Wako Product Update

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Wako

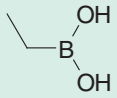
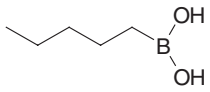
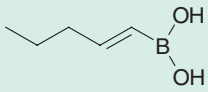
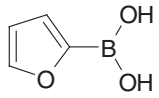
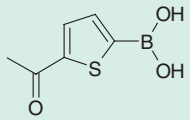
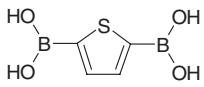
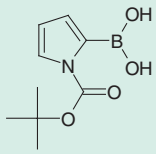
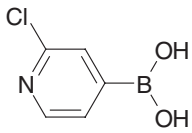
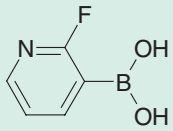
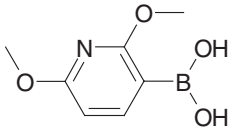
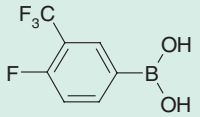
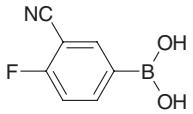
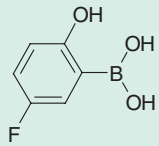
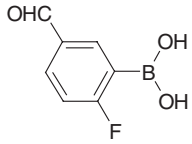
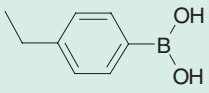
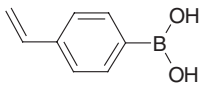
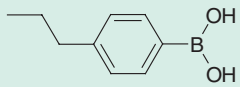
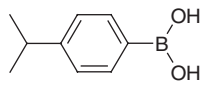
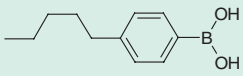
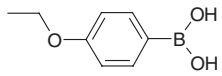
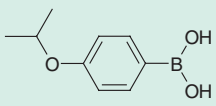
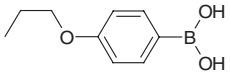
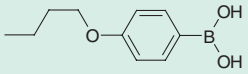
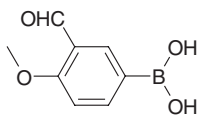
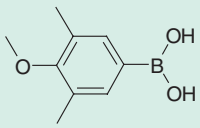
Alphabetical Index –Wako Product Update No.18–


Biphenyl

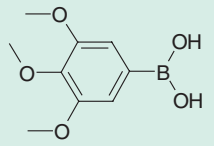
	Description	(Wako Catalog No. (Package Size))
A	4-Acetoxybiphenyl	(322-21491(10g); 328-21493(100g))
	4-Acetoxy-4'-bromobiphenyl	(323-23822(25g); 327-23825(500g))
	4-Acetylbiphenyl	(329-68842(25g); 327-68843(100g))
	2-Aminobiphenyl	(016-02502(25g); 010-02505(500g))
	4-(Aminomethyl)biphenyl	(321-78971(1g); 327-78973(10g))
B	4-Benzoylbiphenyl	(322-41852(25g); 320-41853(100g))
	4-Benzoyl-4'-bromobiphenyl	(325-28201(5g); 323-28202(25g))
	Biphenyl	(040-18412(25g); 044-18415(500g))
	4-Biphenylacetic Acid	(326-47232(25g); 324-47233(100g))
	3-Biphenylboronic Acid	(328-82151(1g); 324-82153(5g))
	4-Biphenylboronic Acid	(328-59441(5g); 326-59442(25g))
	4-Biphenylcarbonyl Chloride	(322-75081(5g); 320-75082(25g))
	4-Biphenylcarboxamide	(321-72491(5g); 329-72492(25g))
	2-Biphenylcarboxylic Acid	(323-24721(5g); 321-24722(25g))
	3-Biphenylcarboxylic Acid	(320-52181(1g); 326-52183(5g))
	2,2'-Biphenyldicarboxylic Acid	(328-62572(25g); 326-62573(100g))
	4,4'-Biphenyldicarboxylic Acid	(023-08532(25g))
	4,4'-Biphenyldimethanol	(325-33831(1g); 321-33833(5g))
	Biphenylene	(323-46821(100mg); 329-46823(500mg))
	4-Biphenylmethanol	(028-12551(10g); 024-12553(50g))
	4-Biphenylyl Benzoate	(329-50071(5g); 327-50072(25g))
	4-(4-Biphenylyl)butanal	(321-21461(1g); 327-21463(5g))
	4-(4-Biphenylyl)butanol	(328-21471(1g); 324-21473(5g))
	4-(4-Biphenylyl)butyric Acid	(325-21481(1g); 321-21483(5g))
	4-(4-Biphenylyl)cyclohexanone	(321-56011(1g); 327-56013(5g))
	3-(2-Biphenylyloxy)-1,2-epoxypropane	(027-09831(100g); 029-09835(500g))
	2-(2-Biphenylyloxy)ethanol	(322-69172(25g); 326-69175(500g))
	5-(4-Biphenylyl)pentanal	(321-22941(1g); 327-22943(5g))
	5-(4-Biphenylyl)pentanol	(328-22951(1g); 324-22953(5g))
	5-(4-Biphenylyl)valeric Acid	(324-22931(1g); 320-22933(5g))
	4,4'-Bis(4-aminophenoxy)biphenyl	(025-11721(5g); 023-11722(25g))
	4,4'-Bis(bromomethyl)biphenyl	(328-33821(1g); 324-33823(5g))
	4,4'-Bis(chloromethyl)biphenyl	(323-47242(25g); 327-47245(500g))
	2,2'-Bis(diphenylphosphino)-1,1'-biphenyl	(320-85271(100mg); 326-85273(500mg))
	4,4'-Bis(heptyloxy)biphenyl	(325-62521(1g); 321-62523(5g))
	4,4'-Bis(hexyloxy)biphenyl	(328-62511(1g); 324-62513(5g))
	4,4'-Bis(methoxymethyl)biphenyl	(326-63271(5g); 324-63272(25g))
	4,4'-Bis(2-sulfostyryl)biphenyl Disodium Salt	(324-63571(5g); 322-63572(25g))
	BOC-3-(4-biphenylyl)-D-alanine	(325-46901(500mg))
	BOC-3-(4-biphenylyl)-L-alanine	(322-46891(500mg))
	3-Bromobiphenyl	(326-47411(1g); 322-47413(5g))
	4-Bromo-2-fluorobiphenyl	(324-29131(5g); 322-29132(25g))
	4-Bromomethylbiphenyl	(328-78981(5g); 326-78982(25g))
	4'-Bromomethyl-2-cyanobiphenyl	(326-54241(5g); 324-54242(25g))
	4'-(p-Bromophenyl)acetophenone	(326-30321(5g); 324-30322(25g))
	4-Butoxy-4'-biphenylcarboxylic Acid	(323-30831(1g); 329-30833(10g))
	4-Butoxy-4'-hydroxybiphenyl	(320-54261(1g); 326-54263(5g))
	4-Butylbiphenyl	(324-30861(5g); 322-30862(25g))
	4-Butyl-4'-biphenylcarboxylic Acid	(329-30791(1g); 325-30793(10g))
	4-Butyl-4'-cyanobiphenyl	(322-23331(1g); 328-23333(5g))
C	4-Cyanobiphenyl	(325-20881(5g); 323-20882(25g))
	4-Cyano-4'-ethoxybiphenyl	(324-23531(1g); 320-23533(5g))
	4-Cyano-4'-ethylbiphenyl	(325-23321(1g); 321-23323(5g))
	4-Cyano-4'-heptylbiphenyl	(326-23351(1g); 322-23353(5g))
	4-Cyano-4'-heptyloxybiphenyl	(320-23371(1g); 326-23373(5g))
	4-Cyano-4'-hydroxybiphenyl	(326-23812(25g); 324-23813(100g))
	2-Cyano-4'-methylbiphenyl	(321-20861(5g); 329-20862(25g))
	4-Cyano-4'-methylbiphenyl	(328-37461(5g); 326-37462(25g))
	4-Cyano-4'-octylbiphenyl	(326-23513(5g))
	4-Cyano-4'-octyloxybiphenyl	(320-23491(1g); 326-23493(5g))
	4-Cyano-4'-pentylbiphenyl	(329-23341(1g); 325-23343(5g))
	4-Cyano-4'-pentyloxybiphenyl	(323-23361(1g); 329-23363(5g))
	4-Cyano-4"-pentyl-p-terphenyl	(327-23381(1g); 323-23383(5g))
	4-Cyano-4'-propylbiphenyl	(328-23311(1g); 324-23313(5g))
	4-Cyano-4'-propyloxybiphenyl	(327-23521(1g); 323-23523(5g))
D	Decafluorobiphenyl	(327-32931(5g); 325-32932(25g))
	4,4'-Diacetoxybiphenyl	(326-52002(25g); 320-52005(500g))
	4,4'-Diacetylbiphenyl	(327-70651(5g); 325-70652(25g))
	4,4'-Diamino-3,3'-biphenyldiol	(044-23481(5g); 042-23482(25g))
	Dibenzofuran	(046-22042(25g); 048-22041(100g))
	Dibenzothiophene	(047-00911(5g); 045-00912(25g))
	4,4'-Dibenzoyloxybiphenyl	(321-51991(5g); 329-51992(25g))
	4,4'-Dibutoxybiphenyl	(329-56431(5g); 327-56432(25g))

	Description	(Wako Catalog No. (Package Size))
D	4,4'-Di-t-butylbiphenyl	(329-58491(5g); 327-58492(25g))
	2-(Di-t-butylphosphino)biphenyl	(321-84601(1g); 327-84603(5g))
	rac-3,3'-Di-t-butyl-5,5',6,6'-tetramethyl-1,1'-biphenyl-2,2'-diol	(320-85151(1g); 326-85153(5g))
	(S)-(-)-3,3'-Di-t-butyl-5,5',6,6'-tetramethyl-1,1'-biphenyl-2,2'-diol	(323-85141(100mg))
	2-Dicyclohexylphosphino-2'-(dimethylamino)biphenyl	(328-84591(1g))
	2-(Dicyclohexylphosphino)-2'-methylbiphenyl	(323-85261(1g))
	4,4'-Diethoxybiphenyl	(320-53921(1g); 326-53923(5g))
	4,4'-Diglyoxyloylbiphenyl	(325-23701(1g); 321-23703(10g))
	4,4'-Dihydroxybiphenyl	(043-02331(1g); 041-02332(25g); (045-02335(500g))
	4,4'-Diiodobiphenyl	(048-22862(25g); 040-22861(100g); (042-22865(500g))
	3,3'-Dimethoxybenzidine Dihydrochloride	(049-26432(25g); 041-26431(100g))
	4,4'-Dimethoxybiphenyl	(324-47191(1g); 320-47193(5g))
	4,4'-Dimethoxyoctafluorobiphenyl	(320-32921(1g); 326-32923(5g))
	2-Dimethylamino-2'-(diphenylphosphino)biphenyl	(321-84581(500mg))
	Dimethyl 4,4'-Biphenyldicarboxylate	(321-24462(25g); 325-24465(500g))
	2,2'-Dimethyl-4,4'-biphenyldiol	(324-85431(5g); 322-85432(25g))
	Diphenyl Disulfide	(165-12552(25g); 169-12555(500g))
	Diphenyl Ether	(163-01622(25g); 167-01625(500g))
E	4-Ethoxy-4'-biphenylcarboxylic Acid	(329-30811(1g); 325-30813(10g))
	4-Ethoxy-4'-hydroxybiphenyl	(327-52571(1g); 323-52573(5g))
	Ethyl 3-Biphenylcarboxylate	(323-52171(1g); 329-52173(5g))
	4-Ethylbiphenyl	(057-05831(5g); 055-05832(25g))
	4'-Ethyl-4-biphenylboronic Acid	(321-24401(1g))
	4'-Ethyl-4-biphenylcarboxylic Acid	(058-05121(5g); 056-05122(25g))
	4-Ethyl-4'-iodobiphenyl	(323-21801(1g); 329-21803(5g))
	4-Ethynylbiphenyl	(324-76521(1g); 320-76523(5g))
F	Fluorene	(064-00222(25g); 068-00225(500g))
	2-Fluorobiphenyl	(329-32871(1g); 325-32873(5g))
	4-Fluorobiphenyl	(328-32841(1g); 324-32843(5g))
	4-Fluoro-4'-hydroxybiphenyl	(320-22271(5g); 328-22272(25g))
H	4-Heptylbiphenyl	(325-30891(5g); 323-30892(25g))
	4-Heptyl-4'-biphenylcarboxylic Acid	(328-28811(1g); 324-28813(10g))
	4-(Heptyloxy)-4'-biphenylcarboxylic Acid	(322-28831(1g); 328-28833(10g))
	4-Hexylbiphenyl	(328-30881(5g); 326-30882(25g))
	4-Hexyl-4'-biphenylcarboxylic Acid	(321-28801(1g); 327-28803(10g))
	4-(Hexyloxy)-4'-biphenylcarboxylic Acid	(325-28821(1g); 321-28823(10g))
	o-Hydroxybiphenyl	(080-01402(25g); 084-01405(500g))
	p-Hydroxybiphenyl	(084-01422(25g); 088-01425(500g))
	2-Hydroxybiphenyl Sodium Salt Tetrahydrate	(089-05551(100g); 081-05555(500g))
	4'-Hydroxy-4-biphenylcarboxylic Acid	(327-20601(5g); 325-20602(25g))
	4-Hydroxy-4'-iodobiphenyl	(324-31101(5g); 322-31102(25g))
	4-Hydroxy-4'-methoxybiphenyl	(322-53361(1g); 328-53363(5g))
I	2-Iodobiphenyl	(327-48801(5g); 325-48802(25g))
	4-Iodo-4'-methylbiphenyl	(320-21791(1g); 326-21793(5g))
M	o-Methoxybiphenyl	(327-46802(25g); 325-46803(100g))
	p-Methoxybiphenyl	(328-51901(5g); 326-51902(25g))
	3-Methylbiphenyl	(320-76621(1g); 326-76623(5g))
	Methyl 4-Biphenylcarboxylate	(329-72551(5g); 327-72552(25g))
	4'-Methyl-2-biphenylcarboxylic Acid	(324-57341(1g); 320-57343(5g))
	4'-Methyl-3-biphenylcarboxylic Acid	(321-57351(1g); 327-57353(5g))
	4'-Methyl-4-biphenylcarboxylic Acid	(328-57361(1g); 324-57363(5g))
	2-Methyl-3-biphenylmethanol	(328-34122(25g); 326-34123(100g))
	Methyl 4'-(Bromomethyl)biphenyl-2-carboxylate	(323-54251(1g); 329-54253(5g))
	Methyl 4'-Methyl-2-biphenylcarboxylate	(325-57371(1g); 321-57373(5g))
N	2-Nitrobiphenyl	(324-53522(25g); 322-53523(250g))
	4-Nonylbiphenyl	(327-81401(1g); 323-81403(5g))
O	4-Octylbiphenyl	(328-30901(5g); 326-30902(25g))
	4-Octyl-4'-biphenylcarboxylic Acid	(322-30801(1g); 328-30803(10g))
P	4-Pentylbiphenyl	(321-30871(5g); 329-30872(25g))
	4-Pentyl-4'-biphenylcarboxylic Acid	(328-28791(1g); 324-28793(10g))
	4-(Pentyloxy)biphenyl	(325-30911(5g); 323-30912(25g))
	4-(Pentyloxy)-4'-biphenylcarboxylic Acid	(320-30841(1g); 326-30843(10g))
	p-Phenylbenzaldehyde	(165-17231(10g); 161-17233(50g))
	p-Phenylpropiophenone	(320-21171(1g); 326-21173(5g))
	3-Phenylpyridine	(169-17371(5ml); 167-17372(25ml))
	4-Propoxy-4'-biphenylcarboxylic Acid	(326-30821(1g); 322-30823(10g))
	4-Propylbiphenyl	(327-30851(5g); 325-30852(25g))
	4-Propyl-4'-biphenylcarboxylic Acid	(321-28781(1g); 327-28783(10g))
T	p-Terphenyl	(329-25002(25g); 323-25005(500g))
	2,2',5,5'-Tetrachlorobenzidine	(209-12002(25g); 203-12005(500g))
	Tetraethyl (4,4'-Biphenylylenedimethylene)-diphosphonate	(320-63551(1g); 326-63553(5g))
	o-Tolidine Dihydrochloride	(207-12221(5g); 205-12222(25g); (203-12223(100g))

The latest brochure "BIPHENYL COMPOUNDS" can be seen through the following address : ***http://www.wako-chem.co.jp/english/labchem/index.htm***

Ethylboronic Acid  [CAS No. 4433-63-0] 327-84941 1 g 323-84943 5 g	1-Pentylboronic Acid  [CAS No. 4737-50-2] 322-84871 1 g 328-84873 5 g	(*E*)-1-Pentenylboronic Acid  [CAS No. 59239-44-0] 320-72961 1 g 326-72963 5 g	2-Furanboronic Acid  [CAS No. 13331-23-2] 320-73441 1 g 326-73443 5 g	5-Acetyl-2-thiopheneboronic Acid  [CAS No. 206551-43-1] 325-84361 5 g 323-84362 25 g
2,5-Thiophenediboronic Acid  [CAS No. 26076-46-0] 328-84091 5 g 326-84092 25 g	1-BOC-pyrrole-2-boronic Acid  [CAS No. 135884-31-0] 327-87001 1 g 323-87003 5 g	2-Chloro-4-pyridineboronic Acid  326-77201 1 g	2-Fluoro-3-pyridineboronic Acid  [CAS No. 174669-73-9] 324-83351 1 g 320-83353 5 g	2,6-Dimethoxy-3-pyridineboronic Acid  [CAS No. 221006-70-8] 329-76191 1 g 325-76193 5 g
4-Fluoro-3-(trifluoromethyl)phenylboronic Acid  [CAS No. 182344-23-6] 328-83371 1 g 324-83373 5 g	3-Cyano-4-fluorophenylboronic Acid  [CAS No. 214210-21-6] 328-76161 1 g	5-Fluoro-2-hydroxyphenylboronic Acid  [CAS No. 259209-20-6] 321-84101 1 g 327-84103 5 g	2-Fluoro-5-formylphenylboronic Acid  [CAS No. 352534-79-3] 324-84951 1 g	*p*-Ethylphenylboronic Acid  [CAS No. 63139-21-9] 328-73481 5 g 326-73482 25 g
p-Vinylphenylboronic Acid  [CAS No. 2156-04-9] 329-84401 1 g 325-84403 5 g	*p*-Propylphenylboronic Acid  [CAS No. 134150-01-9] 323-73431 1 g 329-73433 5 g	*p*-Isopropylphenylboronic Acid  [CAS No. 16152-51-5] 321-77991 1 g 327-77993 5 g	*p*-Pentylphenylboronic Acid  [CAS No. 121219-12-3] 324-84831 100m g 320-84833 500m g	*p*-Ethoxyphenylboronic Acid  [CAS No. 22237-13-4] 322-82171 5 g 320-82172 25 g
p-Isopropoxyphenylboronic Acid  [CAS No. 153624-46-5] 327-72971 1 g 323-72973 5 g	*p*-Propoxyphenylboronic Acid  [CAS No. 186497-67-6] 324-88111 5 g 322-88112 25 g	*p*-Butoxyphenylboronic Acid  [CAS No. 105365-51-3] 324-88091 1 g 320-88093 5 g	3-Formyl-4-methoxyphenylboronic Acid  [CAS No. 121124-97-8] 321-72991 5 g 329-72992 25 g	3,5-Dimethyl-4-methoxyphenylboronic Acid  [CAS No. 301699-39-8] 322-85471 1 g 328-85473 5 g

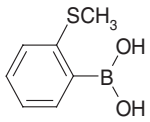
3,4,5-Trimethoxyphenylboronic Acid



[CAS No. 182163-96-8]

327-73451 1 g

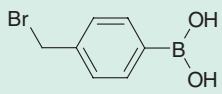
o-(Methylthio) phenylboronic Acid



[CAS No. 168618-42-6]

320-84431 1 g
326-84433 5 g

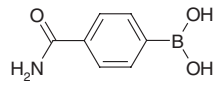
p-(Bromomethyl) phenylboronic Acid



[CAS No. 68162-47-0]

320-84811 1 g
326-84813 5 g

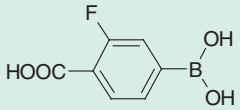
p-(Aminocarbonyl) phenylboronic Acid



[CAS No. 123088-59-5]

320-76121 1 g
326-76123 5 g

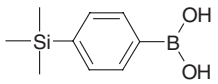
4-Carboxy-3-fluorophenylboronic Acid



[CAS No. 120153-08-4]

323-84921 1 g

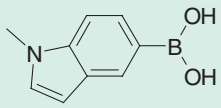
p-(Trimethylsilyl) phenylboronic Acid



[CAS No. 17865-11-1]

328-85331 1 g
324-85333 5 g

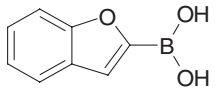
1-Methyl-5-indoleboronic Acid



[CAS No. 192182-55-1]

323-77211 1 g

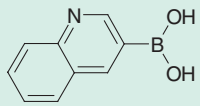
2-Benzofuranboronic Acid



[CAS No. 98437-24-2]

322-84371 1 g
328-84373 5 g

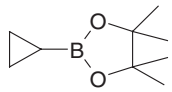
3-Quinolineboronic Acid



[CAS No. 191162-39-7]

328-74101 1 g
324-74103 5 g

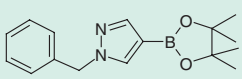
2-Cyclopropyl-4,4,5,5-tetramethyl-1,3,2-dioxaborolane



[CAS No. 126689-01-8]

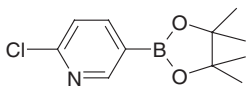
322-76181 1 g

1-Benzyl-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)-*1H*-pyrazole



323-77191 1 g
329-77193 5 g

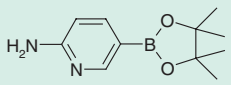
2-Chloro-5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)pyridine



[CAS No. 444120-94-9]

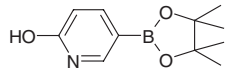
324-76141 1 g
320-76143 5 g

2-Amino-5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)pyridine



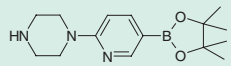
322-77161 1 g
328-77163 5 g

2-Hydroxy-5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)pyridine



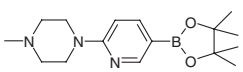
327-77231 1 g

1-[5-(4,4,5,5-Tetramethyl-1,3,2-dioxaborolan-2-yl)pyridin-2-yl]piperazine



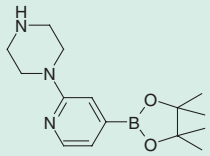
321-76271 1 g
327-76273 5 g

1-Methyl-4-[4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)pyridin-2-yl]piperazine



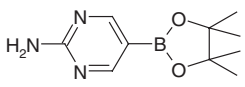
320-76241 1 g

1-[4-(4,4,5,5-Tetramethyl-1,3,2-dioxaborolan-2-yl)pyridin-2-yl]piperazine



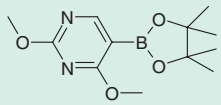
324-77241 1 g

2-Amino-5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)pyrimidine



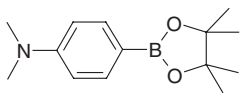
321-77251 1 g

2,6-Dimethoxy-5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)pyrimidine



322-76201 1 g
328-76203 5 g

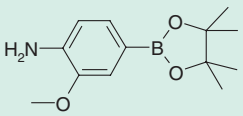
N,N-Dimethyl[4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl]amine



[CAS No. 171364-78-6]

325-82161 1 g
321-82163 5 g

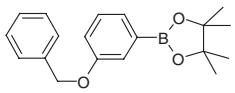
2-Methoxy-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)aniline



[CAS No. 461699-81-0]

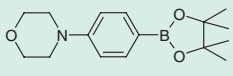
329-82201 1 g
325-82203 5 g

2-(3-Benzyloxyphenyl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane



321-82141 1 g
327-82143 5 g

4-[4-(4,4,5,5-Tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl]morpholine



320-77221 1 g

Please visit the Wako Online Catalog to search further Boronic Acid Compounds:

http://www.e-reagent.com

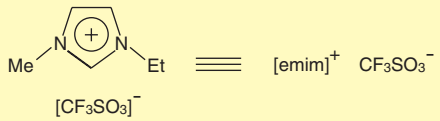
The latest brochure "BORONIC ACID COMPOUNDS for Suzuki Coupoling Reaction" can be seen through the following address:

http://www.wako-chem.co.jp/english/labchem/index.htm

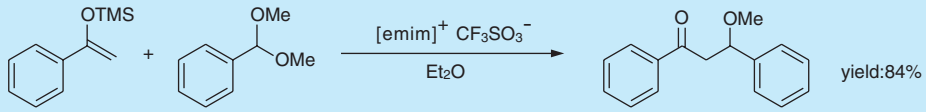
Ionic Liquid consists of only ions exhibiting non-volatility, high ionic conductivity and catalytic activity.
Its use as the solvent for extractions and electrolyte for batteries is attracting increasing attention.
Ionic Liquid is an environmentally friendly reagent for organic synthesis reactions and generally displays the features described below.
In addition, due to its catalytic action, Ionic Liquid can also be applied to Aldol reactions and Diels-Alder reactions.

Features

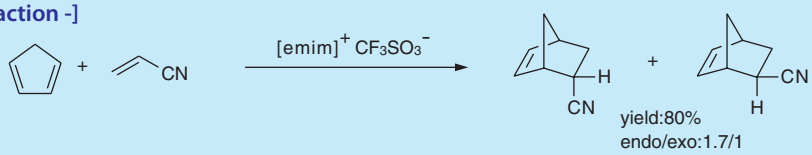
1. Non-volatile
2. Has ionic character, but is a low viscosity liquid
3. Is heat-resistant, and has a wide liquid temperature range
4. Has a high ionic conductivity
5. Recoverable and recyclable since it will not mix organic solvents



[Reaction 1 - Aldol Reaction -]



[Reaction 2 - Diels-Alder Reaction -]



[Product List]

	Description	
Imidazolium	1-Allyl-3-methylimidazolium Chloride (Fig. 1)	013-20491 (5 g); 011-20492 (25 g)
Imidazolium	1-Butyl-3-methylimidazolium Chloride	027-15201 (5 g); 025-15202 (25 g)
Imidazolium	1-Butyl-3-methylimidazolium Hexafluorophosphate	024-15211 (5 g); 022-15212 (25 g)
Imidazolium	1-Butyl-3-methylimidazolium Tetrachloroferrate(III)	327-86401 (5 g); 325-86402 (25 g)
Imidazolium	1-Butyl-3-methylimidazolium Tetrafluoroborate	027-15181 (5 g); 025-15182 (25 g)
Imidazolium	1-Butyl-3-methylimidazolium Trifluoromethanesulfonate	024-15191 (1 g); 020-15193 (5 g)
Imidazolium	1-Ethyl-2,3-dimethylimidazolium Hexafluorophosphate	326-87191 (5 g); 324-87192 (25 g)
Imidazolium	1-Ethyl-2,3-dimethylimidazolium Tetrafluoroborate	050-07401 (5 g); 058-07402 (25 g)
Imidazolium	1-Ethyl-3-methylimidazolium Bromide	055-07331 (5 g); 053-07332 (25 g)
Imidazolium	1-Ethyl-3-methylimidazolium *p*-Toluenesulfonate	051-07311 (5 g); 059-07312 (25 g)
Imidazolium	1-Ethyl-3-methylimidazolium Tetrafluoroborate	054-07301 (5 g); 052-07302 (25 g)
Imidazolium	1-Ethyl-3-methylimidazolium Trifluoroacetate	057-07411 (5 g); 055-07412 (25 g)
Imidazolium	1-Hexyl-3-methylimidazolium Hexafluorophosphate	085-08191 (5 g); 083-08192 (25 g)
Imidazolium	1-Hexyl-3-methylimidazolium Tetrafluoroborate	088-08201 (5 g); 086-08202 (25 g)
Imidazolium	1-Methyl-3-octylimidazolium Hexafluorophosphate	138-14761 (5 g); 136-14762 (25 g)
Imidazolium	1-Methyl-3-octylimidazolium Tetrafluoroborate	135-14771 (5 g); 133-14772 (25 g)
Pyrrolidinium	1-Butyl-1-methylpyrrolidinium Bis(trifluoromethanesulfonyl)imide	027-15441 (5 g); 025-15442 (25 g)
Pyrrolidinium	1-Butyl-1-methylpyrrolidinium Hexafluorophosphate (Fig. 2)	325-87281 (5 g); 323-87282 (25 g)
Pyrrolidinium	1-Butyl-1-methylpyrrolidinium Tetrafluoroborate	322-87291 (5 g); 320-87292 (25 g)
Pyrrolidinium	1-Ethyl-1-methylpyrrolidinium Tetrafluoroborate	328-87271 (5 g); 326-87272 (25 g)
Pyridinium	1-Butyl-3-methylpyridinium Hexafluorophosphate (Fig. 3)	327-87241 (5 g); 325-87242 (25 g)
Pyridinium	1-Butyl-3-methylpyridinium Tetrafluoroborate	324-87251 (5 g); 322-87252 (25 g)
Pyridinium	1-Butylpyridinium Chloride	324-87212 (25 g); 322-87213 (100 g)
Pyridinium	1-Butylpyridinium Hexafluorophosphate	323-87221 (5 g); 321-87222 (25 g)
Pyridinium	1-Butylpyridinium Tetrafluoroborate	320-87231 (5 g); 328-87232 (25 g)
Ammonium	Tetrabutylammonium Bromide (Fig. 4)	205-04331 (5 g); 203-04332 (25 g); 207-04335 (500 g)
Ammonium	Tetraoctylammonium Bromide	320-42791 (5 g); 328-42792 (25 g)
Ammonium	Tetrapentylammonium Bromide	201-04291 (5 g)
Phosphonium	Tetra-n-butylphosphonium Bromide (Fig. 5)	327-67162 (25 g); 321-67165 (500 g)
Phosphonium	Tetrabutylphosphonium Tetrafluoroborate	328-33941 (5 g); 326-33942 (25 g)
Phosphonium	Tributylhexadecylphosphonium Bromide	206-08722 (25 g)

1-Allyl-3-methylimidazolium Chloride

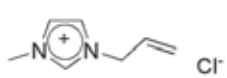


Fig. 1

1-Butyl-1-methylpyrrolidinium Hexafluorophosphate

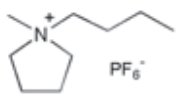


Fig. 2

1-Butyl-3-methylpyridinium Hexafluorophosphate

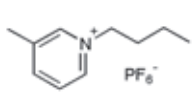


Fig. 3

Tetrabutylammonium Bromide

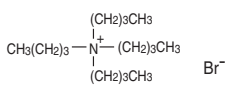


Fig. 4

Tetrabutylphosphonium Bromide

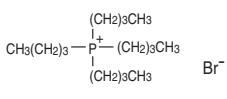
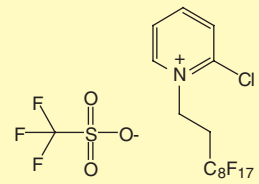


Fig. 5

The concept of organic synthesis reactions and separation and purification techniques using fluorous solvents has been gaining ground in recent years. Although fluorous reagents can be readily separated like solid-phase reagents, because unlike solid-phase reagents, the reactions can be handled as normal solution reactions, the purification by chromatography and identification with various spectrum equipment are possible.

Fluorous Mukaiyama reagent

This reagent acts as a carboxylic acid activator, and provides the corresponding amide and ester in high yield. Also, because fluorous tags are introduced, by-products derived from the reagent can be readily separated and recovered from the reaction mixtures.



2-Chloro-1-(1,1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8-heptadecafluorodecyl) pyridinium Trifluoromethanesulfonate
$C_{16}H_8ClF_{20}NO_3S$ = 709.73

Description	Wako Cat. #	Pkg. Size	Grade	Storage
2-Chloro-1-(1,1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8-heptadecafluorodecyl) pyridinium Trifluoromethanesulfonate	036-20101	200 mg	for Organic Synthesis	Keep at RT
	032-20103	1 g		

Wakopak® Fluofix-II 120E, packed column with fluorocarbon chains bonded highly purified spherical silica-gel

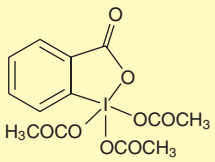
Wakopak® Fluofix-II 120E is a reversed-phase HPLC column packed with highly purified spherical 5μm silica-gel, to which fluorocarbon chains are bonded. Because of the strong water/oil repellency and molecular structure of fluorine-containing silane compound, it shows enhanced selectivity and structure recognition as well as high retention and separation capacities, especially when the analyte is a halogen compound.

Description	Wako Cat. #	Column Size	Pkg. Size	
Wakopak® Fluofix-II 120E	001-00030	4.6 × 150	1 ea.	for HPLC
		4.6 × 250	1 ea.	

Readily Accessible Oxidant

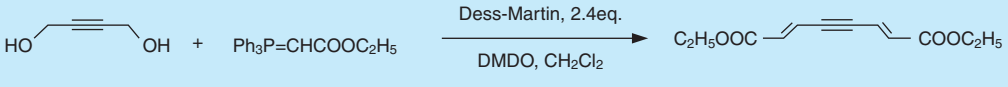
Dess-Martin Reagent is useful for the facile and efficient oxidation of primary alcohol to aldehydes and secondary alcohols to ketones.
The reaction avoids some of the difficulties encounterd in using other methods for the oxidation of aldohols such as long reaction times, difficult workup procedures, or the need to use a large excess of the oxdizing agent [1].

Solubility: Sparingly soluble in hexane or ether ;
Very soluble in chloroform, methylene chloride, or acetonitrile



Dess-Martin Reagent
[1,1,1-Tris(acetyloxy)-1,1-dihydro-1,2-benziodoxol-3(1*H*)-one]
$C_{13}H_{13}IO_8$=424.14
CAS No. 87413-09-0

[Reaction[2]]



E, *E* : *E*, *Z* - 4 : 1
89%

[References]

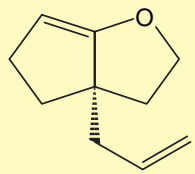
1) D. B. Dess, J. C. Martin: *J. Org. Chem.*, **48**, 4155 (1983).
2) A. G. M. Barret, D. Hamprecht, M. Ohkubo: *J. Org. Chem.*, **62** , 9736 (1997).

Description	Wako Cat. #	Pkg. Size	Grade	Storage
Dess-Martin Reagent, 96.0+ %	323-47661	1 g	for Organic Synthesis	Keep at −20°C
	329-47663	5 g		

New Resolving Reagent for Alcohols and Thiols

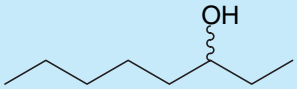
Features

1. Possible recovery/purification by distillation due to adequate boiling point (46 ˚C (1.0 mmHg))
2. Chemically-stable hydrocarbon structure
3. No concern about racemization due to asymmetric construction of quaternary carbon



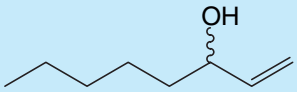
(*S*)-5-Allyl-2-oxabicyclo [3.3.0] oct-1 (8)-ene
$C_{10}H_{14}O$ = 150.22
CAS No. 250220-36-1

[Resolution example 1]



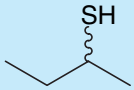
ΔRf 0.064

[Resolution example 2]



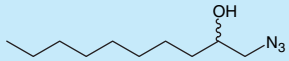
ΔRf 0.074

[Resolution example 3]



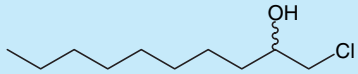
ΔRf 0.083

[Resolution example 4]



ΔRf 0.139

[Resolution example 5]



ΔRf 0.061

Description	Wako Cat. #	Pkg. Size	Grade	Storage
(*S*)-5-Allyl-2-oxabicyclo [3.3.0] oct-1 (8)-ene [(*S*)-ALBO], 97.0+ %	011-20671	1 g	for Optical Resolution	Keep at RT
	017-20673	5 g		

Please visit the Wako Online Catalog to search further Green Chemistry products:

http://www.e-reagent.com/

No. 9 and No. 14 of Wako Product Update did special features on Green Chemistry Products

Please visit the following address to browse each Wako Product Update:
http://www.wako-chem.co.jp/english/labchem/index.htm

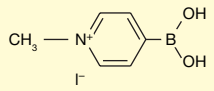
a. Active Catalysts for dehydrative condensation

[Catalysts for Dehydrative Amide Condensation Reaction]

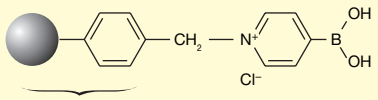
N-Methyl-4-pyridineboronic Acid Iodide [1]is highly effective and reusable catalysts for the dehydrative amide condensation reaction between equimolar mixtures of carboxylic acids and amines. The homogeneous catalyst is effective in the presence of ionic liquid and can be recovered by extraction with ionic liquid. In contrast, a heterogeneous catalyst, such as polystyrene-bound *N*-Methyl-4-pyridineboronic Acid Chloride [2], is effective even in the absence of ionic liquid and can be recovered by filtration.

[Catalysts for Dehydrative Esterification Reaction]

N-methyl-4-boronopyridinium iodide [1] is a more effective catalyst for the dehydrative esterification reaction of α-hydroxycarboxylic acids in alcohol solvents. *N*-polystyrene-bound 4-boronopyridinium chloride [2] is also an effective catalyst and can be recovered by filtration.

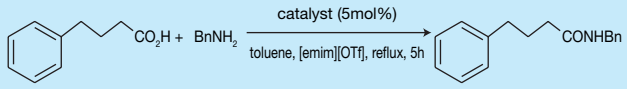


1 *N*-Methyl-4-pyridineboronic Acid Iodide
$C_6H_9BINO_2$=264.86/ CAS No. 362045-65-6



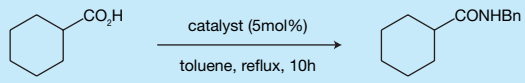
2 Polystyrene-bound *N*-Methyl-4-pyridineboronic Acid Chloride

[Dehydrative Amide Condensation Reaction]



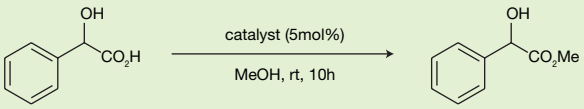
1st Yield : >99%
2nd Yield : >99%
3rd Yield : >99%

[Dehydrative Amide Condensation Reaction -1-]



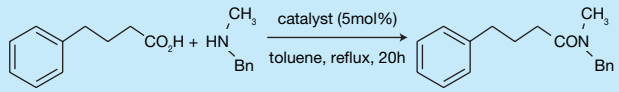
Yield : 93%

[Dehydrative Esterification Reaction -1-]



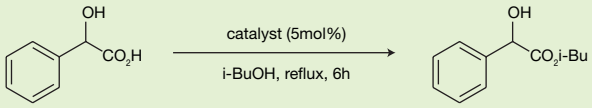
Yield : 93%

[Dehydrative Amide Condensation Reaction -2-]



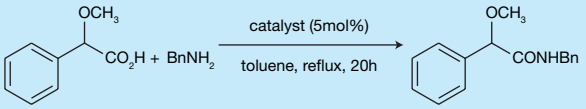
Yield : 92%

[Dehydrative Esterification Reaction -2-]



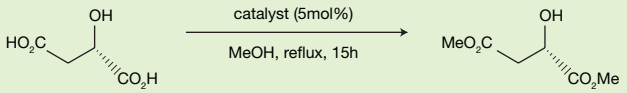
Yield : 99%

[Dehydrative Amide Condensation Reaction -3-]



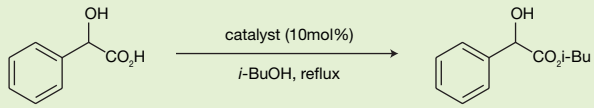
1st Yield : 95%
2nd Yield : 95%
3rd Yield : 94%

[Dehydrative Esterification Reaction -3-]



Yield : 95%

[Dehydrative Esterification Reaction -1-]



1st Yield : 96%
10th Yield : 95%

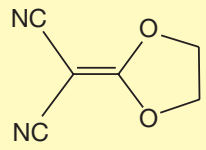
[References]

1) Ohara, S., Ishihara, K. and Yamamoto, H.: *The 78th Spring Meeting of Chemist. Org. Chemistry Society of Japan*, 3-B 5-10 (2000).
2) Maki, T., Ishihara, K. and Yamamoto, H.: *Org. Lett.*, **7** , 5043 (2005).
3) Maki, T., Ishihara, K. and Yamamoto, H.: *Org. Lett.*, **7** , 5047 (2005).

Description	Wako Cat. #	Pkg. Size	Grade	Storage
***N*-Methyl-4-pyridineboronic Acid Iodide**	130-15181	100 mg	for Organic Synthesis	Keep at 2~10℃
	132-15185	500 mg		
Polystyrene-bound *N*-Methyl-4-pyridineboronic Acid Chloride	165-22241	100 mg		Keep at 2~10℃
	161-22243	500 mg		

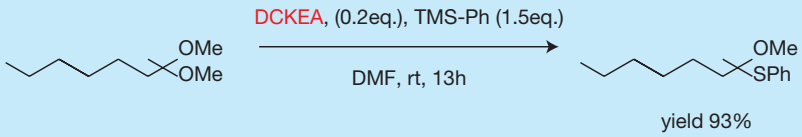
b. π-Acid Catalyst

Dicyanoketene Ethylene Acetal (DCKEA) functions as π-acid catlyst. The effect of DCKEA has efficient activity in monothioacetalzation, cyanation, Mannich-type reaction and hydrolysis of acetals and silyl ethers. Remarkably, it works more efficiently in water than in organic solvents and recyclable.



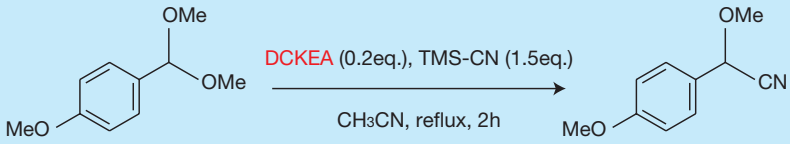
$C_6H_4N_2O_2$=136.11
CAS No. 5694-65-5
DCKEA (Dicyanoketone Ethylene Acetal)

[Monothioacetalization[1)]]

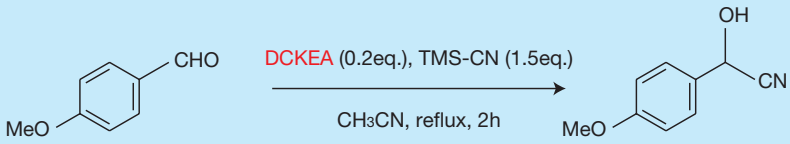


yield 93%

[Cyanation of 4-Methoxybenzaldehyde Dimethylacetal[2)]]

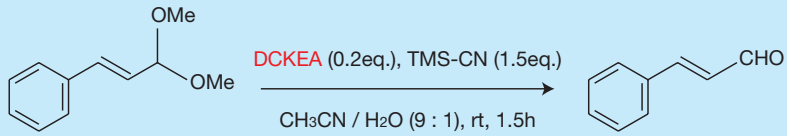


yield 92%



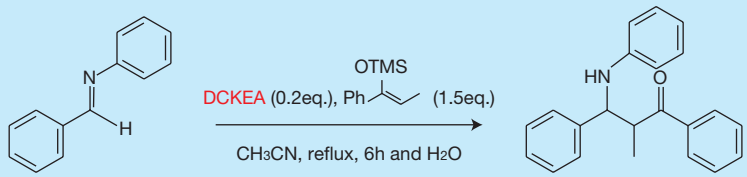
yield quant.

[Hydrolysis of Acetals[3)]]



yield quant.

[Mannich Type Reaction of Benzylidene Aniline with a Silylenol Ether[4)]]



yield 83%

[References]

1) T. Miura, Y. Masaki: *Tetrahedron Lett.*, **35**, 7961 (1994).
2) N. Tanaka, Y. Masaki: *Synlett*, 1277 (1999).
3) N. Tanaka, Y. Masaki: *Synlett*, 1960 (1999).
4) N. Tanaka, Y. Masaki: *Synlett*, 406 (2000).

Description	Wako Cat. #	Pkg. Size	Grade	Storage
Dicyanoketene Ethylene Acetal, 98% **[DCKEA]**	044-29581	500 mg	for Organic Synthesis	Keep below 25°C

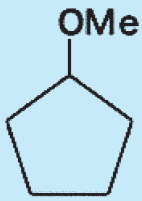
c. Novel Hydrophobic Ether Type Solvent

Cyclopentyl methyl ether (CPME) is a totally new hydrophobic ether solvent, which was established out of Zeon's unique synthetic technology and C5 raw materials.
Unlike other common ether solvents, CPME has unique excellent properties and is widely applicable as a replacement for Tetrahydrofuran (THF), Methyl Tert-Butyl Ether (MTBE), Dioxane and other existing ether solvents.

[Features]

- **High Hydrophobicity**
  Easy separation and recovery from water, reducing emissions and wastewater
  Wide applicability as a reaction, extraction and crystallization solvent, giving simple and One-pot syntheses
- **Wide Liquidity Range**
  Wide applications from lower to higher temperature, accelerating reaction rate
- **Low Heat of Vaporization**
  Saving energy for distillation and recovery
- **Resist Peroxide Formation**
  Low exothermic decomposition energy of solvent containing it's peroxides
- **Narrow Explosion Area**
- **Relatively Stable to Acids or Bases**
- **Easy Drying**

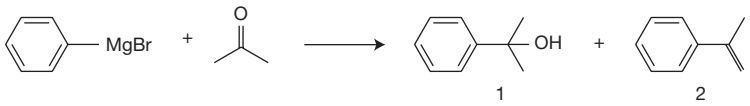
CPME



$C_6H_{12}O = 100.16$
CAS No. 5614-37-9

[Applications]

- **Grignard Reaction**



Solvent	Yield (%)		Selectivity	
	1	2	1	2
THF	45	33	58	42
THF + CPME (1 : 1(v))	67	15	82	18
CPME	82	2	98	2

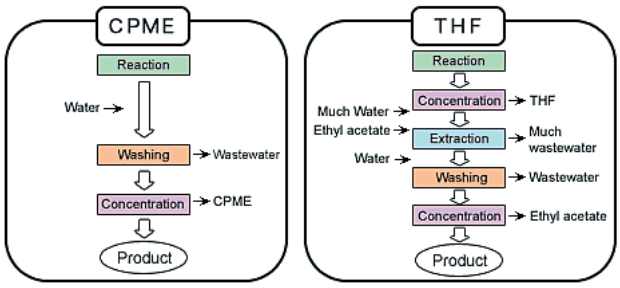
1. GR production condition: Stir at room temperature for 20 minutes, then heat reflux for 1 hour
2. GR production concentrations: 1 mol/L
3. Reaction conditions: Stir at 0°C for 1 hour, then heat reflux for 1 hour
4. Work-up conditions: Treated at room temperature with 1 M-HCl

- **Other Reactions:**

Suzuki Coupling, Buchwald Amination, Metal Reductions ($NaBH_4$, $LiAlH_4$, i-Bu_2AlH), Reactions with n-BuLi, Reactions with Lewis Acid, Friedel Crafts Reactions.

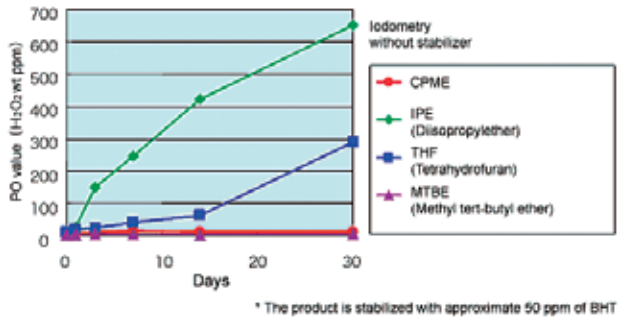
Organic Process with CPME vs. THF

CPME simplifies processes, reduces wastewater and emissions.



Peroxide Formation of Ether Solvents

at RT in the dark place in the presence of air



* The product is stabilized with approximate 50 ppm of BHT

Solubility of water in the solvents (23℃) (g/100 g)

CPME	THF	Diethyl Ether	Dioxane	MTBE	MeTHF
1.1	∞	6.5	∞	4.8	14

Description	Pkg. Size	Pkg. Size	Grade	Storage
Cyclopentyl Methyl Ether [CPME], containing abt. 0.005% of BHT as a stabilizer	031-19845	500 mL	Wako Special Grade	protect from light
	039-19841	3 L		
	037-19847	16 kg		

d. New Metathesis Catalyst

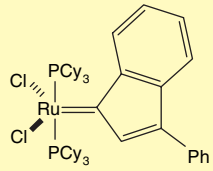
The metathesis catalyst is an efficient and useful catalyst, reacting only to olefin and forming C-C bond by substitution of olefin. Its application to commercial manufacturing of pharmaceutical products, macromolecules and new materials etc. is expected.

This catalyst is air-stable and shows a high activity in RCM (Ring-Closing Metathesis) reaction [1].

The RCM reaction exerts its effect as a key reaction in total syntheses of natural products having a very complex structure [2].

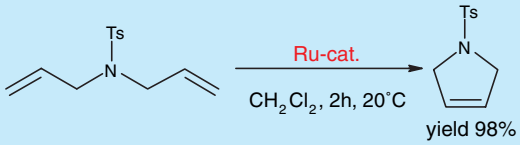
Features

1. Air-stable
2. Highly active in Ring-Closing Metathesis (RCM) reaction

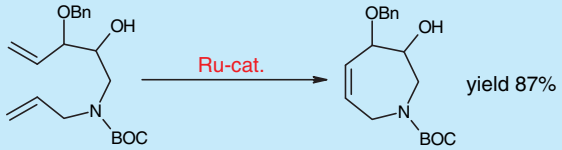


Dichloro (3-phenyl-1H-inden-1-ylidene) bis-(tricyclohexylphosphine) ruthenium (IV) or (II)?
$C_{51}H_{76}Cl_2P_2Ru$ = 923.07
CAS No. 250220-36-1

[Reaction 1]



[Reaction 2]



[References]

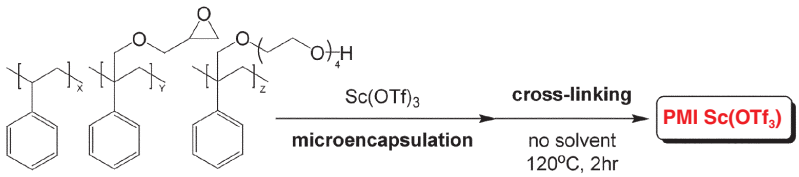
1) A. Furstner, *et al.*: *Chem. Eur. J.*, **7**, 4811 (2001).
2) A. Furstner, *et al.*: *Chem. Eur. J.*, **9**, 320 (2003).

Description	Wako Cat. #	Pkg. Size	Grade	Storage
Dichloro (3-phenyl-1*H*-inden-1-ylidene) bis (tricyclohexylphosphine) ruthenium (IV)	041-29971	1 g	for Organic Synthesis	Keep at RT
	047-29973	5 g		

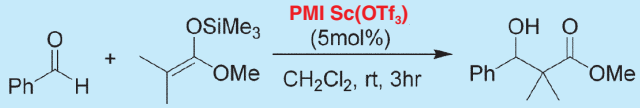
Sold in collaboration with Umicore.

e. Polymer-Micelle-Incarcerated Scandium Trifluoromethanesulfonate

PMI $Sc(OTf)_3$ is a cross-linked macromolecular micelle catalyst supported with scandium triflate, a lewis acid, as a macromolecular support. It efficiently catalyzes carbon-carbon bond-forming reactions in various solvents that could not have been used with standard microencapsulated scandium catalysts.



[Mukaiyama Aldol Reaction]



[References]

1) M. Takeuchi, R. Akiyama, S. Kobayashi: J. Am. Chem. Soc., 127, 13096 (2005).

Description	Wako Cat. #	Pkg. Size	Grade	Storage
Polymer-Micelle-Incarcerated Scandium Trifluoromethanesulfonate [PMI $Sc(OTf)_3$]	167-22821	1 g	for Organic Synthesis	Keep at RT

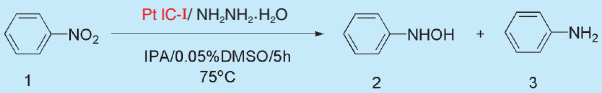
f. Platinum catalyst for selective reduction

Platinum, Immobilized Catalyst I is a platinum catalyst for the selective reduction fixed on amine cross-linked polymers. This catalyst, whose features include reduced ignitability, possibility of repeated use and possibility of selectively synthesizing only the desired ones, can be commercially used as a green chemistry catalyst.

Features
1. Possibility of repeated use (50 times)
2. Catalyst for selective reduction
3. Almost no ignitability
4. Used with various reaction solvents due to high solvent resistance
5. Possible recovery/purification by distillation due to adequate boiling point
6. Chemically stable hydrocarbon structure
7. No concern about racemization due to asymmetric construction of quaternary carbon

[Selective synthesis of phenylhydroxyamine]

For the selective synthesis of phenylhydroxyamine used as an intermediate in polymerization inhibitors, antioxidants, agricultural chemicals, pharmaceutical products, cosmetic products, agents for electronic industry etc., Platinum Immobilized Catalyst I is useful and can be repeatedly used.



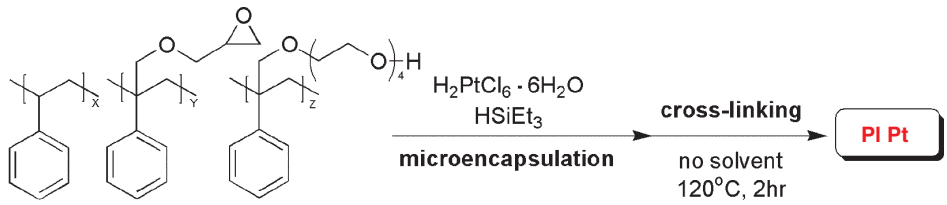
Run	NO_2(1)	NHOH(2)	NH_2(3)
1	1.7	97.9	0.5
2	2.2	97.3	0.5
3	0.5	99.1	0.4
4	0.1	99.5	0.4
5	trace	99.0	1.0
10	trace	99.1	0.9
30	trace	98.6	1.4
50	trace	98.9	1.1

Note: When using, decrease the rate of agitation because during reaction, the resin may be physically damaged by friction leading to reduced performance (especially when a magnetic stirrer is used).

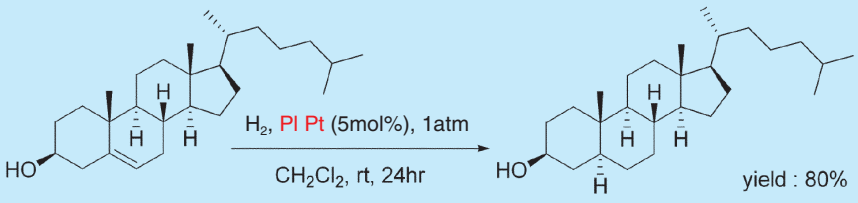
Description	Wako Cat. #	Pkg. Size	Grade	Storage
Platinum, Immobilized Catalyst I [Pt IC-I]	167-22701	1 g	for Organic Synthesis	Keep at RT
	163-22703	5 g		

g. Polymer-Incarcerated Platinum

PI Pt is a fixed metal catalyst supported with platinum as a cross-linked macromolecular support, and its solvent resistance is superior to that of standard microcapsulated catalysts. This catalyst can proceed not only the hydrogenation of olefin, but also that of sterically bulky molecules such as cholesterol or quinoline under room temperature and normal atmospheric pressure. Also, after reaction, it can be repeatedly recovered and reused by filtration.



[Hydrogenation of Cholesterol]



[References]

1) Y. Miyazaki, H. Hagio, S. Kobayashi: Org. Biomol. Chem., 4, 2529 (2006).

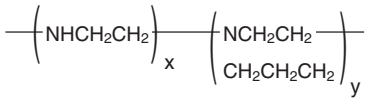
Description	Wako Cat. #	Pkg. Size	Grade	Storage
PI Platinum [PI Pt]	163-22801	1 g	for Organic Synthesis	Keep at RT

h. Palladium-Polyethyleneimine

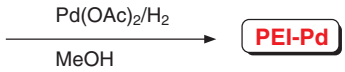
The selective partial hydrogenation of alkyne to alkene is interesting not only in terms of synthetic chemistry but also from the perspective of selective expression of catalysts. In general, the selective partial hydrogenation of alkyne to alkene is very difficult and Lindlar catalysts using lead as the catalyst poison is known to be effective. However, there are disadvantages in using these catalysts: the toxicity of lead places heavy burdens on the environment and they cannot be applied to monosubstituted alkyne [1]. To resolve these problems, the palladium-polyethylene catalyst (Pd/PEI) was developed using polyethylene imine polymer containing a high concentration of nitrogen base as a strong catalyst poison and carrier for palladium [2]. The use of the popular Pd/C(en) [3] and Pd/Fib [4] allows for various conversions of reducible functional groups.

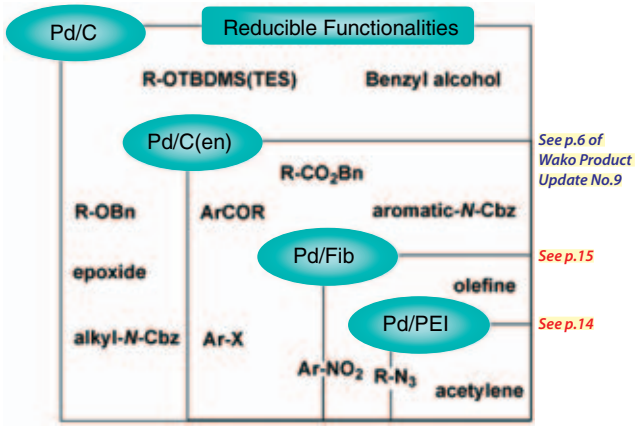
Features

1. Selective partial hydrogenation of alkyne to alkene
2. Partial hydrogenation of terminal alkyne



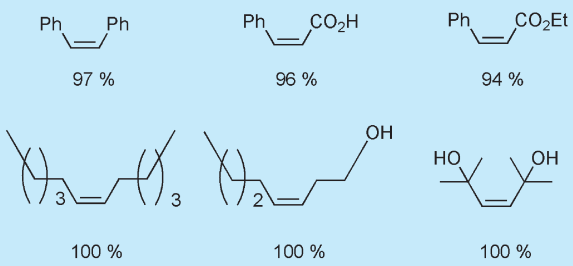
Polyethyleneimine (PEI)



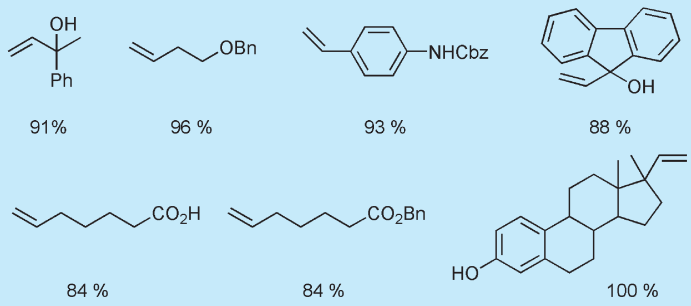


Comparison of catalytic activities

[Partial Hydrogenation of di-substituted Alkynes]



[Partial Hydrogenation of mono-substituted Alkynes]



[References]

1) 1. P. N. Rylander, Hydrogenation Methods; Academic Press: New York, 1985.
2) 231st ACS National Meeting, Atlanta, GA, United States, March 26-30, 2006 (2006), ORGN-568.
3) H. Sajiki, K. Hattori, K. Hirota: *J. Org. Chem.*, **63**, 7990 (1998).
4) H. Sajiki, T. Ikawa, K. Hirota : *Tetrahedron Lett.*, **44**, 8437 (2003).

Description	Wako Cat. #	Pkg. Size	Grade	Storage
Palladium-Polyethyleneimine [Pd/PEI]	161-22221	1 g	for Organic Synthesis	Keep at RT
	167-22223	5 g		

i. Palladium-Fibroin

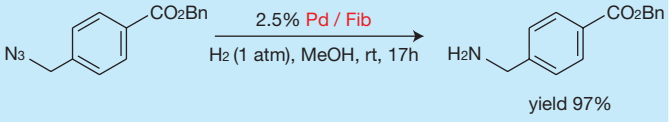
Pd/Fib is a catalyst in which approximately 2% Pd is supported on silk fibroin [1), 3)]. Its reducing activity is more inhibited than that of the already available Pd/C and Pd/C(en) , making the application to selective contact reduction among various functional groups possible.

While retaining benzylester [2)], the Cbz(benzyloxycarbony[l)] group which is an aromatic amine [2)], aromatic halogen [1)] and aromatic carbonyl group [1)] that are readily reduced when Pd/C or Pd/C(en) is used as catalyst, it reduces functional groups such as olefin, acetylene, azido and nitro [3), 4)].

In addition, after reaction, it can be readily removed by filtration.

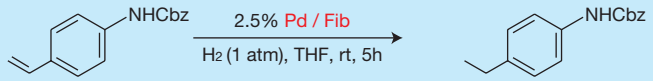
Palladium-Fibroin

[Selective reduction reaction in the presence of a benzylester group]



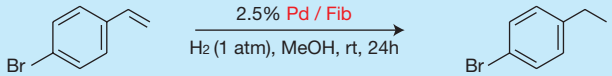
yield 97%

[Selective reduction reaction in the presence of a aromatic halogen compound]



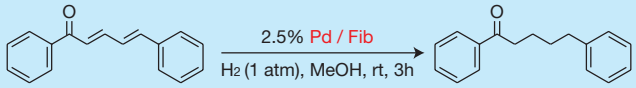
yield 92%

[Selective reduction reaction under the protection of the Cbz group, an aromatic amine]

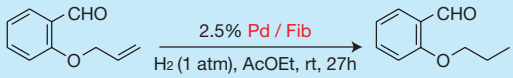


yield quant.

[Selective reduction reaction in the presence of a carbonyl group]



yield quant.



yield quant.

[References]

1) H. Sajiki, T. Ikawa, H. Yamada, K. Tsubouchi, K. Hirota: *Tetrahedron Lett.*, **44**, 171 (2003).
2) H. Sajiki, T. Ikawa, K. Kirota: *Tetrahedron*, **44**, 8437 (2003).
3) T. Ikawa, H. Sajiki, K. Hirota: *Tetrahedron*, **61**, 2217 (2005).

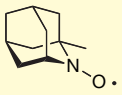
Description	Wako Cat. #	Pkg. Size	Grade	Storage
Palladium-Fibroin [Pd/Fib]	167-22181	1 g	for Organic Synthesis	Keep at RT
	163-22183	5 g		

Related Products

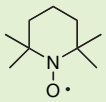
Description	Wako Cat. #	Pkg. Size	Grade	Storage
Palladium-Activated Carbon Ethylenediamine Complex (Pd: 3.5~6.5%) [Pd/C(en)]	163-21441	1 g	for Organic Synthesis	Keep at RT
	169-21443	5 g		
	161-21442	25 g		
Palladium-Activated Carbon (Pd: 10%) [Pd/C]	161-15273	5 g	Wako 1st Grade	Protect from light
	163-15272	25 g		
	165-15271	100 g		

j. Highly Efficient Organocatalysts for Oxidation of Alcohols

A stable nitroxyl radical class of catalysts, 1-Me-AZADO [1], for highly efficient oxidation of alcohols exhibits superior catalytic proficiency to TEMPO [2], converting various sterically hindered alcohols to the corresponding carbonyl compounds in excellent yields.



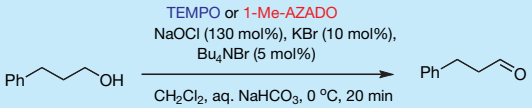
1-Methyl-2-azaadamantane-N-oxyl
1 [1-Me-AZADO]
$C_{10}H_{16}NO$=166.24



2,2,6,6-tetramethyl-1-piperidinyloxy
2 [TEMPO]
$C_9H_{13}NO$=156.25
CAS No. 2564-83-2

[Reaction]

Comparison of catalytic activities between TEMPO and 1-Me-AZADO under Anelli's conditions

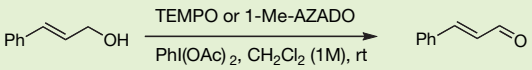


loading amount (mol%)	yield (%) TEMPO	1-Me-AZADO
0.1	96	95
0.01	23	91
0.004	n.d.	88[a]
0.001	n.d.	62[b]

[a] The run time was 30 min. [b] The run time was 60 min.

[Reaction]

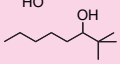
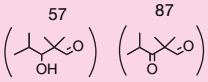
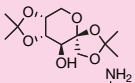
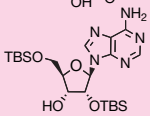
Comparison of catalytic activities between TEMPO and 1-Me-AZADO under Margarita's conditions



loading amount (mol%)	yield (%) / time (h) TEMPO	1-Me-AZADO
10	95 / 1.5	96 / 0.1
1	42 / 6	93 / 0.7
0.1	n.d.	39 / 3

[Reaction]

Comparison of catalytic activities between TEMPO and 1-Me-AZADO in oxidation of secondary alcohol

entry	substrate	method	yield[a] (%) TEMPO	1-Me-AZADO
1		A	83	94
2		A	84	99
3		A	68	97
4		A	0	94
5		A	16	99
6		A	5	95
7		A	15	93
8		A	57 	87
9		A A[b]	8	99 90
10		A B	n.d.[c] 12[d]	19 100
11		A B	n.d.[c] 27[e]	10 46[e]

Method A : reactions were catalyzed by TEMPO or 1-Me-AZADO (1 mol%) with NaOCl (150 mol%), KBr (10 mol%), Bu_4NBr (5 mol%), *aq*. $NaHCO_3$ in CH_2Cl_2 at 0 °C for 20 min. **Method B** : reactions were catalyzed by TEMPO or 1-Me-AZADO (1 mol%) with 1.1. equiv. of $PhI(OAc)_2$ in CH_2Cl_2 for 9 h at rt. a: Isolated yield. b: Reaction was run using 20 g of substrate. c: Not determined. d: Reaction was run using 3.3 equiv. of $PhI(OAc)_2$ for 14 h at rt. e: Reaction was run using 5.1 equiv. of $PhI(OAc)_2$ for 30 h at rt.

[References] 1) Shibuya, M., Tomizawa, M., Suzuki, I., Iwabuchi, Y.: *J. Am. Chem. Soc.*, **128**, 8412 (2006).

Description	Wako Cat. #	Pkg. Size	Grade	Storage
1-Methyl-2-azaadamantane-*N*-oxyl [1-Me-AZADO]	132-15261	100 mg	for Organic Synthesis	Keep at 2~10 °C
	138-15263	500 mg		

Related Products

Description	Wako Cat. #	Pkg. Size	Grade	Storage
TEMPO [2,2,6,6-Tetramehyl-1-piperidinyloxy, Radical], 98.0+ %	201-13123	1 g	Wako Special Grade	Keep at 2~10 °C
	206-13121	5 g		
	203-13122	25 g		

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