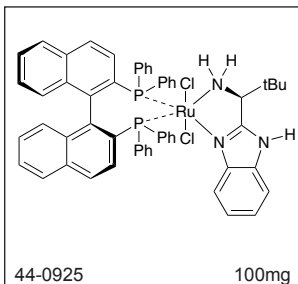
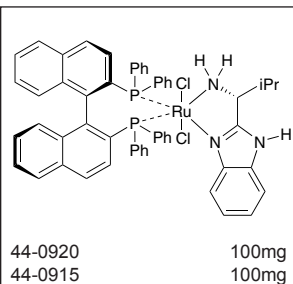
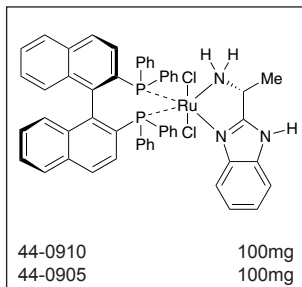
96-3705 Enantitech BIMA Ru BINAP Catalyst Kit for Asymmetric Hydrogenation

Sold under license from Enantitech for research purposes.

PCT/CN2008/073648, CN 200810038929.

Components also available for individual sale.

Contains the following:



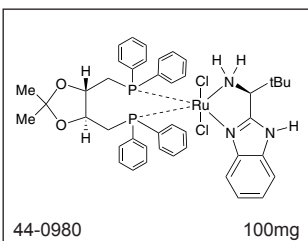
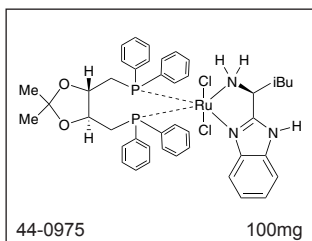
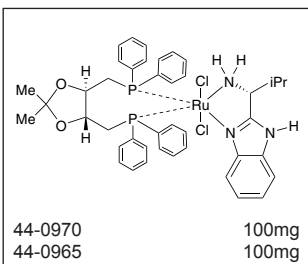
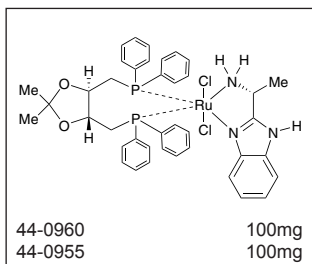
CATALYST & ORGANOCATALYST KITS - Enantitech BIMA Ru DIOP Catalyst Kit

96-3715 Enantitech BIMA Ru DIOP Catalyst Kit for Asymmetric Hydrogenation

Sold under license from Enantitech for research purposes only.

PCT/CN2008/073648, CN 200810038929.

Components also available for individual sale. Contains the following:



CATALYST & ORGANOCATALYST KITS - Enantiotech BIMA Ru Tol-BINAP Catalyst Kit

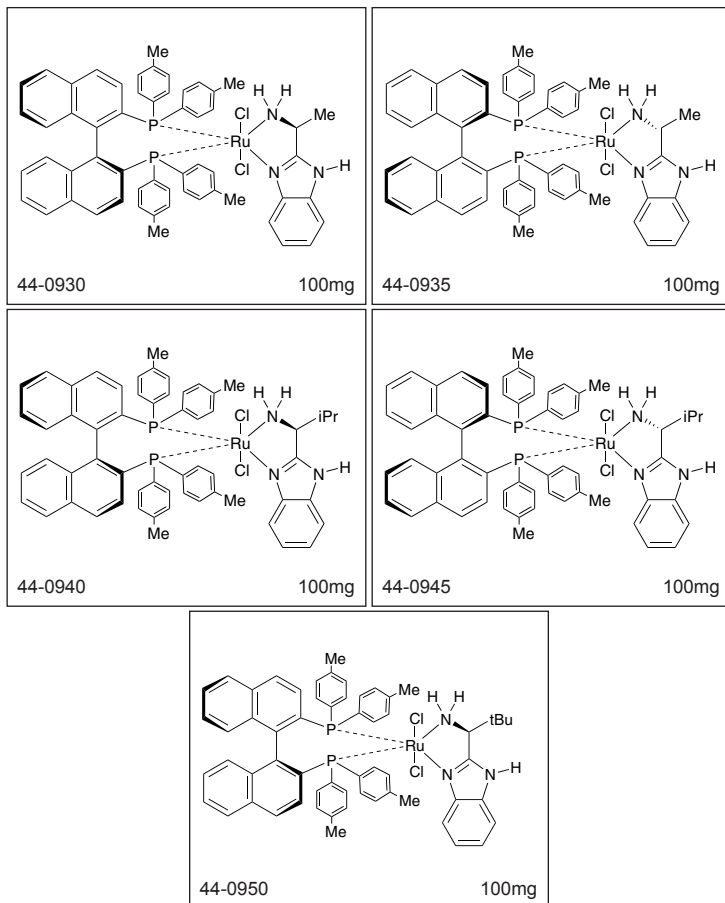
96-3710

Enantiotech BIMA Ru Tol-BINAP Catalyst Kit for Asymmetric Hydrogenation

Sold under license from Enantiotech for research purposes only.

PCT/CN2008/073648, CN 200810038929.

Components also available for individual sale. Contains the following:



CATALYST & ORGANOCATALYST KITS - Evonik Heterogeneous Catalyst Kit**96-6670****Evonik Heterogeneous Catalyst Kit**

Components also available for individual sale. Contains the following:

44-4060	Ruthenium, 5% on activated carbon, (50-70% wetted powder) Evonik Noblyst® P3060 (7440-18-8)	10g
45-1863	Rhodium, 5% on activated carbon (50-70% wetted powder) Evonik Noblyst® P3053 (7440-16-6)	10g
46-1703	Palladium, 5% on activated carbon (50-70% wetted powder) Evonik Noblyst® P1086 (7440-05-3)	10g
46-1706	Palladium, 10% on activated carbon, Pearlman (50-70% wetted powder) Evonik Noblyst® P1070 (7440-05-3)	10g
46-1740	Palladium, 5% on activated carbon (50-70% wetted powder) Evonik Noblyst® P1090 (7440-05-3)	10g
46-1743	Palladium, 5% on activated carbon (50-70% wetted powder) Evonik Noblyst® P1093 (7440-05-3)	10g
46-1747	Palladium, 5% on activated carbon (50-70% wetted powder) Evonik Noblyst® P1092 (7440-05-3)	10g
46-1750	Palladium, 5% on activated carbon (50-70% wetted powder) Evonik Noblyst® P1109 (7440-05-3)	10g
78-1530	Platinum, 5% on activated carbon (50-70% wetted powder) Evonik Noblyst® P2058 (7440-06-4)	10g
78-1534	Platinum, 5% on activated carbon (50-70% wetted powder) Evonik Noblyst® P2060 (7440-06-4)	10g
78-1536	Platinum 1% and vanadium 2%, on activated carbon (50-70% wetted powder) Evonik Noblyst® P8078 (7440-06-4)	10g
78-1540	Platinum, 3% on activated carbon, sulfided (50-70% wetted powder) Evonik Noblyst® P2065 (7440-06-4)	10g

CATALYST & ORGANOCATALYST KITS - Evonik Heterogeneous Catalyst Kit for Selective Hydrogenation**96-6674****Evonik Heterogeneous Catalyst Kit for Selective Hydrogenation**

Components also available for individual sale. Contains the following:

44-4060	Ruthenium, 5% on activated carbon, (50-70% wetted powder) Evonik Noblyst® P3060 (7440-18-8)	10g
45-1863	Rhodium, 5% on activated carbon (50-70% wetted powder) Evonik Noblyst® P3053 (7440-16-6)	10g
78-1530	Platinum, 5% on activated carbon (50-70% wetted powder) Evonik Noblyst® P2058 (7440-06-4)	10g
78-1534	Platinum, 5% on activated carbon (50-70% wetted powder) Evonik Noblyst® P2060 (7440-06-4)	10g
78-1536	Platinum 1% and vanadium 2%, on activated carbon (50-70% wetted powder) Evonik Noblyst® P8078 (7440-06-4)	10g
78-1540	Platinum, 3% on activated carbon, sulfided (50-70% wetted powder) Evonik Noblyst® P2065 (7440-06-4)	10g

CATALYST & ORGANOCATALYST KITS - Evonik Heterogeneous Palladium Catalyst Kit**96-6672****Evonik Heterogeneous Palladium Catalyst Kit**

Components also available for individual sale. Contains the following:

46-1703	Palladium, 5% on activated carbon (50-70% wetted powder) Evonik Noblyst® P1086 (7440-05-3)	10g
46-1706	Palladium, 10% on activated carbon, Pearlman (50-70% wetted powder) Evonik Noblyst® P1070 (7440-05-3)	10g
46-1740	Palladium, 5% on activated carbon (50-70% wetted powder) Evonik Noblyst® P1090 (7440-05-3)	10g
46-1743	Palladium, 5% on activated carbon (50-70% wetted powder) Evonik Noblyst® P1093 (7440-05-3)	10g
46-1747	Palladium, 5% on activated carbon (50-70% wetted powder) Evonik Noblyst® P1092 (7440-05-3)	10g
46-1750	Palladium, 5% on activated carbon (50-70% wetted powder) Evonik Noblyst® P1109 (7440-05-3)	10g

CATALYST & ORGANOCATALYST KITS - Evonik Heterogeneous Catalyst Kits

Application Sheet

Kits 96-6670, 96-6672 & 96-6674 sold in collaboration with Evonik for research purposes only.

96-6670 - Heterogeneous Catalyst Kit												
Stream Item #	96-6672 - Palladium Catalyst Kit				96-6674 - Selective Hydrogenation Kit							
	46-1706	46-1703	46-1740	46-1747	46-1743	46-1750	78-1530	78-1534	78-1540	45-1863	44-4060	78-1536
Evonik Item #	E 101 NEW	E 101 RW	E 105 NW	E 105 NW	E 105 OW	E 107 MA	F 1015 REW	F 105 NW	F 1082 Q&W	G 106 NW	H 198 PW	CF 1082 BVW
Nobylst® nomenclature Application/ Catalyst	Nobylst® P 1070 10% Pd	Nobylst® P 1086 5% Pd	Nobylst® P 1090 5% Pd	Nobylst® P 1092 5% Pd	Nobylst® P 1093 5% Pd	Nobylst® P 1109 5% Pd	Nobylst® P 2058 5% Pd	Nobylst® P 2060 5% Pd	Nobylst® P 2065 3% Pd	Nobylst® P 2053 5% Rh	Nobylst® P 3060 5% Ru	Nobylst® P 8078 1% Pt
Hydrogenation of C=C Double Bonds		●		○	●	○						
Hydrogenation of CN Bonds	○		○	●		●	○	●		●		
Reduction of the C=O Group		○		●	○	●				●		
Hydrogenation of Nitro Groups	●	●		●	○	○	●	○	○		●	●
Hydrogenolysis Reactions (Deprotections, Dehalogenations, etc.)	○		●	●		○						
Reductive Alkylation and Amination		●	○	○	●				●			
Hydrogenation of (Hetero) Aromatic Rings		●	○	●	○		○	○		●	●	
Oxidations (Alcohols and Sugars)							●	●				
CC Coupling Reactions	○			●	●	○						
												○ recommended ● preferred

Note: Please refer to the different reaction classes in the Evonik manual for more detailed information regarding selectivity, activity and reaction conditions. This sample kit is designed as an entry point to find a suitable catalyst. Please contact one of our technical specialists for further recommendations. Most often the catalyst performance can be improved significantly by tailoring the catalyst to your requirements.

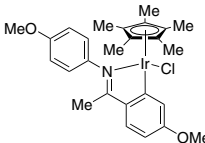
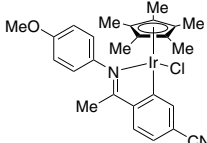
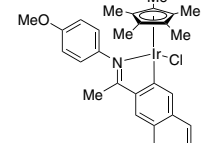
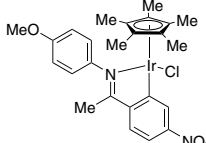
The recommendations given above are believed to be accurate at the time of publication but EVONIK makes no warranty with respect thereto, including but not limited to any results to be obtained or the infringement of any proprietary right.

CATALYST & ORGANOCATALYST KITS - Iridicycle Catalyst Kit**96-3745 Iridicycle Catalyst Kit**

Sold in collaboration with Yorkshire Process Technology for research purposes only. Developed by Prof. J. Xiao, Liverpool University.

Patents GB 1206572.8 and GB 1206573.6

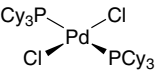
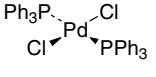
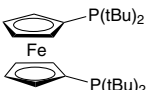
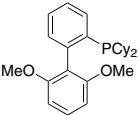
Components also available for individual sale. Contains the following:

 77-0418 100mg Iridicycle-MeO	 77-0424 100mg Iridicycle-CN	 77-0428 100mg Iridicycle-Naphth	 77-0430 100mg Iridicycle-NO₂
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CATALYST & ORGANOCATALYST KITS - Kit of CatKits - Single-Use Vials**96-3790 Kit of CatKits - Single-Use Vials for Low Catalyst Loading Experiments**

Components also available for individual sale. Contains the following:

46-2030	Palladium(II) acetate/1,1'-bis(di-t-butylphosphino)ferrocene/potassium phosphate admixture [CatKit single-use vials - 2.02 wt% Pd(OAc) ₂]	5 x 1vial
46-2033	Palladium(II) acetate/2-dicyclohexylphosphino-2,6-dimethoxy-1,1'-bi-phenyl (SPhos)/potassium phosphate admixture [CatKit single-use vials - 1.96 wt% Pd(OAc) ₂]	5 x 1vial
46-2038	trans-Dichlorobis(triphenylphosphine)palladium(II)/potassium phosphate admixture [CatKit single-use vials - 6.32 wt% Pd complex] (13965-03-2)	5 x 1vial
46-2040	trans-Dichlorobis(tricyclohexylphosphine)palladium(II)/potassium phosphate admixture [CatKit single-use vials - 6.62 wt% Pd complex] (29934-17-6)	5 x 1vial

Components	46-2040	46-2038	46-2030	46-2033
Metal Precursor	 mixture with K₃PO₄	 mixture with K₃PO₄	Pd(OAc) ₂	Pd(OAc) ₂
Ligand	---	---	 mixture with Pd(OAc)₂/K₃PO₄	 mixture with Pd(OAc)₂/K₃PO₄
Base	K ₃ PO ₄	K ₃ PO ₄	K ₃ PO ₄	K ₃ PO ₄

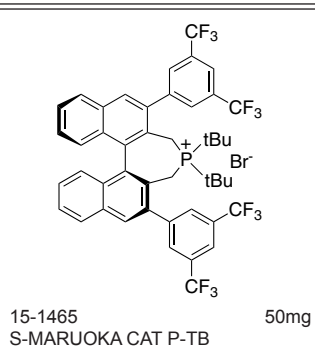
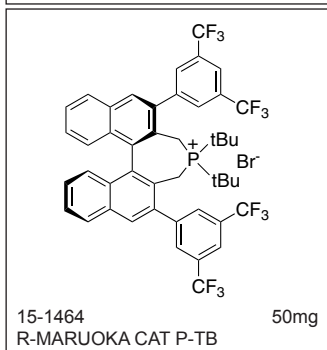
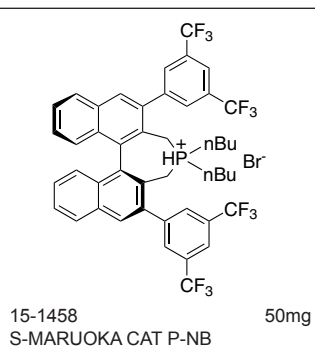
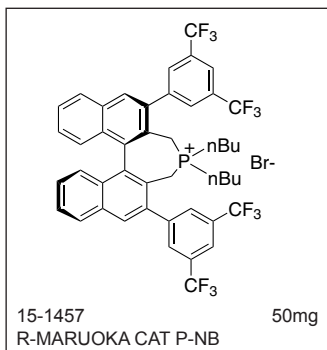
This Kit contains 4 different types of Single-Use Vials. Each type has 5 x 1 vials.

CATALYST & ORGANOCATALYST KITS - Maruoka Chiral Phase-Transfer Phosphonium Organocatalyst Kit

96-3750

Maruoka Chiral Phase-Transfer Phosphonium Organocatalyst Kit

Components also available for individual sale. Contains the following:



CATALYST & ORGANOCATALYST KITS - Palladium Kit

96-4650

Palladium Kit

For a variety of catalytic organic transformations.

Components also available for individual sale.

Contains the following:

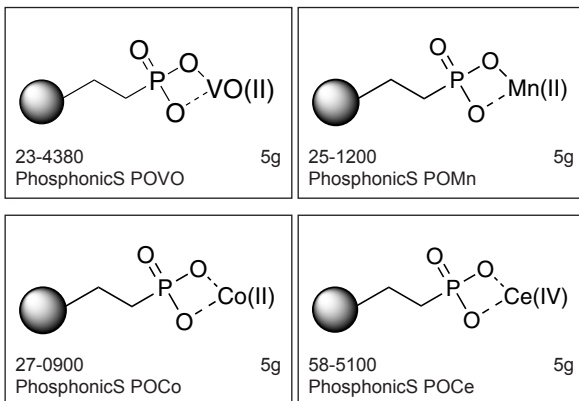
46-0100	Allylpalladium chloride dimer, min. 98% (12012-95-2)	500mg
46-0400	Dichlorobis(benzonitrile)palladium(II), 99% (14220-64-5)	1g
46-1780	Palladium(II) acetate, min. 98% (99.9+%-Pd) (3375-31-3)	1g
46-1850	Palladium(II) chloride (99.9%-Pd) (7647-10-1)	1g
46-2150	Tetrakis(triphenylphosphine)palladium(0), 99% (99.9+%-Pd) (14221-01-3)	5g
46-3000	Tris(dibenzylideneacetone)dipalladium(0) (51364-51-3)	5g
46-3010	Tris(dibenzylideneacetone)dipalladium(0) chloroform adduct (52522-40-4)	500mg

CATALYST & ORGANOCATALYST KITS - PhosphonicS Metal Oxidation Catalyst Kit

96-6770

PhosphonicS Metal Oxidation Catalyst Kit

Sold in collaboration with PhosphonicS Ltd. for research purposes only.
Components also available for individual sale. Contains the following:



Reactions such as allylic and benzylic oxidations, alcohol oxidations and epoxidations are key chemical transformations in organic synthesis. In general these reactions are conducted by the use of stoichiometric, or even higher concentrations, of inorganic oxidants. Typical oxidizing agents include potassium permanganate, manganese dioxide, chromium trioxide, potassium chromate, potassium dichromate and peracids. These hazardous reagents produce large volumes of toxic wastes that are becoming increasingly costly to treat and dispose. In addition, difficulties are often encountered in the work up of reactions and purification of the products. There is a need for new heterogeneous oxidation catalysts that are not only effective, but exhibit ease of recovery and recyclability. PhosphonicS has developed a number of novel heterogeneous oxidation catalysts for a wide range of applications in the pharmaceutical, fine chemicals and petrochemical industries. Reactions include allylic and benzylic oxidations, epoxidations and the selective oxidations of alcohols to ketones and sulfides to sulfoxides.

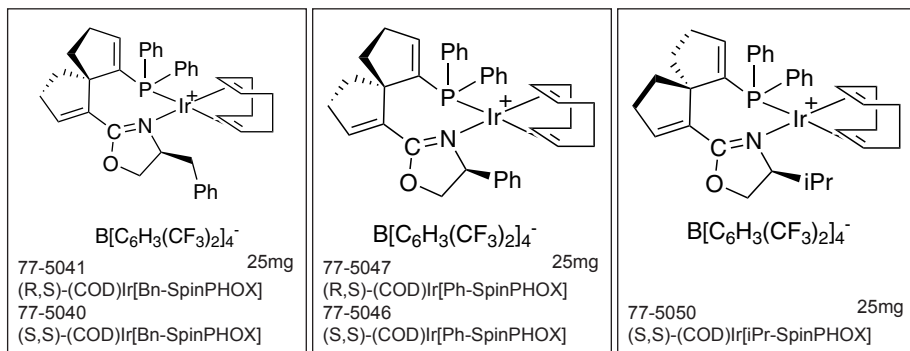
CATALYST & ORGANOCATALYST KITS - SpinPHOX-Ir Catalyst Kit

96-7710

SpinPHOX-Ir Catalyst Kit for enantioselective hydrogenation

Sold in collaboration with SIOC for research purposes only. Patents
CN200910051314.3, CN 101555259.

Components also available for individual sale. Contains the following:



CATALYST & ORGANOCATALYST KITS - Takasago ATH Catalyst Kit

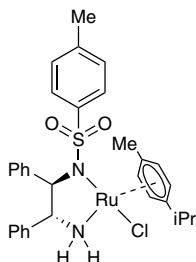
96-6955

Takasago ATH (Asymmetric Transfer Hydrogenation) Catalyst Kit

Manufactured under license of Takasago patent US7129367B2.

Components also available for individual sale.

Contains the following:

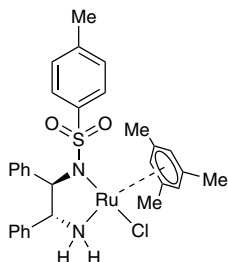


44-0148 250mg

RuCl[(R,R)-Tsdpen](p-cymene)

44-0149

RuCl[(S,S)-Tsdpen](p-cymene)

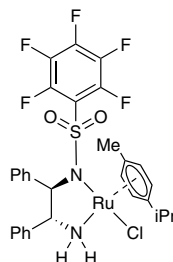


44-0154 250mg

RuCl[(R,R)-Tsdpen](mesitylene)

44-0155

RuCl[(S,S)-Tsdpen](mesitylene)

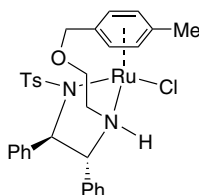


44-0156 250mg

RuCl[(R,R)-Fsdpen](p-cymene)

44-0157

RuCl[(S,S)-Fsdpen](p-cymene)

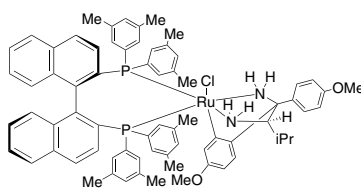


44-0185 250mg

(R,R)-Ts-DENEB™

44-0186

(S,S)-Ts-DENEB™

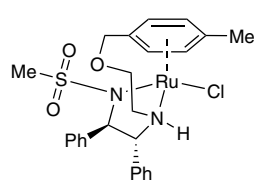


44-0217 250mg

(R)-RUCY™-XylBINAP

44-0218

(S)-RUCY™-XylBINAP



44-0255 250mg

Ru-(R,R)-Ms-DENEB

44-0256

Ru-(S,S)-Ms-DENEB

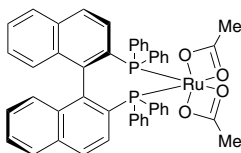
CATALYST & ORGANOCATALYST KITS - Takasago BINAP Ru Acetate Catalyst Kit

96-6953

Takasago BINAP Ru Acetate Catalyst Kit

Manufactured under license of Takasago patent.

Components also available for individual sale. Contains the following:

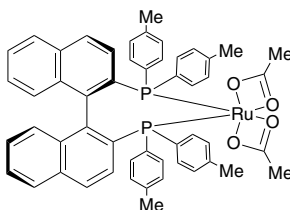


44-0152 250mg

Ru(OAc)₂[(R)-binap]

44-0153

Ru(OAc)₂[(S)-binap]

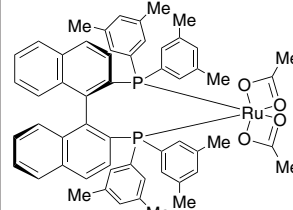


44-0162 250mg

Ru(OAc)₂[(R)-tolbinap]

44-0163

Ru(OAc)₂[(S)-tolbinap]



44-0164 250mg

Ru(OAc)₂[(R)-xylbinap]

44-0164

Ru(OAc)₂[(S)-xylbinap]

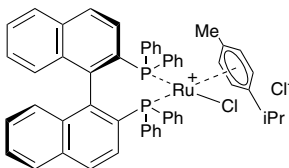
CATALYST & ORGANOCATALYST KITS - Takasago BINAP Ru Cymene Catalyst Kit

96-6951

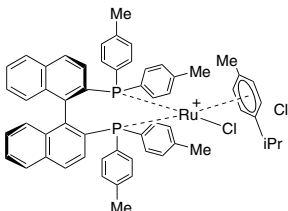
Takasago BINAP Ru Cymene Catalyst Kit

Manufactured under license of Takasago patent.

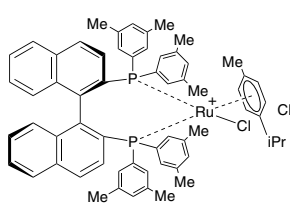
Components also available for individual sale. Contains the following:



44-0084 250mg
[RuCl(p-cymene)((R)-binap)]Cl
44-0086
[RuCl(p-cymene)((S)-binap)]Cl



44-0088 250mg
[RuCl(p-cymene)((R)-tolbinap)]Cl
44-0089
[RuCl(p-cymene)((S)-tolbinap)]Cl



44-0092 250mg
[RuCl(p-cymene)((R)-xylbinap)]Cl
44-0093
[RuCl(p-cymene)((S)-xylbinap)]Cl

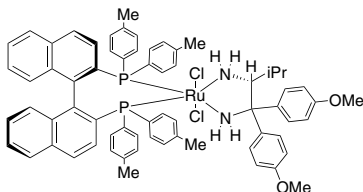
CATALYST & ORGANOCATALYST KITS - Takasago BINAP Ru Diamine Catalyst Kit

96-6954

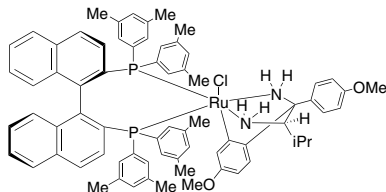
Takasago BINAP Ru Diamine Catalyst Kit

Manufactured under license of Takasago patent.

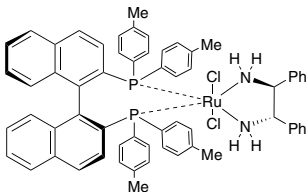
Components also available for individual sale. Contains the following:



44-0212 250mg
RuCl₂[(R)-xylbinap][(R)-daipen]
44-0213
RuCl₂[(S)-xylbinap][(S)-daipen]



44-0217 250mg
(R)-RUCY™-XylBINAP
44-0218
(S)-RUCY™-XylBINAP



44-0224 250mg
RuCl₂[(S)-xylbinap][(S,S)-dpen]
44-0226
RuCl₂[(R)-xylbinap][(R,R)-dpen]

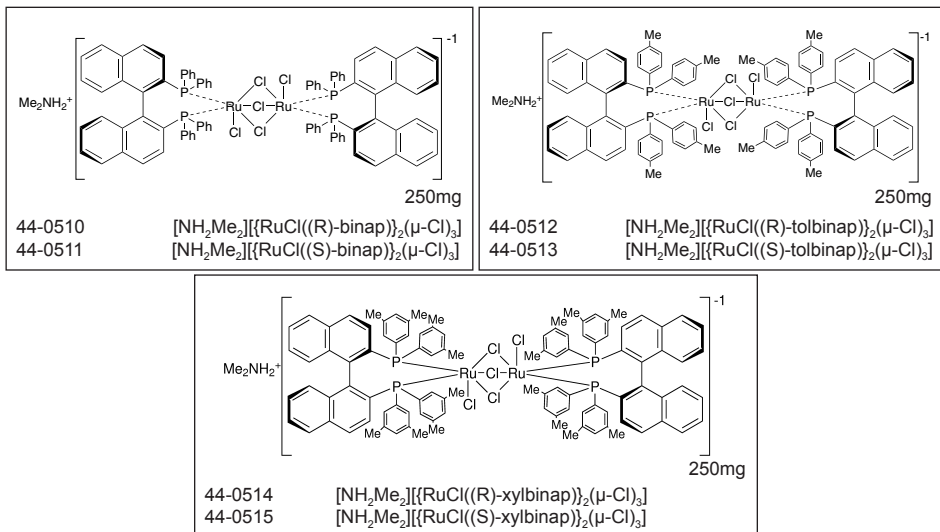
CATALYST & ORGANOCATALYST KITS - Takasago BINAP Ru Dimer Catalyst Kit

96-6952

Takasago BINAP Ru Dimer Catalyst Kit

Manufactured under license of Takasago patent.

Components also available for individual sale. Contains the following:



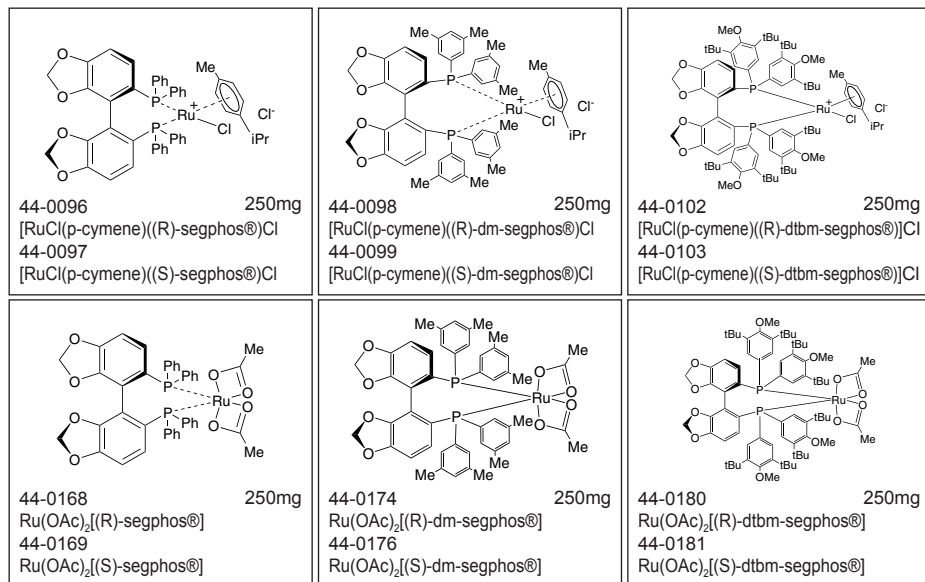
CATALYST & ORGANOCATALYST KITS - Takasago SEGPHOS® Ru Catalyst Kit

96-6901

Takasago SEGPHOS® Ru Catalyst Kit

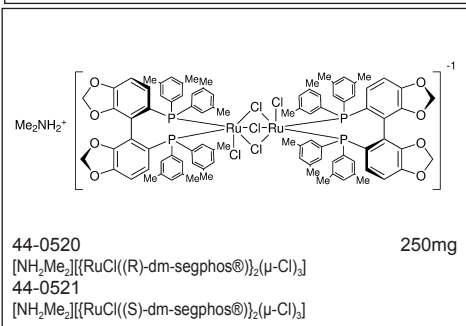
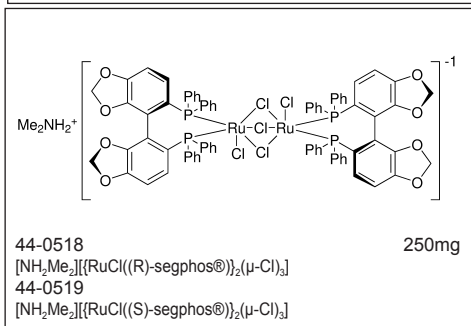
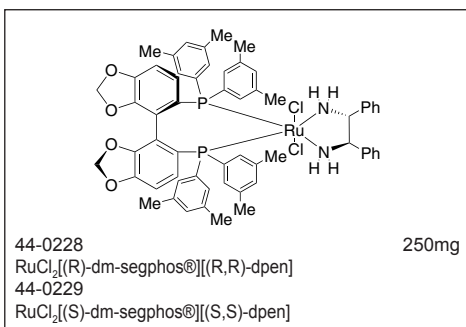
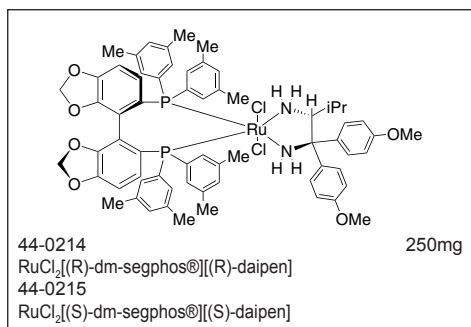
Manufactured under license of Takasago patent.

Components also available for individual sale. Contains the following:



CATALYST & ORGANOCATALYST KITS - Takasago SEGPHOS® Ru Catalyst Kit

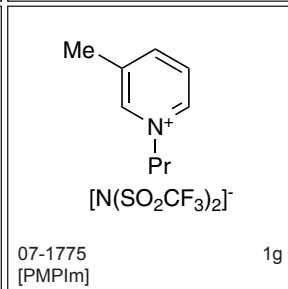
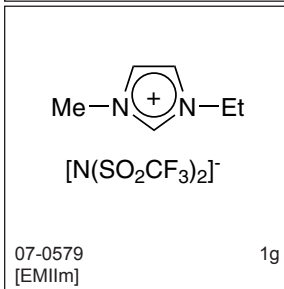
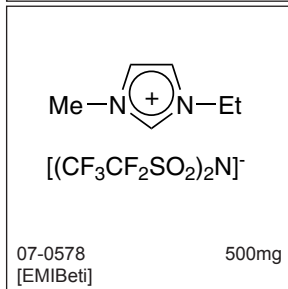
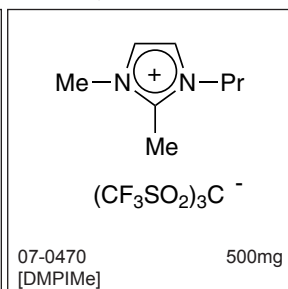
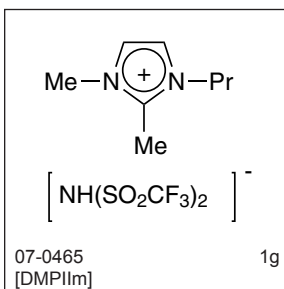
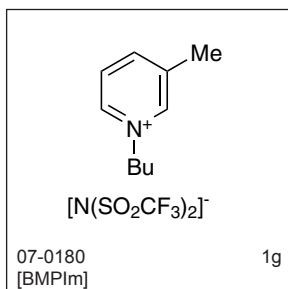
96-6901

Takasago SEGPHOS® Ru Catalyst Kit (*continued*)**IONIC LIQUID KITS - Ionic Liquid Kit 1: Hydrophobic (water-immiscible) Kit**

96-6500

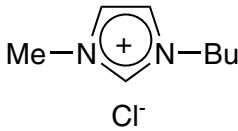
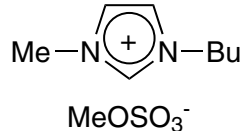
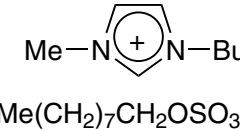
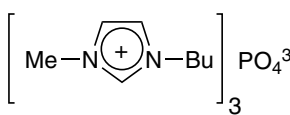
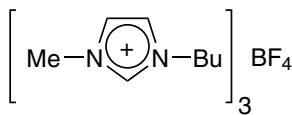
Ionic Liquid Kit 1: Hydrophobic (water-immiscible) Kit

Components also available for individual sale. Contains the following:



IONIC LIQUID KITS - Ionic Liquid Kit 2: BMIM Kit**96-6510****Ionic Liquid Kit 2: BMIM Kit**

Components also available for individual sale. Contains the following:

 07-0100 [BMIM][Cl] 10g	 07-0140 [BMIM] [MeSO₄] 5g	 07-0150 [BMIM] [OctSO₄] 5g
 07-0160 [BMIM]₃ [PO₄] 5g	 07-0170 [BMIM] [BF₄] 5g	

IONIC LIQUID KITS - Ionic Liquid Kit 3: CYPHOS® IL Phosphonium Salt Kit**96-6520****Ionic Liquid Kit 3: CYPHOS® IL Phosphonium Salt Kit**

Components also available for individual sale.

Contains the following:

15-6370	Trihexyl(tetradecyl)phosphonium bis(trifluoromethanesulfonyl)amide, min. 97% CYPHOS® IL 109 (460092-03-9)	10g
15-6374	Trihexyl(tetradecyl)phosphonium bis(2,4,4-trimethylpentyl)phosphinate, min. 95% CYPHOS® IL 104 (465527-59-7)	10g
15-6378	Trihexyl(tetradecyl)phosphonium bromide, min. 95% CYPHOS® IL 102 (654057-97-3)	10g
15-6382	Trihexyl(tetradecyl)phosphonium chloride, min. 93% CYPHOS® IL 101 (258864-54-9)	10g
15-6386	Trihexyl(tetradecyl)phosphonium decanoate, min. 95% CYPHOS® IL 103 (465527-65-5)	10g
15-6390	Trihexyl(tetradecyl)phosphonium dicyanamide, min. 95% CYPHOS® IL 105	10g
15-6394	Trihexyl(tetradecyl)phosphonium hexafluorophosphate, min. 98% CYPHOS® IL 110 (374683-44-0)	10g

CYPHOS® IL Registered trademark of Cytec.

References:

1. The Strem Chemiker, Vol. XX, No. 1, 2003 for technical note.

LIGAND KITS - AntPhos and WingPhos Kit

96-3810

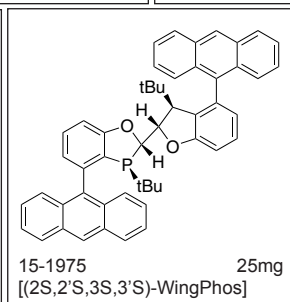
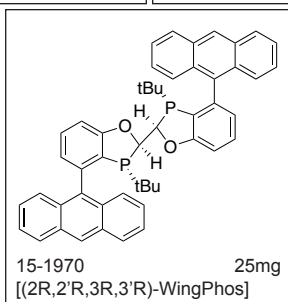
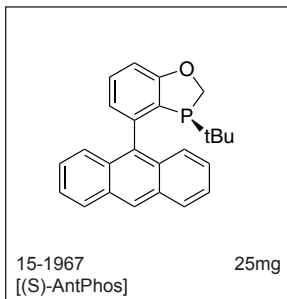
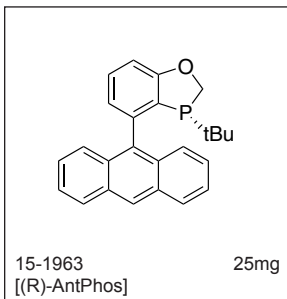
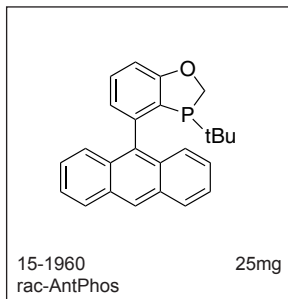
AntPhos and WingPhos Kit

Sold in collaboration with Zejun for research purposes only.

Patents ZL201310020371.1, CN 201610056390.

Components also available for individual sale.

Contains the following:



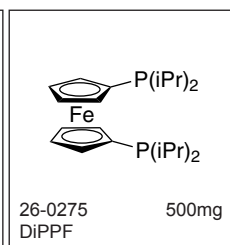
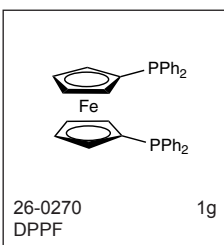
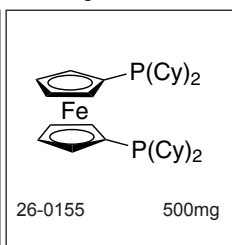
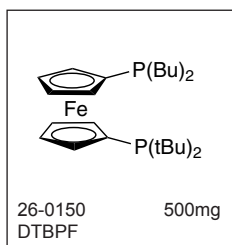
LIGAND KITS - 1,1'-Bis(dialkyl/diarylphosphino)ferrocene Ligand Kit

96-3730

1,1'-Bis(dialkyl/diarylphosphino)ferrocene Ligand Kit

Components also available for individual sale.

Contains the following:



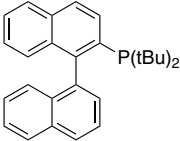
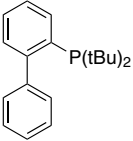
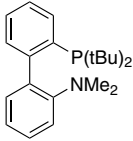
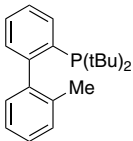
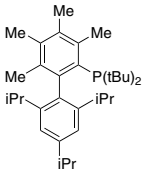
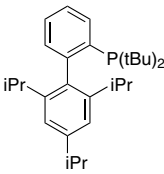
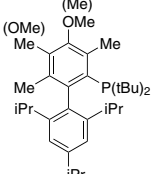
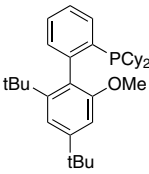
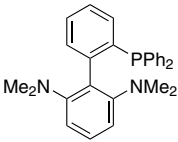
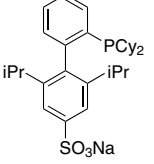
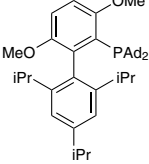
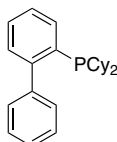
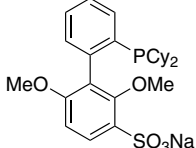
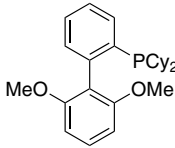
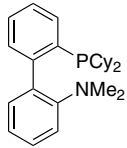
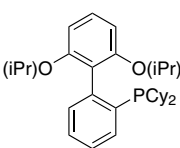
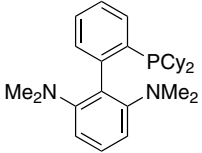
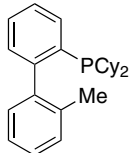
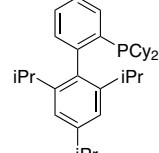
LIGAND KITS - Buchwald Biaryl Phosphine Ligand Master Kit**96-5500****Buchwald Biaryl Phosphine Ligand Master Kit for Aromatic Carbon-Heteroatom Bond Formation, Suzuki Coupling and Negishi Cross-coupling**

For aromatic carbon-heteroatom bond formation and Suzuki Coupling.

Patents: US 6,395,916, US 6,307,087

Components also available for individual sale.

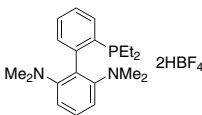
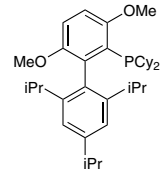
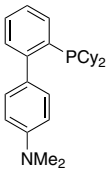
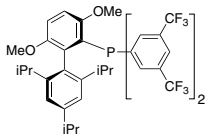
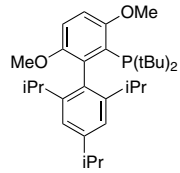
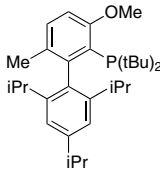
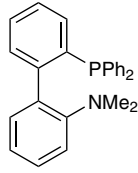
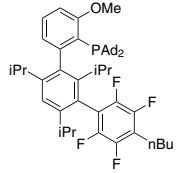
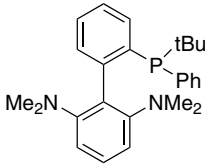
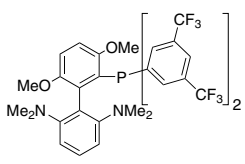
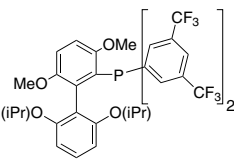
Contains the following:

 15-1043 TrixiePhos 250mg	 15-1045 JohnPhos 500mg	 15-1048 tBuDavePhos 500mg	 15-1049 t-BuMePhos 500mg
 15-1051 Me4-t-BuXPhos 250mg	 15-1052 t-BuXphos 500mg	 15-1063 250mg	 15-1105 VPhos 250mg
 15-1125 PhCPhos 100mg	 15-1135 (XPhos-SO₃Na) 100mg	 15-1138 AdBrettPhos 100mg	 15-1140 CyJohnPhos 1g
 15-1142 (water soluble SPhos) 500mg	 15-1143 SPhos 500mg	 15-1145 DavePhos 500mg	 15-1146 RuPhos 1g
 15-1147 CPhos 250mg	 15-1148 MePhos 500mg	 15-1149 XPhos 500mg	

LIGAND KITS - Buchwald Biaryl Phosphine Ligand Master Kit

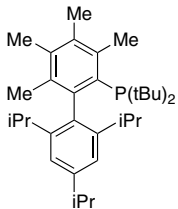
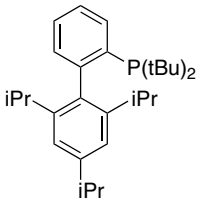
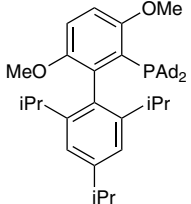
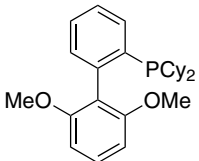
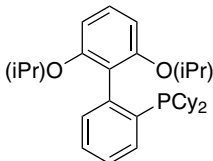
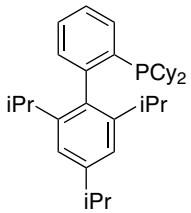
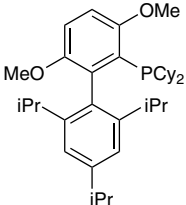
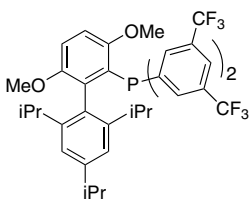
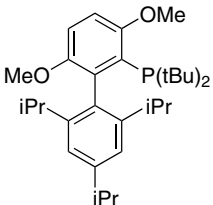
96-5500

Buchwald Biaryl Phosphine Ligand Master Kit for Aromatic Carbon-Heteroatom Bond Formation, Suzuki Coupling and Negishi Cross-coupling (*continued*)

 15-1151 100mg EtCPhos	 15-1152 250mg BrettPhos	 15-1154 250mg	 15-1157 100mg JackiePhos
 15-1164 100mg t-BuBrettPhos	 15-1168 100mg RockPhos	 15-1745 500mg PhDavePhos	 15-2065 100mg AlPhos
 15-3010 250mg (t-Bu)PhCPhos	 15-3015 100mg	 15-3020 250mg	

LIGAND KITS - Buchwald Biaryl Phosphine Ligand Mini Kit 1

96-5485 Buchwald Biaryl Phosphine Ligand Mini Kit 1 for Aromatic Carbon-Heteroatom Bond Formation, Suzuki Coupling and Negishi Cross-coupling
 For aromatic carbon-heteroatom bond formation and Suzuki Coupling.
 Patents: US 6,395,916, US 6,307,087
 Components also available for individual sale. Contains the following:

 15-1051 Me₄ t-BuXPhos 250mg	 15-1052 t-BuXPhos 500mg	 15-1138 AdBrettPhos 100mg
 15-1143 SPhos 500mg	 15-1146 RuPhos 1g	 15-1149 XPhos 500mg
 15-1152 BrettPhos 250mg	 15-1157 JackiePhos 100mg	 15-1164 t-BuBrettPhos 100mg

LIGAND KITS - Buchwald Biaryl Phosphine Ligand Mini Kit 2

96-5490

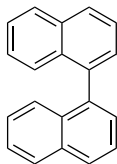
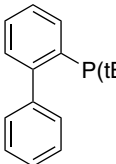
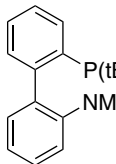
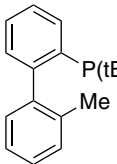
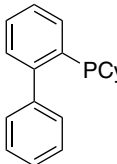
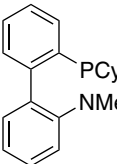
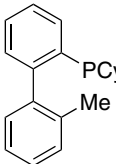
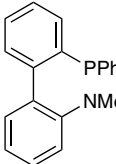
Buchwald Biaryl Phosphine Ligand Mini Kit 2 for Aromatic Carbon-Heteroatom Bond Formation, Suzuki Coupling and Negishi Cross-coupling

For aromatic carbon-heteroatom bond formation and Suzuki Coupling.

Patents: US 6,395,916, US 6,307,087

Components also available for individual sale.

Contains the following:

 15-1043 TrixiePhos 250mg	 15-1045 JohnPhos 500mg	 15-1048 tBuDavePhos 500mg
 15-1049 t-BuMePhos 500mg	 15-1140 CyJohnPhos 1g	 15-1145 DavePhos 500mg
 15-1148 MePhos 500mg	 15-1745 PhDavePhos 500mg	

LIGAND KITS - Buchwald Biaryl Phosphine Ligand Mini Kit 3

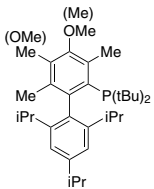
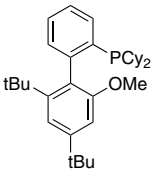
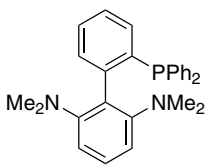
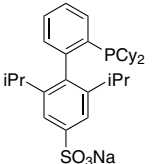
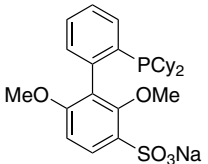
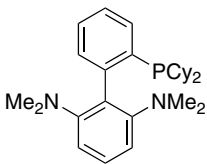
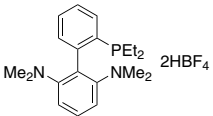
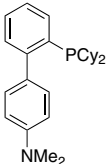
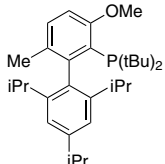
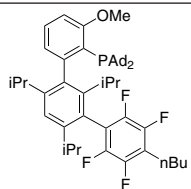
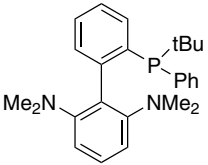
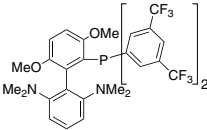
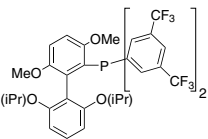
96-5495

NEW**Buchwald Biaryl Phosphine Ligand Mini Kit 3 for Aromatic Carbon-Heteroatom Bond Formation, Suzuki Coupling and Negishi Cross-coupling**

For aromatic carbon-heteroatom bond formation and Suzuki Coupling.

Patents: US 6,395,916, US 6,307,087.

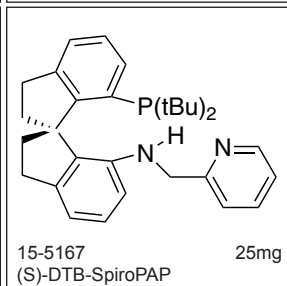
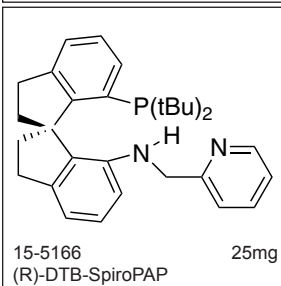
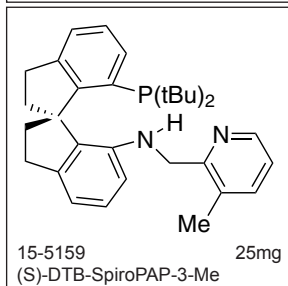
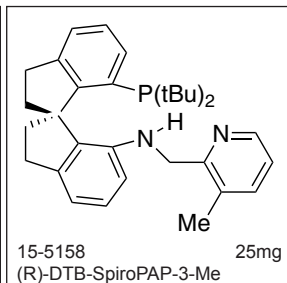
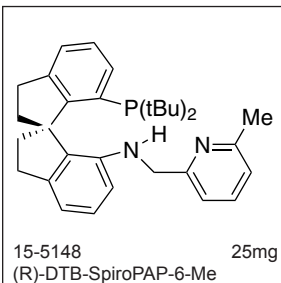
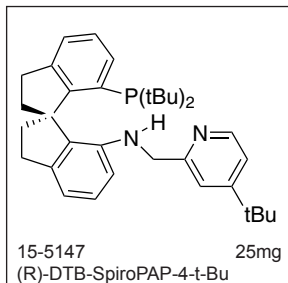
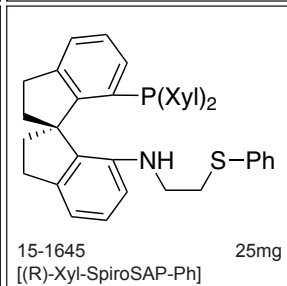
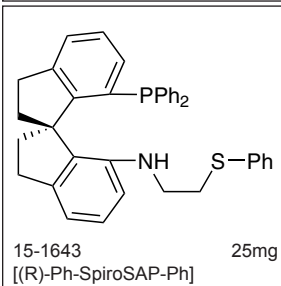
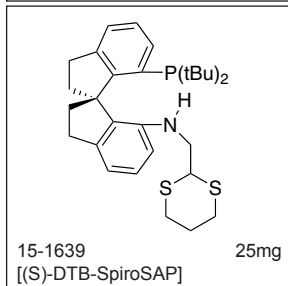
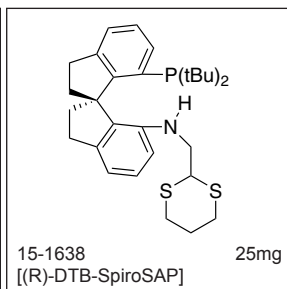
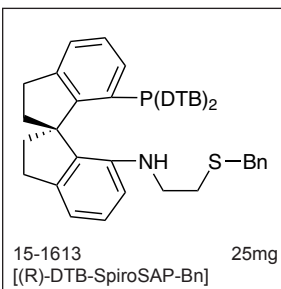
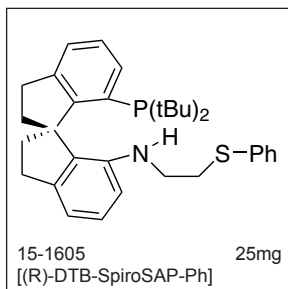
Components also available for individual sale. Contains the following:

 15-1063 250mg	 15-1105 VPhos 250mg	 15-1125 PhCPhos 100mg
 15-1135 100mg (XPhos-SO₃Na)	 15-1142 500mg (water soluble SPhos)	 15-1147 250mg CPhos
 15-1151 100mg EtCPhos	 15-1154 250mg	 15-1168 100mg RockPhos
 15-2065 100mg AlPhos	 15-3010 250mg (t-Bu)PhCPhos	 15-3015 100mg
 15-3020 250mg		

LIGAND KITS - Chiral SpiroPAP Ligand Kit**96-0445****Chiral SpiroPAP Ligand Kit****NEW**

Also available: 77-4035 [Ir-(R)-DTB-SpiroPAP-3-Me] and 77-4036 [Ir-(S)-DTB-SpiroPAP-3-Me] (not part of the kit)

Components also available for individual sale. Contains the following:

**LIGAND KITS - Chiral SpiroSAP Ligand Kit****96-0070****Chiral SpiroSAP Ligand Kit****NEW**Also available: 77-2510 [Ir-(R)-DTB-SpiroSAP] and 77-2511 [Ir-(S)-DTB-SpiroSAP] (not part of the kit)
Components also available for individual sale. Contains the following:

LIGAND KITS - DSM MonoPhos™ Ligand Kit

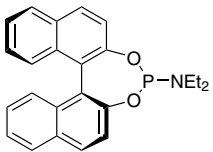
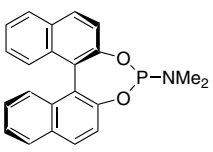
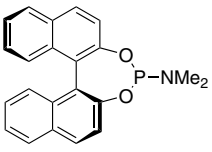
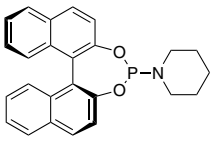
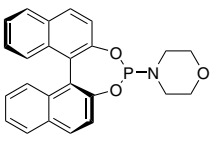
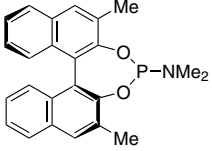
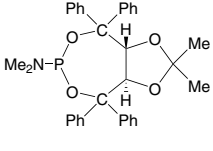
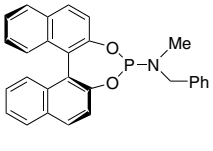
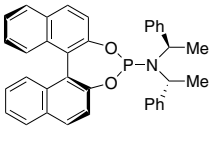
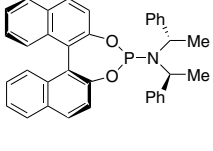
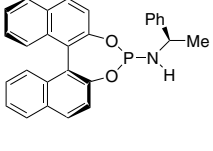
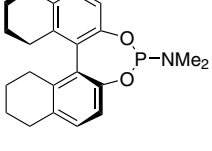
96-5650

DSM MonoPhos™ Ligand Kit

For asymmetric catalytic hydrogenations and other transformations.

Sold in collaboration with DSM for research purposes only.

Components also available for individual sale. Contains the following:

 15-1231 250mg	 15-1232 1g	 15-1233 1g
 15-1234 100mg	 15-1235 100mg	 15-1255 100mg
 15-1505 100mg	 15-1510 100mg	 15-1520 100mg
 15-1521 100mg	 15-1525 100mg	 15-3495 100mg

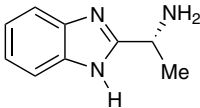
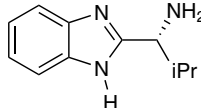
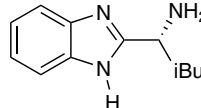
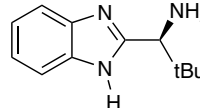
LIGAND KITS - Enantiotech BIMAH Ligand Kit**96-3700****Enantiotech BIMAH Ligand Kit for Asymmetric Hydrogenation**

Sold under license from Enantiotech for research purposes only.

PCT/CN2008/073648, CN 200810038929.

Components also available for individual sale.

Contains the following:

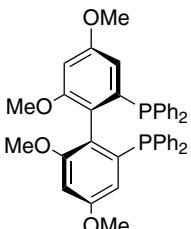
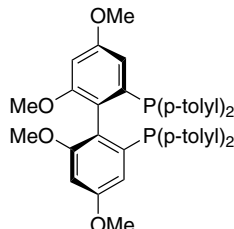
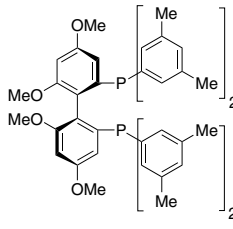
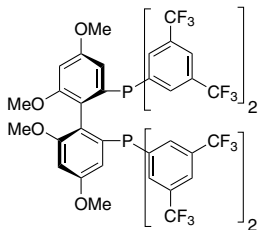
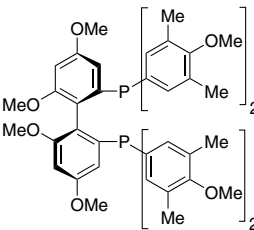
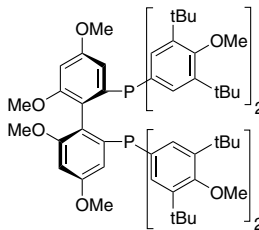
 07-1234 250mg (R)-Me-BIMAH 07-1232 (S)-Me-BIMAH	 07-1238 250mg (R)-i-Pr-BIMAH 07-1236 (S)-i-Pr-BIMAH	 07-1242 100mg (R)-i-Bu-BIMAH 07-1240 (S)-i-Bu-BIMAH	 07-1245 100mg (S)-t-Bu-BIMAH
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LIGAND KITS - Garphos™ Ligand Kit**96-4100****Garphos™ Ligand Kit**

Sold in collaboration with KCT. Patent US App No. 61/381,493.

Components also available for individual sale.

Contains the following:

 15-1653 100mg (R)-Ph-Garphos™ 15-1654 (S)-Ph-Garphos™	 15-1657 100mg (R)-Tol-Garphos™ 15-1658 (S)-Tol-Garphos™	 15-1661 100mg (R)-Xyl-Garphos™ 15-1662 (S)-Xyl-Garphos™
 15-1663 100mg (R)-BTfM-Garphos™ 15-1664 (S)-BTfM-Garphos™	 15-1666 100mg (R)-DMM-Garphos™ 15-1667 (S)-DMM-Garphos™	 15-1672 100mg (R)-DTBM-Garphos™ 15-1673 (S)-DTBM-Garphos™

LIGAND KITS - NHC Ligand Kit 1: Chiral N-Heterocyclic Carbenes

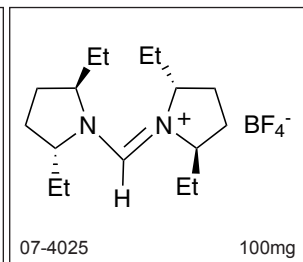
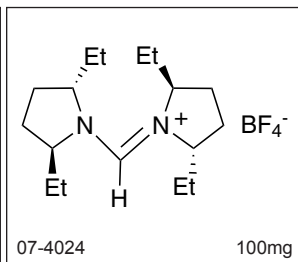
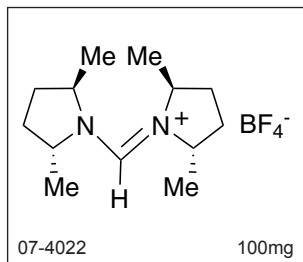
96-3760

NHC Ligand Kit 1: Chiral N-Heterocyclic Carbenes

Sold under license from Kanata for research purposes only. WO2010/003226.

Components also available for individual sale.

Contains the following:



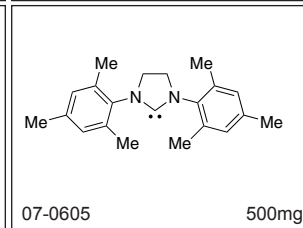
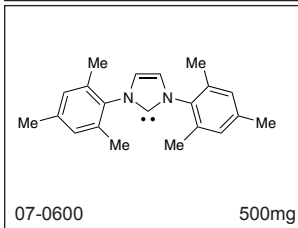
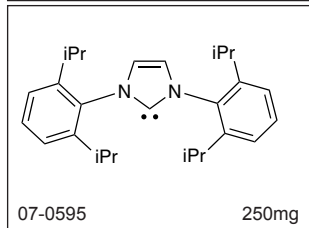
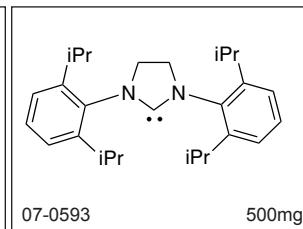
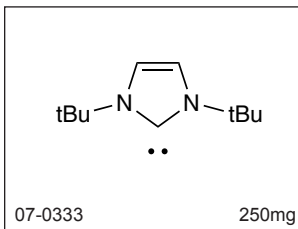
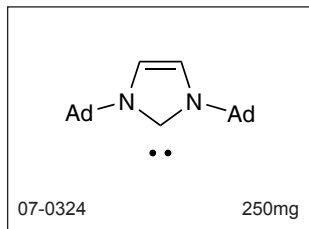
LIGAND KITS - NHC Ligand Kit 2: "Free" Carbenes

96-3765

NHC Ligand Kit 2: "Free" Carbenes

HAZ

Components also available for individual sale. Contains the following:

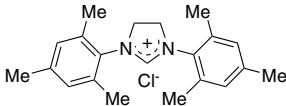
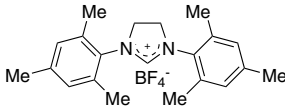
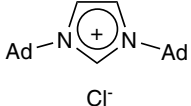
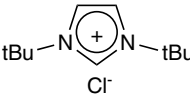
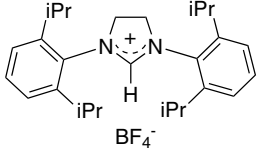
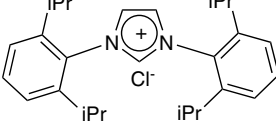
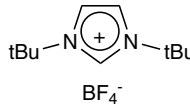
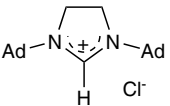
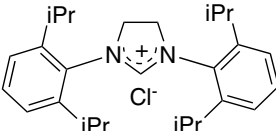
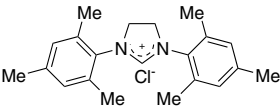


LIGAND KITS - NHC Ligand Kit 3: Variety of N-Heterocyclic Carbenes

96-3770

NHC Ligand Kit 3: Variety of N-Heterocyclic Carbenes

Components also available for individual sale. Contains the following:

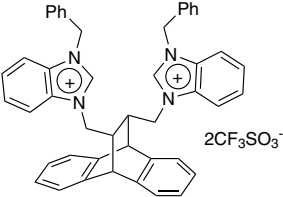
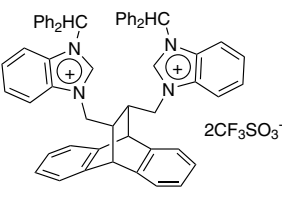
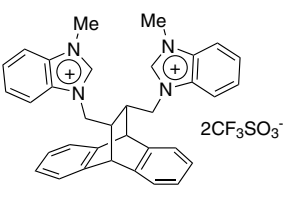
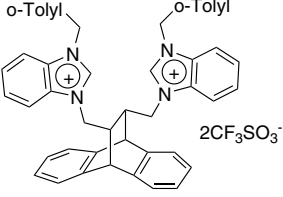
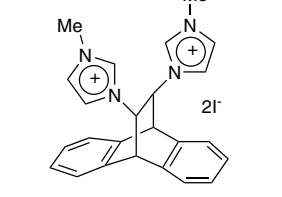
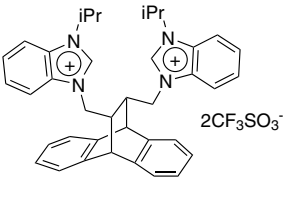
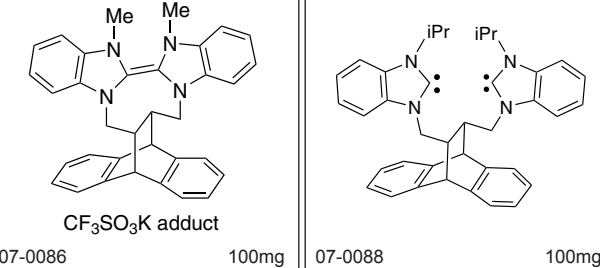
 07-0299 1g	 07-0302 1g	 07-0322 250mg
 07-0368 250mg	 07-0587 1g	 07-0590 500mg
 07-0598 500mg	 07-4007 500mg	 07-4009 500mg
 07-4011 500mg		

LIGAND KITS - NHC Ligand Kit 4: Bis Carbenes

96-3775

NHC Ligand Kit 4: Bis Carbenes

Components also available for individual sale. Contains the following:

 07-0076 100mg	 07-0078 100mg	 07-0080 100mg
 07-0082 100mg	 07-0083 100mg	 07-0084 100mg
 07-0086 100mg 07-0088 100mg		

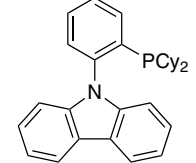
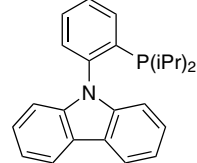
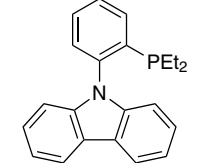
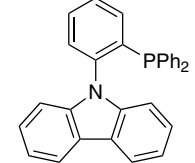
LIGAND KITS - PhenCar-Phos Ligand Kit

96-3780

PhenCar-Phos Ligand Kit

Components also available for individual sale.

Contains the following:

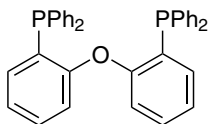
 15-0445 250mg PhenCar-Phos	 15-0493 250mg i-Pr PhenCar-Phos	 15-0496 100mg Et PhenCar-Phos	 15-0498 250mg Ph PhenCar-Phos
--	--	--	--

LIGAND KITS - Phosphine Ligand Kit

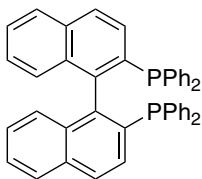
96-1650

Phosphine Ligand Kit for Palladium-Catalyzed Carbon-Carbon and Carbon-Heteroatom Bond Formation

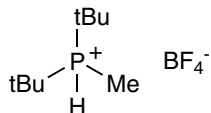
For Palladium-catalyzed carbon-carbon and carbon-heteroatom bond formation.
Components also available for individual sale. Contains the following:

15-0380
DPEphos

5g

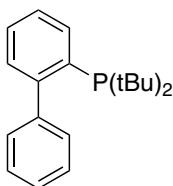
15-0433
rac-BINAP

1g

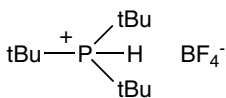


15-1023

1g

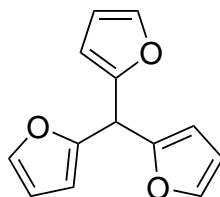
15-1045
JohnPhos

500mg



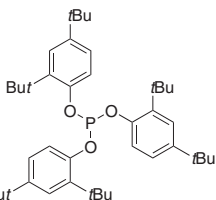
15-6000

1g



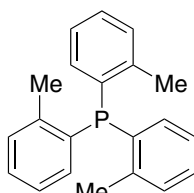
15-6372

500mg



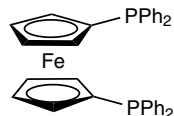
15-7720

10g



15-8050

5g

26-0270
DPPF

1g

LIGAND KITS - PINAP Ligand Kit

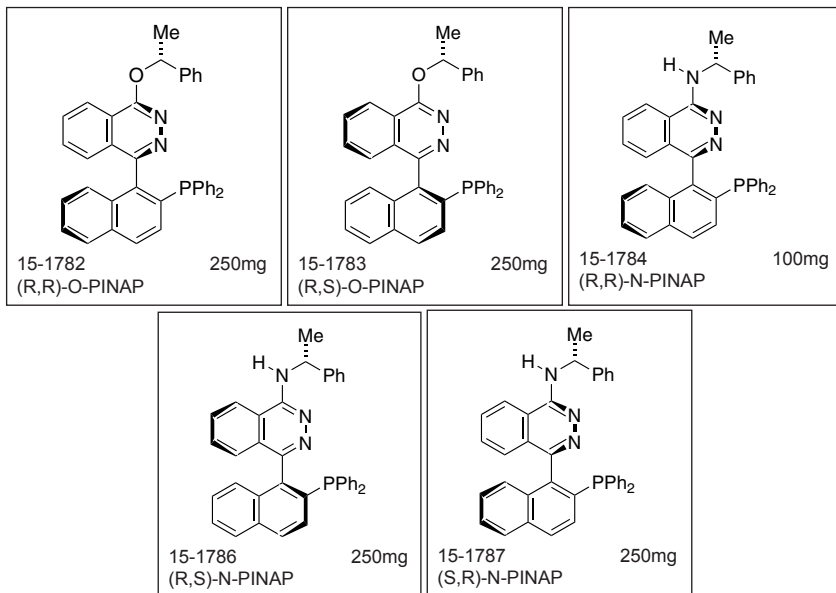
96-7050

PINAP Ligand Kit

For a variety of asymmetric C-C bond formations.

Components also available for individual sale.

Contains the following:



LIGAND KITS -SKP Ligand Kit

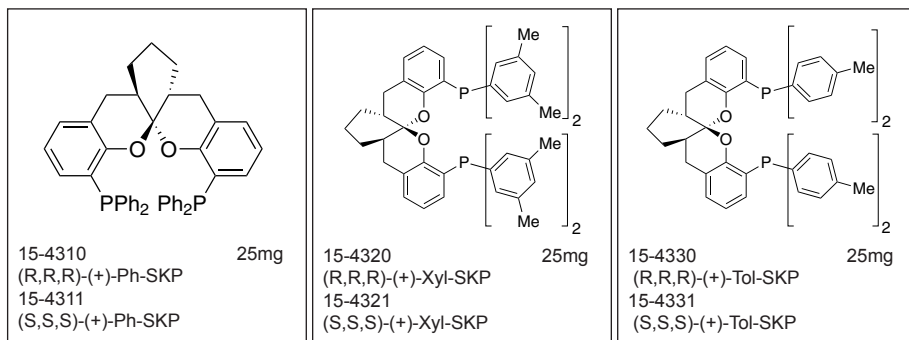
96-2310

SKP Ligand Kit for asymmetric-allylic amination and cyclopropanation

Sold in collaboration with SIOC for research purposes only.

Patents PCT/CN2013/071091, CN202110253896.5

Components also available for individual sale. Contains the following:

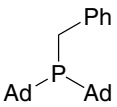
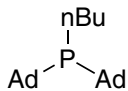
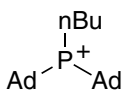
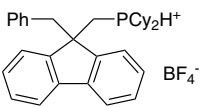
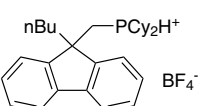
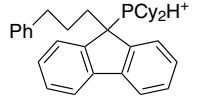
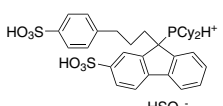
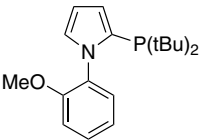
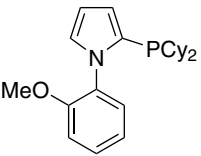
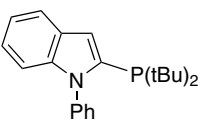
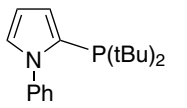
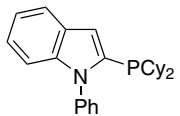
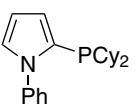
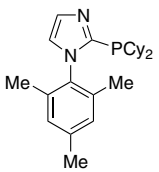
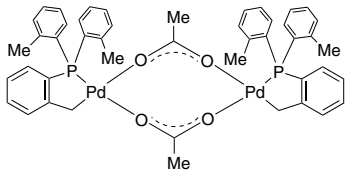


LIGAND KITS - Solvias cataCXium® Ligand Kit

96-6651

Solvias cataCXium® Ligand Kit for C-X coupling reactions

For C-X coupling reactions. Sold in collaboration with Solvias for research purposes only.
Components also available for individual sale. Contains the following:

 15-0038 500mg [cataCXium® ABn]	 15-0483 1g [cataCXium® A]	 15-0495 250mg [cataCXium® AHI]	 15-1072 500mg [cataCXium® FBn]
 15-1074 500mg [cataCXium® FBu]	 15-1076 500mg [cataCXium® FPrPh]	 15-1078 500mg [cataCXium® FSulf]	 15-2975 500mg [cataCXium® POMeB]
 15-2980 500mg [cataCXium® POMeCy]	 15-3550 500mg [cataCXium® PlntB]	 15-3600 500mg [cataCXium® PtB]	 15-3605 500mg [cataCXium® PlnCyl]
 15-3610 500mg [cataCXium® PCy]	 15-6362 500mg [cataCXium® PICy]	 46-0290 250mg [cataCXium® C]	

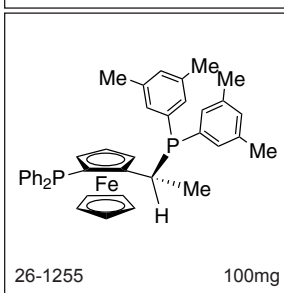
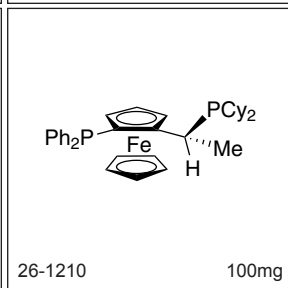
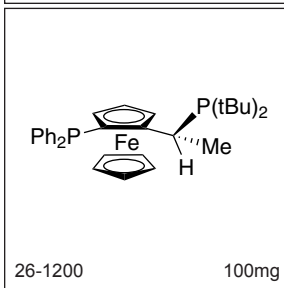
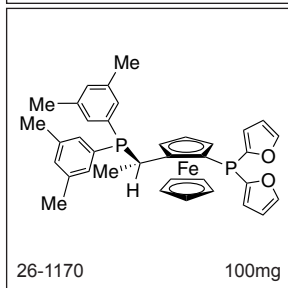
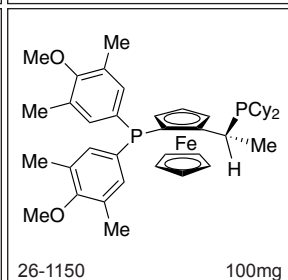
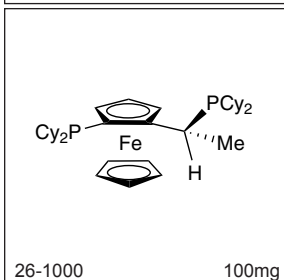
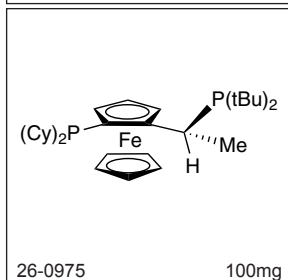
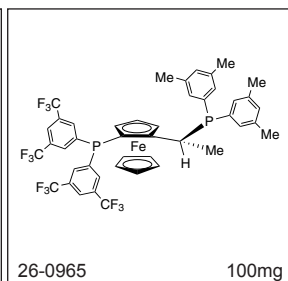
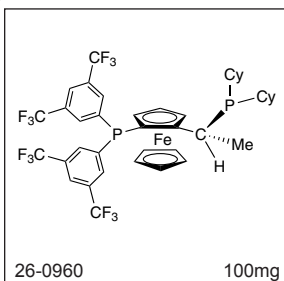
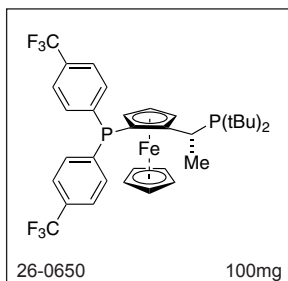
LIGAND KITS - Solvias Josiphos Ligand Kit**96-3650****Solvias Josiphos Ligand Kit**

For asymmetric catalytic hydrogenations and other transformations.

Sold in collaboration with Solvias for research purposes only.

Components also available for individual sale.

Contains the following:

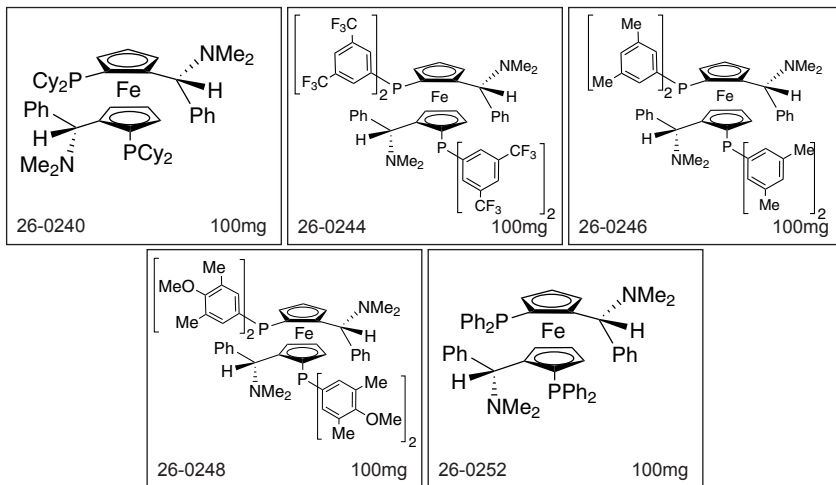


LIGAND KITS - Solvias MandyPhos™ Ligand Kit**96-3652 Solvias MandyPhos™ Ligand Kit**

For asymmetric catalytic hydrogenations and other transformations.

Sold in collaboration with Solvias for research purposes only.

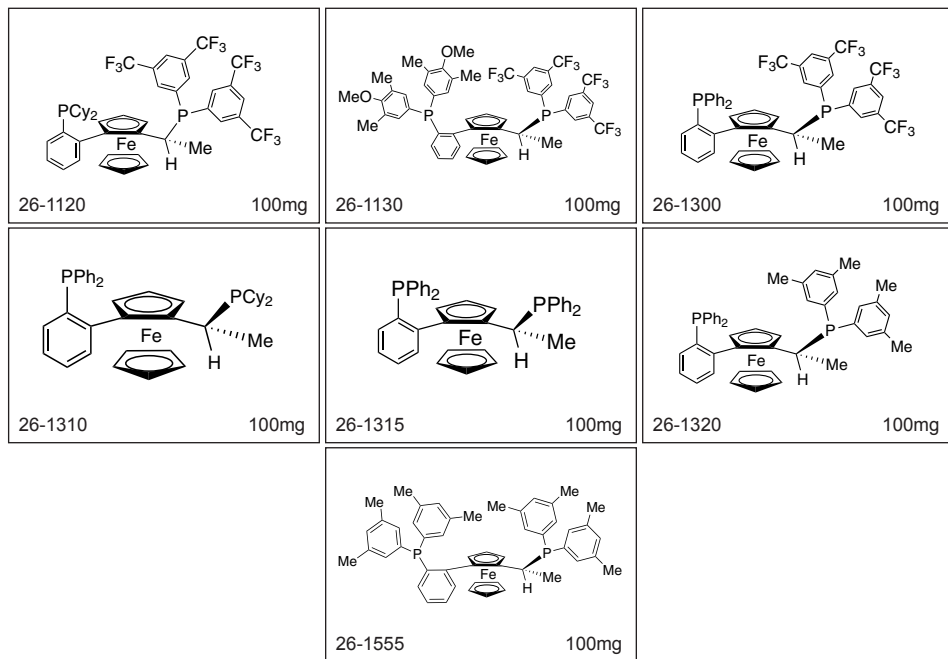
Components also available for individual sale. Contains the following:

**LIGAND KITS - Solvias Walphos Ligand Kit****96-3651 Solvias Walphos Ligand Kit**

For asymmetric catalytic hydrogenations and other transformations.

Sold in collaboration with Solvias for research purposes only.

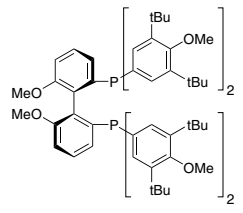
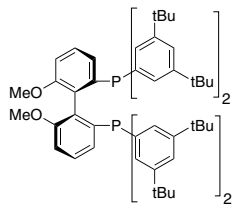
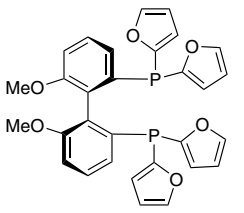
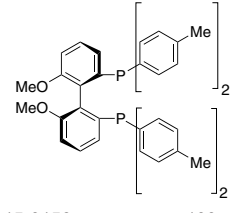
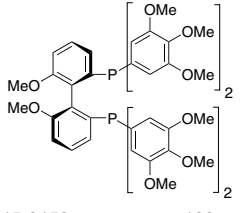
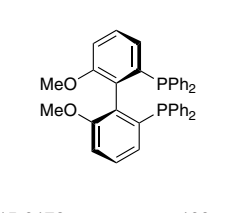
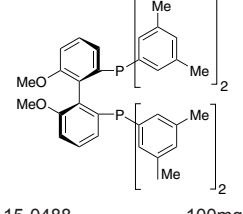
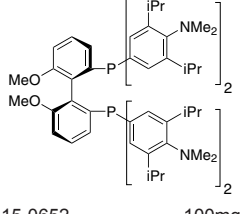
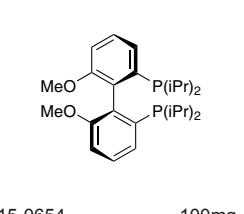
Components also available for individual sale. Contains the following:



LIGAND KITS - Solvias (R)-MeO-BIPHEP Ligand Kit**96-3655****Solvias (R)-MeO-BIPHEP Ligand Kit**

Sold in collaboration with Solvias for research purposes only.

Components also available for individual sale. Contains the following:

	15-0042	100mg
	15-0044	100mg
	15-0112	100mg
	15-0156	100mg
	15-0158	100mg
	15-0178	100mg
	15-0488	100mg
	15-0652	100mg
	15-0654	100mg

LIGAND KITS - Solvias (S)-MeO-BIPHEP Ligand Kit**96-3656****Solvias (S)-MeO-BIPHEP Ligand Kit**

Sold in collaboration with Solvias for research purposes only.

Components also available for individual sale. Contains the following:

15-0043	(S)-(+)-2,2'-Bis[di(3,5-di- <i>t</i> -butyl-4-methoxyphenyl)phosphino]-6,6'-dimethoxy-1,1'-biphenyl, min. 97% (910134-30-4)	100mg
15-0045	(S)-(-)-2,2'-Bis[di(3,5-di- <i>t</i> -butylphenyl)phosphino]-6,6'-dimethoxy-1,1'-biphenyl, min. 97% (167709-31-1)	100mg
15-0113	(S)-(-)-2,2'-Bis(di-2-furanylphosphino)-6,6'-dimethoxy-1,1'-biphenyl, min. 97% (145214-59-1)	100mg
15-0157	(S)-(-)-2,2'-Bis(di- <i>p</i> -tolylphosphino)-6,6'-dimethoxy-1,1'-biphenyl, min. 97% (133545-25-2)	100mg
15-0159	(S)-(-)-2,2'-Bis[di(3,4,5-trimethoxyphenyl)phosphino]-6,6'-dimethoxy-1,1'-biphenyl, min. 97% (256235-61-7)	100mg
15-0179	(S)-(-)-2,2'-Bis(diphenylphosphino)-6,6'-dimethoxy-1,1'-biphenyl, min. 97% (S)-MeO-BIPHEP (133545-17-2)	100mg
15-0489	(S)-(-)-2,2'-Bis[di(3,5-xylyl)phosphino]-6,6'-dimethoxy-1,1'-biphenyl, min. 97% (362634-22-8)	100mg
15-0653	(S)-(+)-2,2'-Bis[di(3,5-di- <i>i</i> -propyl-4-dimethylaminophenyl)phosphino]-6,6'-dimethoxy-1,1'-biphenyl, min. 97% (919338-66-2)	100mg
15-0655	(S)-(-)-2,2'-Bis(di- <i>i</i> -propylphosphino)-6,6'-dimethoxy-1,1'-biphenyl, min. 97% (150971-43-0)	100mg

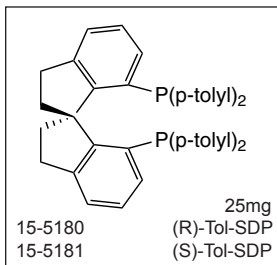
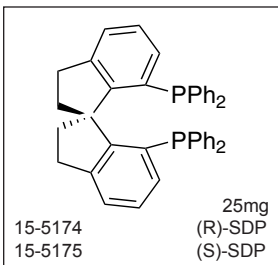
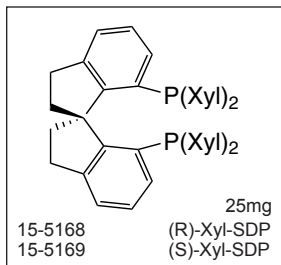
LIGAND KITS - Spiro Biphosphine Ligand Kit

96-0060

Spiro Bisphosphine Ligand Kit

Components also available for individual sale.

Contains the following:



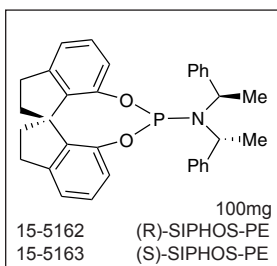
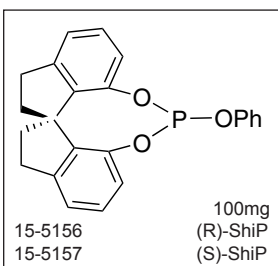
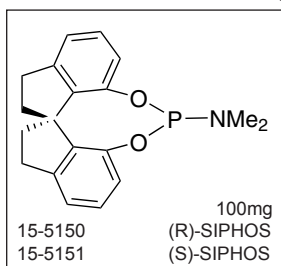
LIGAND KITS - Spiro Monophosphite & Monophosphoramidite Ligand Kit

96-0065

Spiro Monophosphite and Monophosphoramidite Ligand Kit

Components also available for individual sale.

Contains the following:



LIGAND KITS - Takasago BINAP Ligand Kit

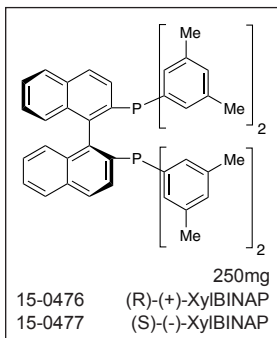
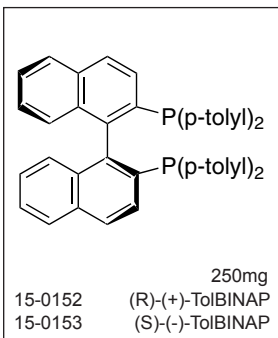
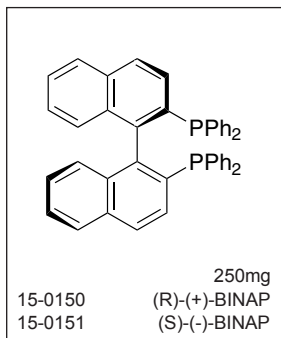
96-6950

Takasago BINAP Ligand Kit

Manufactured under license of Takasago patent.

Components also available for individual sale.

Contains the following:



LIGAND KITS - Takasago SEGPPOS® Ligand Kit

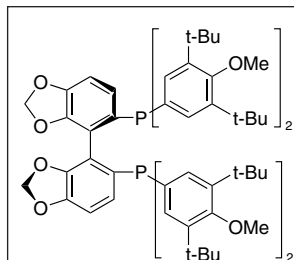
96-6900

Takasago SEGPPOS® Ligand Kit

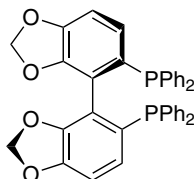
Manufactured under license of Takasago patent.

Components also available for individual sale.

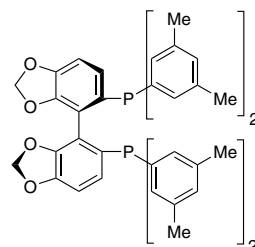
Contains the following:



250mg
15-0066 (R)-(-)-DTBM-SEGPPOS®
15-0067 (S)-(+)-DTBM-SEGPPOS®



250mg
15-0136 (R)-(+)-SEGPPOS®
15-0137 (S)-(-)-SEGPPOS®



250mg
15-0478 (R)-(+)-DM-SEGPPOS®
15-0479 (S)-(-)-DM-SEGPPOS®

LIGAND KITS - UREApHos & METAMORPhos Ligand Kit

96-3740

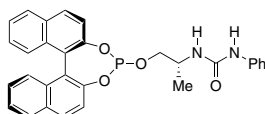
UREApHos and METAMORPhos Ligand Kit for Asymmetric Hydrogenation

Sold under license from InCatT for research purposes only.

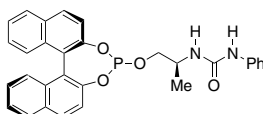
WO2004/103559, WO2009/065853

Components also available for individual sale.

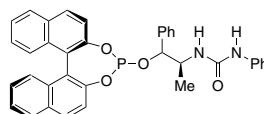
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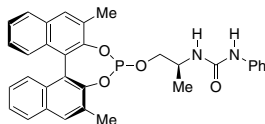
15-2200 50mg



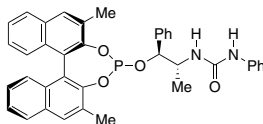
15-2201 50mg



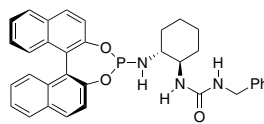
15-2202 50mg



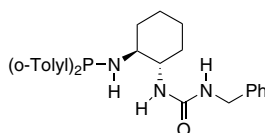
15-2204 50mg



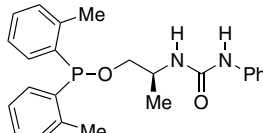
15-2206 50mg



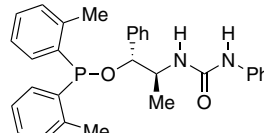
15-2208 50mg



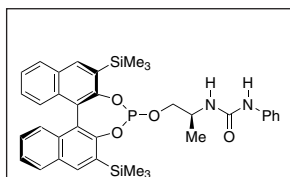
15-2210 50mg



15-2212 50mg

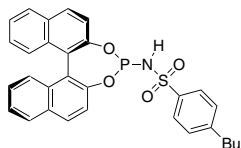


15-2214 50mg

LIGAND KITS - UREaphos & METAMORPhos Ligand Kit**96-3740 UREaphos and METAMORPhos Ligand Kit for Asymmetric Hydrogenation (continued)**

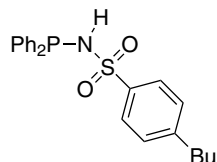
15-2216

50mg



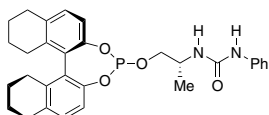
15-2218

50mg



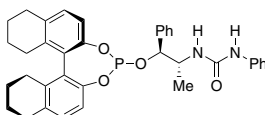
15-2220

50mg



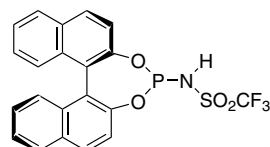
15-2222

50mg



15-2224

50mg



15-2228

50mg

METAL SCAVENGING KITS - BASF Metals Scavenging Agent Kit (MSA Kit)**96-6700 BASF Metals Scavenging Agent Kit (MSA Kit)**

Sold in collaboration with BASF for research purposes only.

Components also available for individual sale. Contains the following:

06-0805	Metals scavenging agent, Phosphotungstic acid modified activated carbon (BASF MSA-FC C-1) (7440-44-0)	10g
13-6300	Metals scavenging agent, Phosphotungstic acid modified alumina (BASF MSA-FC Al-1) (1344-28-1)	10g
14-4353	Metals scavenging agent, Mercaptopropyl modified silica (BASF MSA-FC Si-3) (112926-00-8)	10g

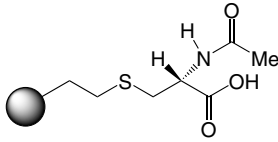
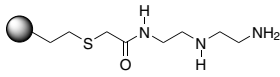
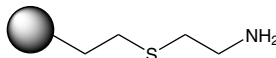
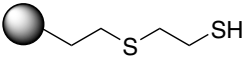
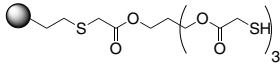
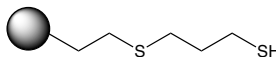
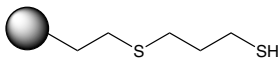
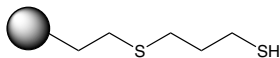
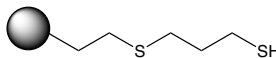
METAL SCAVENGING KITS - PhosphonicS Metals Scavenging Kit

96-6750

PhosphonicS Metals Scavenging Kit

Sold in collaboration with PhosphonicS Ltd. for research purposes only.

Components also available for individual sale. Contains the following:

 16-0200 (PhosphonicS SCYT1) 10g	 16-0210 (PhosphonicS STA3) 10g	 16-0215 (PhosphonicS SEA) 10g
 16-0650 (PhosphonicS SEM26) 10g	 16-1540 (PhosphonicS SET) 10g	 16-1700 (PhosphonicS SPM36) 10g
 16-1702 (PhosphonicS SPM36f) 10g	 16-1704 (PhosphonicS SPM32f) 10g	 16-1706 (PhosphonicS SPM32) 10g

Metal scavengers are increasingly used as an effective way to solve metal removal problems associated with Active Pharmaceutical Ingredients (API's) and synthetic intermediates. This is an often complex technical challenge, influenced by a number of factors including the significant structural variations with API's, the polar functional groups which APIs tend to contain, the environment (solvent and pH) and potential incompatibilities within the API. PhosphincS has designed a portfolio of silica-based materials containing a diverse range of functional groups to address effective metal scavenging.

Properties of PhosphonicS' Broad Portfolio of Metal Scavengers

- High affinity for a wide range of metals, in different oxidation states
- Fast kinetics - highly active at ambient temperatures
- High selectivity for the metal, meaning minimal loss of the API/compound
- Broad solvent and pH compatibility with both organic and aqueous formulations, reducing the requirements of time-consuming and costly solvent switches
- No swelling of the materials are required
- Excellent stability - thermal, physical, chemical and mechanical
- Very high purity - eliminating issues of extractable impurities
- Enhanced performance, due to multiple functional groups and higher effective loadings
- Metal recycling options
- Availability on process scale

Performance Benefits from using PhosphonicS' Metal Scavengers

- **Faster:** purification, batch processing, problem-solving, market introduction
- **Reduced:** development time, valuable API losses, total manufacturing costs, environmental burden
- **Enhanced:** process, productivity, compliance

NANOMATERIAL KITS - Cadmium selenide CANdot® Quantum Dot (CdSe core) Kit

96-0800 **Cadmium selenide CANdot® quantum dot (CdSe core) kit, 50umol/L in hexanes, 525-625nm peak emissions**
HAZ

Sold in collaboration with CAN for research purposes.

Components also available for individual sale.

Contains the following:

48-1011	Cadmium selenide CANdot® quantum dot (CdSe core), 50umol/L in hexanes, 525nm peak emission (1306-24-7)	5ml
48-1017	Cadmium selenide CANdot® quantum dot (CdSe core), 50umol/L in hexanes, 550nm peak emission (1306-24-7)	5ml
48-1023	Cadmium selenide CANdot® quantum dot (CdSe core), 50umol/L in hexanes, 575nm peak emission (1306-24-7)	5ml
48-1030	Cadmium selenide CANdot® quantum dot (CdSe core), 50umol/L in hexanes, 600nm peak emission (1306-24-7)	5ml
48-1035	Cadmium selenide CANdot® quantum dot (CdSe core), 50umol/L in hexanes, 625nm peak emission (1306-24-7)	5ml

Item #	Peak Emission	Particle size (diameter)	Quantum Yield
48-1011	525nm	2.8nm	>20%
48-1017	550nm	3.5nm	>10%
48-1023	575nm	3.9nm	>10%
48-1030	600nm	4.7nm	>20%
48-1035	625nm	5.3nm	>20%

Kit contains 5ml of each of the above 5 products. Ligand capping agent oleylamine. Stable in dispersions > 6 months.
 *Particle size reported excludes ligand capping agent. All sizes determined by TEM.
 † Available at nanoparticle concentration of 50µmol per liter.

NANOMATERIAL KITS - Cadmium selenide/Cadmium sulfide CANdot® Quantum Rod Kit

96-0813 **Cadmium selenide/cadmium sulfide CANdot® quantum rod kit (CdSe/CdS elongated core/shell), 5 mg/ml in hexanes, 560nm, 590nm, 620nm peak emissions**
HAZ

Sold in collaboration with CAN for research purposes.

Components also available for individual sale.

Contains the following:

48-1053	Cadmium selenide/cadmium sulfide CANdot® quantum rod (CdSe/CdS elongated core/shell), 5 mg/ml in hexanes, 560nm peak emission (1306-24-7)	0.5ml
48-1056	Cadmium selenide/cadmium sulfide CANdot® quantum rod (CdSe/CdS elongated core/shell), 5 mg/ml in hexanes, 590nm peak emission (1306-24-7)	0.5ml
48-1059	Cadmium selenide/cadmium sulfide CANdot® quantum rod (CdSe/CdS elongated core/shell), 5 mg/ml in hexanes, 620nm peak emission (1306-24-7)	0.5ml

NANOMATERIAL KITS - Gold Gemini Nanorods Kit, CTAB Free

96-1549

NEW**Gold Gemini Nanorods Kit, CTAB Free (Wavelength 650-850 nm)**

Rods are synthesized without CTAB. Store at 4°C - 8°C. Do not freeze. At storage temperature the product may appear opaque. Follow the procedure for re-dispersing surfactants as described in the technical note. Complete this process before use to dissolve precipitated stabilizer. Sold in collaboration with SONA Nanotech for research purposes only.

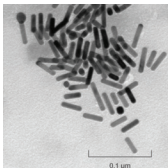
Components also available for individual sale.

Contains the following:

79-7010	Gold Gemini Nanorods, CTAB Free (Wavelength 650 nm) (7440-57-5)	5ml
79-7015	Gold Gemini Nanorods, CTAB Free (Wavelength 700 nm) (7440-57-5)	5ml
79-7020	Gold Gemini Nanorods, CTAB Free (Wavelength 750 nm) (7440-57-5)	5ml
79-7025	Gold Gemini Nanorods, CTAB Free (Wavelength 800 nm) (7440-57-5)	5ml
79-7030	Gold Gemini Nanorods, CTAB Free (Wavelength 850 nm) (7440-57-5)	5ml

Item #	LPSR Maximum (nm)	Length (nm)	Width (nm)	Aspect Ratio	Color & Form
79-7010	640 - 670	25 - 31	13 - 18	1.7 - 1.9	violet liq.
79-7015	685 - 715	37 - 43	13 - 18	2.4 - 2.8	blue liq.
79-7020	735 - 765	37 - 44	10 - 13	3.4 - 3.7	red-purple liq.
79-7025	785 - 815	40 - 50	10 - 13	3.8 - 4.1	red-orange liq.
79-7030	835 - 865	48 - 55	9 - 12	4.6 - 5.3	maroon-purple liq.

Concentration: >30 µg/ml
pH: 5.5 - 7.5
Stabilizer: Amphiphilic Agents
Solvent: Stabilized with amphiphilic agents in conductivity grade water (18.0 MΩ cm⁻¹)
Optical Density: 1.0 - 1.2
Shelf Life: 12 months



NANOMATERIAL KITS - Gold Nanoparticles Kit

96-1547

Gold Nanoparticles Kit (5nm-40nm diameter, OD 1, stabilized suspension citrate buffer)

Components also available for individual sale.

Contains the following:

79-0182	Gold Nanoparticles (5nm, 1 OD, supplied in 0.1mM stabilizing surfactant, 515-520nm abs. max.) (7440-57-5)	25ml
79-0210	Gold Nanoparticles (10nm, 1 OD, supplied in 0.1mM stabilizing surfactant, 515-520nm abs. max.) (7440-57-5)	25ml
79-0212	Gold Nanoparticles (15nm, 1 OD, supplied in 0.1mM stabilizing surfactant, 520nm abs. max.) (7440-57-5)	25ml
79-0214	Gold Nanoparticles (20nm, 1 OD, supplied in 0.1mM stabilizing surfactant, 524nm abs. max.) (7440-57-5)	25ml
79-0216	Gold Nanoparticles (30nm, 1 OD, supplied in 0.1mM stabilizing surfactant, 526nm abs. max.) (7440-57-5)	25ml
79-0218	Gold Nanoparticles (40nm, 1 OD, supplied in 0.1mM stabilizing surfactant, 530nm abs. max.) (7440-57-5)	25ml

NANOMATERIAL KITS - Gold Nanoparticles Kit, Reactant-Free

96-1545 Gold Nanoparticles Kit, Reactant-Free (5nm-40nm diameter, OD 1, suspension in phosphate-buffered saline, 515-530nm abs. max.)
 Components also available for individual sale.
 Contains the following:

79-0180	Gold Nanoparticles (5 nm diameter, 1 OD, stabilized suspension in phosphate-buffered saline, 515-520 nm abs. max.) reactant free (7440-57-5)	25ml
79-0184	Gold Nanoparticles (10nm diameter, 1 OD, stabilized suspension in phosphate-buffered saline, 520nm abs. max.) reactant free (7440-57-5)	25ml
79-0186	Gold Nanoparticles (15nm diameter, 1 OD, stabilized suspension in phosphate-buffered saline, 520nm abs. max.) reactant free (7440-57-5)	25ml
79-0188	Gold Nanoparticles (20nm diameter, 1 OD, stabilized suspension in phosphate-buffered saline, 524nm abs. max.) reactant free (7440-57-5)	25ml
79-0190	Gold Nanoparticles (30nm diameter, 1 OD, stabilized suspension in phosphate-buffered saline, 526nm abs. max.) reactant free (7440-57-5)	25ml
79-0192	Gold Nanoparticles (40nm diameter, 1 OD, stabilized suspension in phosphate-buffered saline, 530nm abs. max.) reactant free (7440-57-5)	25ml

NANOMATERIAL KITS - Gold Nanorods Kit (Axial Diameter - 25nm)

96-1530 Gold Nanorods Kit (Axial Diameter - 25 nm, wavelength 550-700 nm)
 Components also available for individual sale.
 Contains the following:

79-6000	Gold Nanorods (Axial Diameter - 25 nm) (Wavelength 550 nm) (7440-57-5)	25ml
79-6005	Gold Nanorods (Axial Diameter - 25 nm) (Wavelength 600 nm) (7440-57-5)	25ml
79-6010	Gold Nanorods (Axial Diameter - 25 nm) (Wavelength 650 nm) (7440-57-5)	25ml
79-6015	Gold Nanorods (Axial Diameter - 25 nm) (Wavelength 700 nm) (7440-57-5)	25ml

NANOMATERIAL KITS - Gold Nanorods Kit (Axial Diameter - 10nm)

96-1535 Gold Nanorods Kit (Axial Diameter - 10 nm, wavelength 700-808 nm)
 Components also available for individual sale.
 Contains the following:

79-6020	Gold Nanorods (Axial Diameter - 10 nm) (Wavelength 700 nm) (7440-57-5)	25ml
79-6025	Gold Nanorods (Axial Diameter - 10 nm) (Wavelength 750 nm) (7440-57-5)	25ml
79-6030	Gold Nanorods (Axial Diameter - 10 nm) (Wavelength 780 nm) (7440-57-5)	25ml
79-6035	Gold Nanorods (Axial Diameter - 10 nm) (Wavelength 808 nm) (7440-57-5)	25ml

NANOMATERIAL KITS - Gold Nanospheres Kit

96-1540 Gold Nanospheres Kit (30-90 nm)
 Components also available for individual sale. Contains the following:

79-6040	Spherical Gold Nanoparticles (30 nm) (7440-57-5)	25ml
79-6045	Spherical Gold Nanoparticles (50 nm) (7440-57-5)	25ml
79-6050	Spherical Gold Nanoparticles (70 nm) (7440-57-5)	25ml
79-6055	Spherical Gold Nanoparticles (90 nm) (7440-57-5)	25ml

NANOMATERIAL KITS - Graphene Quantum Dots (GQDs) Master Kit**96-7410****NEW****Graphene Quantum Dots (GQDs) Master Kit**

Sold in collaboration with Dotz Nano Ltd. for research purposes only.
Suggested use within 6 months of purchase. Do not freeze. Store in DARK.
Components also available for individual sale. Contains the following:

06-0330	Graphene Quantum Dots (GQDs), Aqua-Green Luminescent (1034343-98-0)	100mg
06-0332	Graphene Quantum Dots (GQDs) in water, Aqua-Green Luminescent (1034343-98-0)	100ml
06-0334	Graphene Quantum Dots (GQDs), Blue Luminescent (1034343-98-0)	100mg
06-0336	Graphene Quantum Dots (GQDs) in water, Blue Luminescent (1034343-98-0)	100ml
06-0338	Graphene Quantum Dots (GQDs), Cyan Luminescent (1034343-98-0)	100mg
06-0340	Graphene Quantum Dots (GQDs) in water, Cyan Luminescent (1034343-98-0)	100ml

Item #	Photoluminescence			
	QY* *	λ max *	Max emission	FWHM *
06-0330 / 06-0332	>17%	485 nm	525 nm	70 nm
06-0334 / 06-0336	>65%	350 nm	445 nm	65 nm
06-0338 / 06-0340	>25%	420 nm	490 nm	80 nm
Particle diameter: <5 nm				
Topographic height: 1.0 - 2.0 nm				
Concentration: 1mg/ml (for liquid items)				
Abbreviations: QY* = Quantum Yield; λ max = Maximum excitation wavelength; FWHM = Full width at half maximum				

NANOMATERIAL KITS - Graphene Quantum Dots (GQDs) Mini Kit (Powders)**96-7425****NEW****Graphene Quantum Dots (GQDs) Mini Kit (Powders)**

Sold in collaboration with Dotz Nano Ltd. for research purposes only.
Suggested use within 6 months of purchase. Do not freeze. Store in DARK.
Components also available for individual sale. Contains the following:

06-0330	Graphene Quantum Dots (GQDs), Aqua-Green Luminescent (1034343-98-0)	100mg
06-0334	Graphene Quantum Dots (GQDs), Blue Luminescent (1034343-98-0)	100mg
06-0338	Graphene Quantum Dots (GQDs), Cyan Luminescent (1034343-98-0)	100mg

Item #	Color & Form	Photoluminescence			
		QY* *	λ max *	Max emission	FWHM *
06-0330	dark red-brown powdr.	>17%	485 nm	525 nm	70 nm
06-0334	dark brown powdr.	>65%	350 nm	445 nm	65 nm
06-0338	dark brown powdr.	>25%	420 nm	490 nm	80 nm
Particle diameter: <5 nm					
Topographic height: 1.0 - 2.0 nm					
Abbreviations: QY* = Quantum Yield; λ max = Maximum excitation wavelength; FWHM = Full width at half maximum					

OTHER KITS - Graphene Quantum Dots (GQDs) Mini Kit (Liquids)

96-7420

NEW**Graphene Quantum Dots in water (GQDs) Mini Kit (Liquids)**

Sold in collaboration with Dotz Nano Ltd. for research purposes only.
Suggested use within 6 months of purchase. Do not freeze. Store in DARK.
Components also available for individual sale. Contains the following:

06-0332	Graphene Quantum Dots (GQDs) in water, Aqua-Green Luminescent (1034343-98-0)	100ml
06-0336	Graphene Quantum Dots (GQDs) in water, Blue Luminescent (1034343-98-0)	100ml
06-0340	Graphene Quantum Dots (GQDs) in water, Cyan Luminescent (1034343-98-0)	100ml

Item #	Color & Form	Photoluminescence			
		QY* *	λ max *	Max emission	FWHM *
06-0332	cloudy orange liq.	>17%	485 nm	525 nm	70 nm
06-0336	cloudy colorless liq.	>65%	350 nm	445 nm	65 nm
06-0340	cloudy brown liq.	>25%	420 nm	490 nm	80 nm

Particle diameter: <5 nm
Topographic height: 1.0 - 2.0 nm
Concentration: 1mg/ml

Abbreviations: QY* = Quantum Yield; λ max = Maximum excitation wavelength; FWHM = Full width at half maximum

OTHER KITS - Biological Hydrogen Peroxide Imaging Kit (FBBBE, CBBE)

96-0350

Biological Hydrogen Peroxide Imaging Kit (FBBBE, CBBE)

Includes:

6 x 1.0ml Dimethylsulfoxide (ACS spectrophotometric grade): 97-4940

05-0058 FBBBE: 3 x 5mg

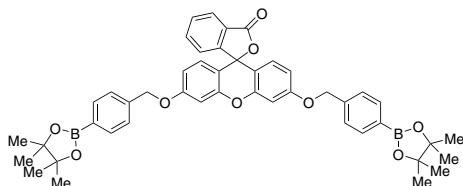
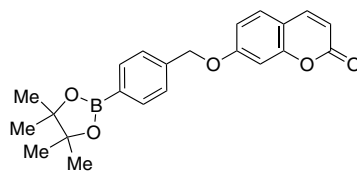
05-0054 CBBE: 3 x 5mg

Sold under license from The Regents of the University of California. US Patent
application 61/762,706.

Components also available for individual sale.

Contains the following:

05-0054	7-[[[(4,4,5,5-Tetramethyl-1,3,2-dioxaborolan-2-yl)benzyl]oxy]-2H-1-benzopyran-2-one CBBE (1522117-80-1)	5mg
05-0058	3',6'-Bis[[[4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)oxy]-3H-[spiro(isobenzofuran-1,9,-xanthen)-3-one] FBBBE (1522117-83-4)	5mg

Active Ingredients: Catalog # 05-0058 Fluorescein bis(benzyl boronic ester) **FBBE**Catalog # 05-0054 Coumarin benzyl boronic ester **CBBE****05-0058 FBBE****05-0054 CBBE**

OTHER KITS - Biological Hydrogen Peroxide Imaging Kit (FBBBE, CBBE)96-0350 Biological Hydrogen Peroxide Imaging Kit (FBBBE, CBBE) (*continued*)

Introduction:	FBBBE and CBBE are robust fluorescent probes, effective for imaging hydrogen peroxide in biological settings. In the supplied form, the fluorescence signal is effectively quenched by the addition of the benzyl ether boronic ester protecting groups to the fluorophores. In the presence of biologically relevant levels of hydrogen peroxide (10-200 :M), the protecting groups cleave and a strong fluorescent signal is observed. (FBBBE: λ_{exc} = 480 nm, λ_{em} = 512 nm; CBBE: λ_{exc} = 370 nm, λ_{em} = 450 nm) 1. <i>ChemBioChem</i>, 2013, 14, 593.
Contents:	FBBBE: 3x5mg CBBE: 3x5mg Dimethylsulfoxide (ACS spectrophotometric grade): 6 x 1.0mL
SDS:	The Safety Data Sheets for the three products contained in this kit can be downloaded from the Strem Chemicals Web Site at www.strem.com. Locate the SDS using the following catalog numbers: FBBBE: 05-0058 CBBE: 05-0054 Dimethylsulfoxide (ACS spectrophotometric grade): 97-4940
Storage Conditions:	Both compounds are stable at ambient conditions for several days. For long term storage, the kit should be stored at -20°C and protected from light.

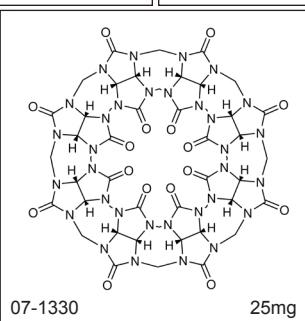
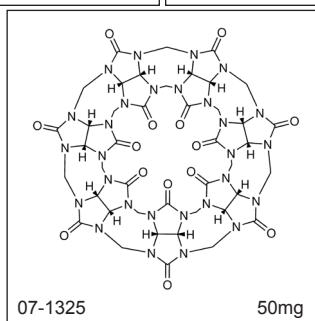
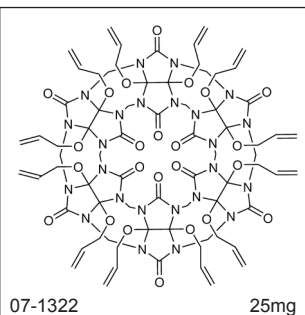
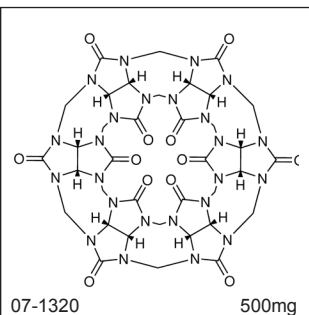
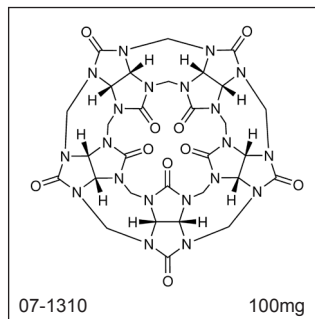
Preparation of FBBBE:	Step 1: Add 654 μL of DMSO to 5.0mg of FBBE (MW: 764.3 g/mol) (resulting concentration = 10 mM). FBBBE is readily soluble in DMSO. The solution can be portioned into 50 μL aliquots as needed. These solutions must be stored in the freezer at < -20°C. Step 2: Add 50 μL of 10 mM stock to 50 μL DMSO (resulting concentration = 5 mM). This stock solution can be stored in the freezer at < -20°C. Step 3: This solution can be further diluted to the desired concentration in buffer. For example add 10μL of the 5 mM stock solution to 990μL 1X PBS, resulting in a 50 μM solution (this solution should be used the same day in which it was prepared). This will result in a solution containing only 1% DMSO (v/v). This solution can then be used in the biological setting to image H_2O_2.
Preparation of CBBE:	Step 1: Add 661 μL of DMSO to 5.0 mg CBBE (MW: 378.2 g/mol) (resulting concentration = 20 mM). Vortex until all solid has been thoroughly dissolved. The solution can be portioned into 50 μL aliquots as needed. These solutions must be stored in the freezer at < -20°C. Step 2: Add 50 μL of 20 mM stock to 150 μL DMSO (resulting concentration = 5 mM). This stock solution can be stored in the freezer at < -20°C. Step 3: The solution can be further diluted to the desired concentration in buffer. For example add 10 μL of the 5 mM stock solution to 990 μL 1X PBS, resulting in a 50μM solution (this solution should be used the same day in which it was prepared). This will result in a solution containing only 1% DMSO (v/v). This solution can then be used to image H_2O_2 in the biological setting.

OTHER KITS - Cucurbituril Kit**96-7054****Cucurbituril Kit**

Sold for research purposes only. US 6365734, US 7388099.

Components also available for individual sale.

Contains the following:

**OTHER KITS - Enzyme Carrier Lifetech™ ECRKIT1****96-0255****Enzyme carrier Lifetech™ ECRKIT1****NEW**

Store in dry conditions (2-20°C). Do not freeze. Shelf Life: 5 years; This enzyme carrier kit allows rapid screening of different methods of enzyme immobilization.

Sold in collaboration with Purolite for research purposes only.

Components also available for individual sale.

Contains the following:

06-0810	Enzyme carrier Lifetech™ ECR8204F	50g
06-0828	Enzyme carrier Lifetech™ ECR8285	50g
06-0913	Enzyme carrier Lifetech™ ECR1090M	50g
06-0925	Enzyme carrier Lifetech™ ECR1030M	50g
07-1512	Enzyme carrier Lifetech™ ECR8309F	50g
07-1532	Enzyme carrier Lifetech™ ECR8806F	50g

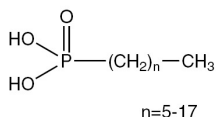
OTHER KITS -Long-Chain n-Alkylphosphonic Acid Kit**96-1525****Long-Chain n-Alkylphosphonic Acid Kit**

Components also available for individual sale. Contains the following:

15-0958	n-Decylphosphonic acid, min. 97% (6874-60-8)	1g
15-1835	n-Dodecylphosphonic acid, min. 97% DDPA (5137-70-2)	1g
15-2400	n-Hexadecylphosphonic acid, min. 97% HDPA (4721-17-9)	1g
15-2410	n-Hexylphosphonic acid, min. 97% HPA (4721-24-8)	1g
15-3510	n-Octadecylphosphonic acid, min. 97% ODPA (4724-47-4)	1g
15-3520	n-Octylphosphonic acid, min. 97% OPA (4724-48-5)	1g
15-5145	n-Tetradecylphosphonic acid, min. 97% TDPA (4671-75-4)	1g

General Use:

Linear alkyl Phosphonic acids and their phosphonate salts are surfactants because of their classic bifunctional chemical structure, $RP(O)(OH)_2$, consisting of both non-polar organic hydrophobic groups and anionic inorganic hydrophilic groups. Like the related alkyl sulfonates, they are used as detergents, dispersants, emulsifiers, and chelating agents. Alkyl phosphonic acids are typically sparingly soluble in both organic solvents and water, but become more soluble in water when neutralized to phosphonates at neutral to high pH.

**OTHER KITS - Nitric Oxide Sensor (Extracellular) Kit ("NO-ON") (FL2A)****96-0397****Nitric Oxide Sensor (Extracellular) Kit ("NO-ON") (FL2A) (Cell-impermeable NO fluorescent probe)****NEW**

Includes:

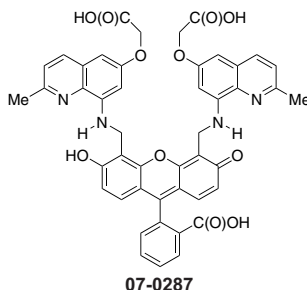
5 x 1ml Dimethylsulfoxide (ACS spectrophotometric grade): 97-4940

5 x 1ml Copper (II) chloride as a 1.0 mM solution in water: 97-3060

07-0287 packaged as 5 x 0.5mg

07-0287	2-{4,5-Bis[(6-(2-ethoxy-2-oxohydroxy)-2-methylquinolin-8-ylamino)methyl]-6-hydroxy-3-oxo-3H-xanthen-9-yl}benzoic acid FL2A (1239877-07-6)	0.5mg
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Active Ingredients: 2-{4,5-Bis[(6-(2-ethoxy-2-oxoethoxy)-2-methylquinolin-8-ylamino)methyl]-6-hydroxy-3-oxo-3H-xanthen-9-yl}benzoic acid FL2A



OTHER KITS -Nitric Oxide Sensor (Extracellular) Kit ("NO-ON") (FL2A)

96-0397

Nitric Oxide Sensor (Extracellular) Kit ("NO-ON") (FL2A) (Cell-impermeable NO fluorescent probe) (continued)**NEW**

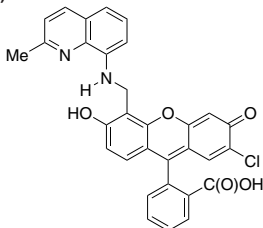
Introduction:	The copper complex of FL2A is a novel, cell-trappable fluorescent NO probe, that allows direct imaging of nitric oxide produced in living cells through fluorescence turn on. The FL2A ligand is trapped in the cell. A solution of the copper (II) complex of FL2A can be readily prepared using this kit. For additional information, consult the following references: 1. <i>Inorg. Chem.</i>, 2010, 49, 7464. 2. <i>PNAS</i>, 2010, 107, 8525.
Contents:	Ligand FL2A: 5 x 0.5mg Dimethylsulfoxide (ACS spectrophotometric grade): 5 x 1.0ml Copper (II) chloride (1.0 mM solution in water): 5 x 1.0ml
SDS:	The Safety Data Sheets for the three products contained in this kit can be downloaded from the Strem Chemical website, www.strem.com. Locate the SDS using the following catalog numbers: 07-0287: FL2A 97-4940: Dimethylsulfoxide (ACS spectrophotometric grade) 97-3060: Copper (II) chloride as a 1.0 mM solution in water
Storage Conditions:	This kit should be stored at -20°C and protected from light.
Preparation of the active copper complex of FL2A:	Step 1: Allow the kit to warm to room temperature. Add 589 microliters of DMSO to a 0.5mg vial of FL2A (resulting concentration -1.0 mM). The FL2A is readily soluble in the DMSO. The solution can be partitioned into aliquots of 40-300 µL as required. These solutions must be stored in the freezer at <-20°C. The DMSO solution of FL2A is stable for three months at -80°C. It is advisable to check the extinction coefficient of the solution before preparing the copper complex. ($\log \epsilon(499 \text{ nm}) = 4.66$) Step 2: A CuFL2A solution should be freshly prepared by adding 1:2 FL2A solution (1.0 mM) to the copper (II) solution (1.0 mM) at room temperature. Note: The prepared DMSO/water stock solution of CuFL2A solution [$\log \epsilon(495 \text{ nm}) = 4.19$] can be kept at room temperature, but should be protected from light. The solution can be diluted with media to provide the concentration required for cell sensing experiments. When the extinction coefficient of the red solution of CuFL2A diminishes by 20% of the original value, the solution should be discarded. Do not use the solution after 1 hour and do not freeze the solution.

OTHER KITS - Nitric Oxide Sensor (Intracellular) Kit ("NO-ON") (FL)

96-0293 Nitric Oxide Sensor (Intracellular) Kit ("NO-ON") (FL) (Cell-trappable NO fluorescent probe)
 Includes: 5 x 1ml Dimethylsulfoxide (ACS spectrophotometric grade): 97-4940
 5 x 1ml Copper (II) chloride as a 1.0 mM solution in water: 97-3060
 07-0293 packaged as 5 x 0.5mg

07-0293 2-[2-Chloro-6-hydroxy-5-[2-methylquinolin-8-ylaminomethyl]-3-oxo-3H-xanthen-9-yl]benzoic acid FL (905982-78-7) 0.5mg

Active Ingredients: 2-[2-Chloro-6-hydroxy-5-[2-methylquinolin-8-ylamino)methyl]-3-oxo-3H-xanthen-9-yl]benzoic acid (FL)



07-0293

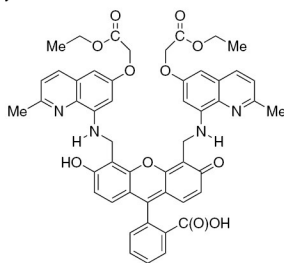
Introduction:	The copper complex of FL is a novel, cell-trappable fluorescent NO probe that allows direct imaging of nitric oxide produced in living cells through fluorescence turn on. A solution of the copper (II) complex of FL can be readily prepared using this kit. For additional information, consult the following references: 1. <i>Nature Chemical Biology</i>, 2006, 2, 375. 2. <i>Nature Protocols</i>, 2007, 2, 408. 3. <i>J. Am. Chem. Soc.</i>, 2006, 128, 14364
Contents:	Ligand FL: 5 x 0.5mg Dimethylsulfoxide (ACS spectrophotometric grade): 5 x 1.0ml Copper (II) chloride (1.0 mM solution in water): 5 x 1.0ml
SDS:	The Safety Data Sheets for the three products contained in this kit can be downloaded from the Strem Chemical website, www.strem.com. Locate the SDS using the following catalog numbers: 07-0293: FL 97-4940: Dimethylsulfoxide (ACS spectrophotometric grade) 97-3060: Copper (II) chloride as a 1.0 mM solution in water
Storage Conditions:	This kit should be stored at -20°C and protected from light.
Preparation of the active copper complex of FL:	Step 1: Allow the kit to warm to room temperature. Add 931 microliters of DMSO to a 0.5mg vial of FL (resulting concentration ~1.0 mM). The FL is readily soluble in the DMSO. The solution can be partitioned into aliquots of 40-300 µL as required. These solutions must be stored in the freezer at <-20°C. The DMSO solution of FL is stable for three months at -80°C. It is advisable to check the extinction coefficient of the solution before preparing the copper complex. (log ε(504 nm) = 4.62) Step 2: A CuFL solution should be freshly prepared by adding 1:1 FL solution (1.0 mM) to the copper (II) solution (1.0 mM) at room temperature. Note: The prepared DMSO/water stock solution of CuFL solution [log ε(499 nm) = 4.60] can be kept at room temperature, but should be protected from light. The solution can be diluted with media to provide the concentration required for cell sensing experiments. When the extinction coefficient of the red solution of CuFL diminishes by 20% of the original value, the solution should be discarded. Do not use the solution after 1 hour, and do not freeze the solution.

OTHER KITS - Nitric Oxide Sensor (Intracellular) Kit ("NO-ON") (FL2E)

96-0396 Nitric Oxide Sensor (Intracellular) Kit ("NO-ON") (FL2E) (Cell-trappable NO fluorescent probe)
 Includes:
 5 x 1ml Dimethylsulfoxide (ACS spectrophotometric grade): 97-4940
 5 x 1ml Copper (II) chloride as a 1.0 mM solution in water: 97-3060
 07-0291 packaged as 5 x 0.5mg

07-0291 2-[4,5-Bis[(6-(2-ethoxy-2-oxoethoxy)-2-methylquinolin-8-ylamino)methyl]-6-hydroxy-3-oxo-3H-xanthen-9-yl]benzoic acid FL2E (1239877-06-5) 0.5mg

Active Ingredients: 2-[4,5-Bis[(6-(2-ethoxy-2-oxoethoxy)-2-methylquinolin-8-ylamino)methyl]-6-hydroxy-3-oxo-3H-xanthen-9-yl]benzoic acid FL2E



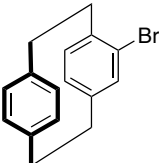
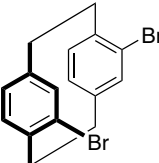
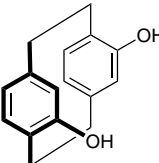
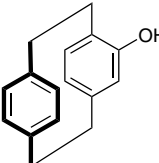
07-0291

Introduction:	The copper complex of FL2E is a novel, cell-trappable fluorescent NO probe, that allows direct imaging of nitric oxide produced in living cells through fluorescence turn on. The FL2E ligand is trapped in the cell. A solution of the copper (II) complex of FL2E can be readily prepared using this kit. For additional information, consult the following references: 1. <i>Inorg. Chem.</i> , 2010 , 49, 7464.
Contents:	Ligand FL2E : 5 x 0.5mg Dimethylsulfoxide (ACS spectrophotometric grade): 5 x 1.0ml Copper (II) chloride (1.0 mM solution in water): 5 x 1.0ml
SDS:	The Safety Data Sheets for the three products contained in this kit can be downloaded from the Strem Chemical website, www.strem.com . Locate the SDS using the following catalog numbers: 07-0291: FL2E 97-4940: Dimethylsulfoxide (ACS spectrophotometric grade) 97-3060: Copper (II) chloride as a 1.0 mM solution in water
Storage Conditions:	This kit should be stored at -20°C and protected from light.

Preparation of the active copper complex of FL2E:	Step 1: Allow the kit to warm to room temperature. Add 571 microliters of DMSO to a 0.5mg vial of FL2E (resulting concentration -1.0 mM). The FL2E is readily soluble in the DMSO. The solution can be partitioned into aliquots of 40-300 µL as required. These solutions must be stored in the freezer at <-20°C. The DMSO solution of FL2E is stable for three months at -80°C. It is advisable to check the extinction coefficient of the solution before preparing the copper complex. (log ε(500 nm) = 4.25) Step 2: A CuFL2E solution should be freshly prepared by adding 1:1 FL2E solution (1.0 mM) to the copper (II) solution (1.0 mM) at room temperature. Note: The prepared DMSO/water stock solution of CuFL2E solution [log ε(496 nm) = 4.05] can be kept at room temperature, but should be protected from light. The solution can be diluted with media to provide the concentration required for cell sensing experiments. When the extinction coefficient of the red solution of CuFL2E diminishes by 20% of the original value, the solution should be discarded. Do not use the solution after 1 hour, and do not freeze the solution.
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OTHER KITS - Paracyclophane Kit**96-7052 Paracyclophane Kit**

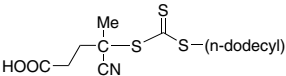
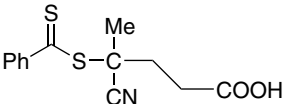
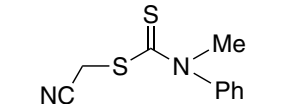
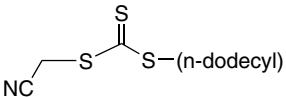
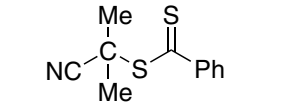
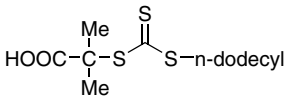
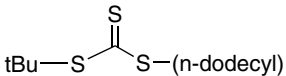
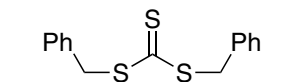
Components also available for individual sale. Contains the following:

			
06-0104 500mg	06-0460 250mg	08-0700 100mg	08-2027 250mg

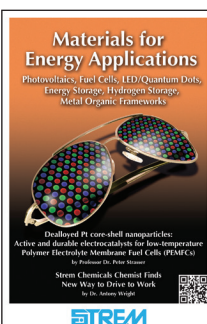
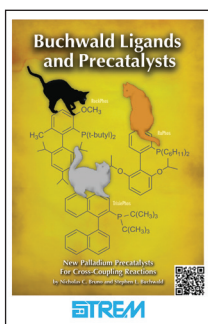
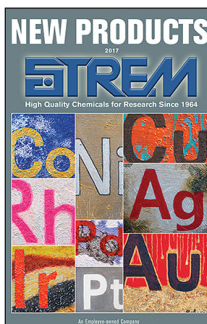
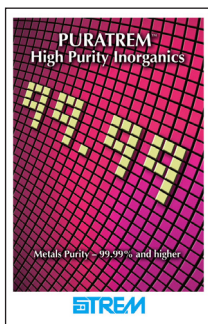
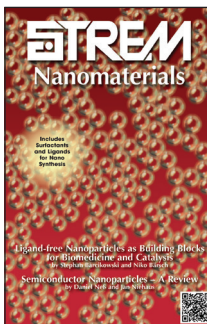
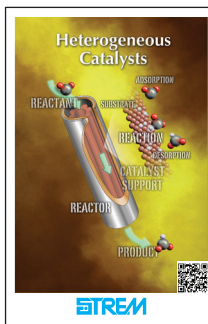
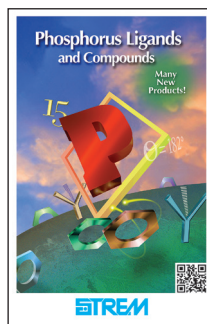
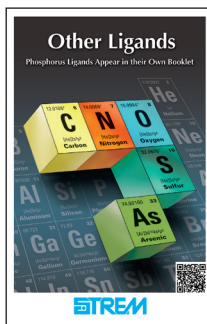
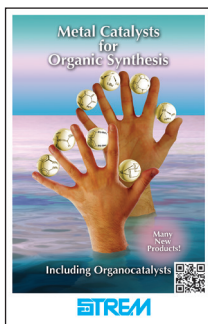
OTHER KITS - RAFT Agent Kit**96-4700 RAFT Agent Kit for controlling polymerizations at the molecular level**

Sold for research purposes only under license from CSIRO.

Components also available for individual sale. Contains the following:

		
16-0415 500mg	16-0422 500mg	16-0423 500mg
		
16-0425 500mg	16-0430 500mg	16-0460 500mg
		
16-0610 500mg	16-0617 500mg	

Available Booklets



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KITS

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