

Гипервалентные соединения йода

Технические характеристики

По вопросам продаж и поддержки обращайтесь:

Алматы (7273)495-231
Ангарск (3955)60-70-56
Архангельск (8182)63-90-72
Астрахань (8512)99-46-04
Барнаул (3852)73-04-60
Белгород (4722)40-23-64
Благовещенск (4162)22-76-07
Брянск (4832)59-03-52
Владивосток (423)249-28-31
Владикавказ (8672)28-90-48
Владимир (4922)49-43-18
Волгоград (844)278-03-48
Вологда (8172)26-4159
Воронеж (473)204-51-73
Екатеринбург (343)384-55-89
Иваново (4932)77-34-06
Ижевск (3412)26-03-58
Иркутск (395)279-98-46
Казань (843)206-01-48

Калининград (4012)72-03-81
Калуга (4842)92-23-67
Кемерово (3842)65-04-62
Киров (8332)68-02-04
Коломна (4966)23-41-49
Кострома (4942)77-07-48
Краснодар (861)203-40-90
Красноярск (391)204-63-61
Курск (4712)77-13-04
Курган (3522)50-90-47
Липецк (4742)52-20-81
Магнитогорск (3519)55-03-13
Москва (495)268-04-70
Мурманск (8152)59-64-93
Набережные Челны (8552)20-53-41
Нижний Новгород (831)429-08-12
Новокузнецк (3843)20-46-81
Ноябрьск (3496)41-32-12
Новосибирск (383)227-86-73

Омск (3812)21-46-40
Орел (4862)44-53-42
Оренбург (3532)37-68-04
Пенза (8412)22-31-16
Петрозаводск (8142)55-98-37
Псков (8112)59-10-37
Пермь (342)205-81-47
Ростов-на-Дону (863)308-18-15
Рязань (4912)46-61-64
Самара (846)206-03-16
Саранск (8342)22-96-24
Санкт-Петербург (812)309-46-40
Саратов (845)249-38-78
Севастополь (8692)22-31-93
Симферополь (3652)67-13-56
Смоленск (4812)29-41-54
Сочи (862)225-72-31
Ставрополь (8652)20-65-13
Сургут (3462)77-98-35

Сыктывкар (8212)25-95-17
Тамбов (4752)50-40-97
Тверь (4822)63-31-35
Тольятти (8482)63-91-07
Томск (3822)98-41-53
Тула (4872)33-79-87
Тюмень (3452)66-21-18
Ульяновск (8422)24-23-59
Улан-Удэ (3012)59-97-51
Уфа (347)229-48-12
Хабаровск (4212)92-98-04
Чебоксары (8352)28-53-07
Челябинск (351)202-03-61
Череповец (8202)49-02-64
Чита (3022)38-34-83
Якутск (4112)23-90-97
Ярославль (4852)69-52-93

Россия +7(495)268-04-70

Казахстан +7(7172)727-132

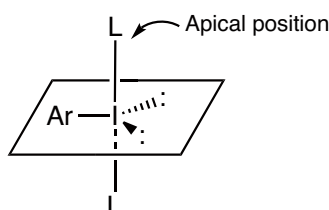
Киргизия +996(312)96-26-47

Адрес: <https://tci.nt-rt.ru/> || эл.почта: tic@nt-rt.ru

Hypervalent Iodine Compounds

As Japan is not blessed with abundant natural resources, it is dependent on the importation of the majority of its raw materials from overseas. However, Japan can be proud of its production of iodine, where it is a leading world manufacturer. The present situation in Japan is that the produced and exported iodine products are low value-added products, and thus Japan still relies on the United States and Europe for importation of high value-added iodine products such as X-ray contrast medium or photosensitive agent for photographic film.

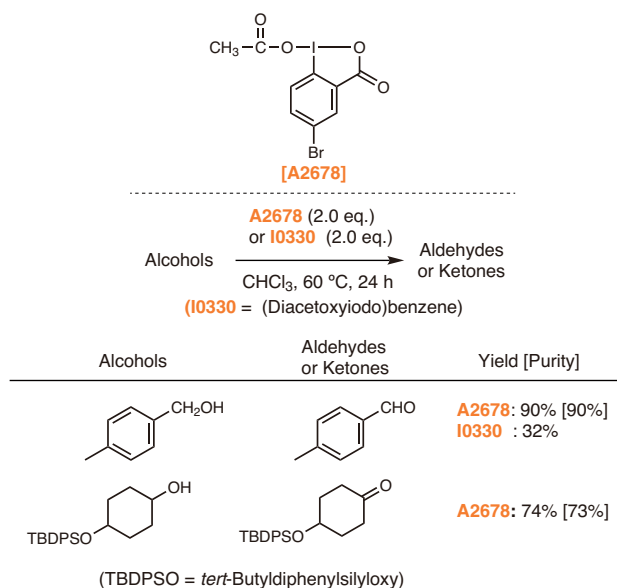
Iodine is atomic number 53, in the 5th period, Group VIIa, halogens of the periodic table. Iodine is a large-sized halogen element, easily polarizable, and low in electronegativity. It forms hypervalent iodine compound beyond the octet rule by readily extending its valence. For example, a hypervalent iodine compound with three ligands is a 10-I-3 type compound as shown in the figure. The central iodine atom forms a plane with two lone pairs and one s-bond, and furthermore, this iodine atom coordinates two ligands with larger electronegativity in an apical position orthogonal to the plane resulting in the formation of a linear three center-four electron bond. The I-L bond in the apical position is longer than the covalent bond. For example, the I-O bond lengths in (diacetoxyiodo)benzene ($\text{PhI}(\text{OAc})_2$, **[I0330]**) are longer than the sum of their covalent bond radii (1.99Å) and these bond lengths have a range of 2.15 - 2.16Å.



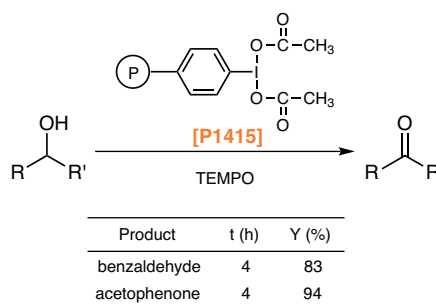
The stability and reactivity of hypervalent iodine compounds exhibit a greater dependence on the character of hypervalent bonds in the apical position. The hypervalent bonds in the apical position are easily cleaved, and the cleavage causes trivalent iodine with 10 electrons to be reduced to monovalent iodine of a more stable octet structure. For this reason it exhibits good elimination and oxidation rates and finds application in organic syntheses.¹⁾

● Oxidizing Agents

ABBX **[A2678]** is a highly active trivalent iodine compound, developed by Togo *et al.*³⁾ **A2678** oxidizes benzylic alcohols and aliphatic secondary alcohols to the corresponding aldehydes and ketones in good yields from simple extraction of the reaction mixture. 5-Bromo-2-iodobenzoic acid, formed as a co-product of this reaction, can be recovered by acidification of the aqueous layer.



The most common of the trivalent iodine compounds, (diacetoxyiodo)benzene **[I0330]** has been supported on a polymer. For example, Togo and co-workers have demonstrated several oxidation reactions using poly[4-(diacetoxyiodo)-styrene] **[P1415]**³⁾



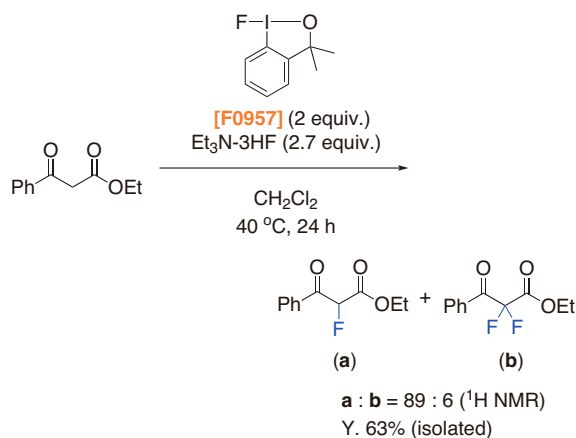
P1415 can selectively oxidize primary alcohols to aldehydes, and secondary alcohols to ketones under mild conditions in the presence of TEMPO. After the reaction, the by-product, poly(4-iodostyrene), can be recovered by filtration, re-oxidized with peracetic acid, and reused. Therefore **P1415** is expected to be used as environmentally-friendly oxidation reagent in the future.

● Fluorinating Agents

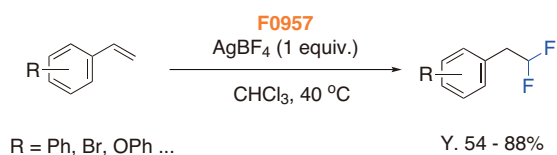
1-Fluoro-3,3-dimethyl-1,2-benziodoxole **[F0957]** is an air- and moisture-stable compound developed by Stuart *et al.*⁴⁾ **F0957** is used as an electrophilic fluorinating agent for a α -monofluorination of β -ketoesters in the presence of triethylamine trihydrofluoride. In this reaction, a difluorination reaction occurs by increasing the amounts of **F0957** with heating at 60 °C. On the other hand, Szabó *et al.* have reported a difluorination reaction of **F0957** with styrene derivatives.

They suggest that the reaction proceeds through the formation of a phenonium ion intermediate based on a deuterium-isotope-labelling experiment.

Monofluorination of β -ketoesters

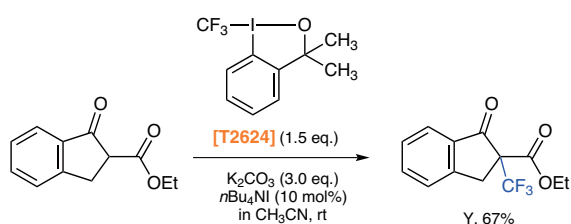


Difluorination of styrene derivatives



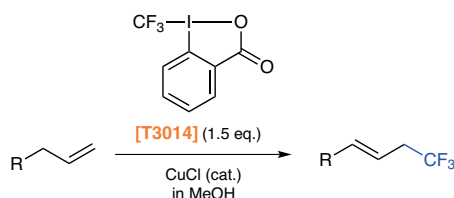
Trifluoromethylating Agents

Togni Reagent **T2624** is an electrophilic trifluoromethylating agent developed by Togni and co-workers, which reacts with β -keto esters and α -nitro esters to introduce a trifluoromethyl group on their α -carbons. **T2624** also reacts with thiols and primary- and secondary phosphines to generate trifluoromethyl sulfides and trifluoromethyl substituted phosphines respectively. **T2624** can be applicable to various substrates.⁵⁾



Togni Reagent II **T3014** is also an electrophilic trifluoromethylating agent, which was developed by Togni *et al.* **T3014** enables it to trifluoromethylate various substrates, as well as Togni Reagent. In particular, it has been reported that the reaction of **T3014** and olefins affords the corresponding allylic trifluoromethylated compounds.⁶⁾

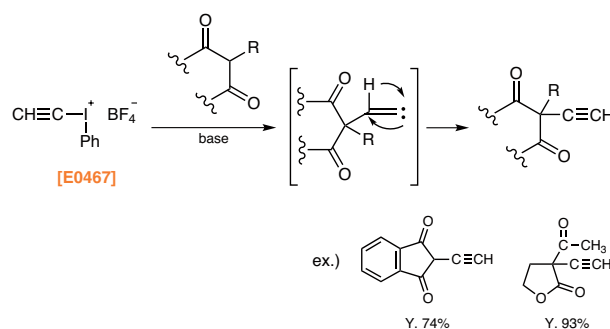
***T3014** contains diatomaceous earth because of reducing explosibility.



Ethynylation Reagents

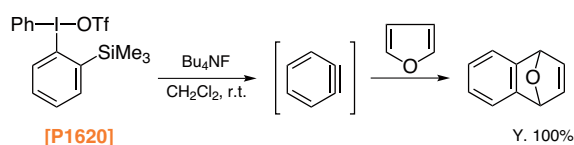
Ochiai and co-workers have developed alkynylidonium tetrafluoroborate **E0467** prepared from alkynylsilanes and iodosobenzene in the presence of BF₃ and they reported its efficacy as electrophilic ethynylation reagents.⁷⁾

When **E0467** was reacted with enolates, alkylidene carbene was generated as an intermediate, and subsequently, an ethynylated product was obtained via 1,2-hydrogen rearrangement of the α -hydrogen. This reaction proceeded under room temperature, and afforded ethynylated products in high yields. As for other electrophilic ethynylation reagents, ethynyl lead triacetate has been exploited, which is prepared from ethynyl(trimethyl)stannane and lead tetraacetate. However, preparation of this reagent requires the use of heavy metal compounds, which make it an unattractive procedure. The ethynylation procedure using this reagent requires careful control of the reaction conditions. The ethynylation method using **E0467** has been at the center of attention in many fields, as this method does not use highly toxic heavy metal compounds, and the reaction proceeds under mild conditions.



Benzyne Precursors

Kitamura and co-workers have reported mild benzyne generation method using TMS-phenyliodonium compound **P1620**.⁸⁾ According to the report, benzyne can be efficiently generated by treating **P1620** with Bu₄NF. **P1620** is the excellent benzyne precursor which needs neither high temperature condition nor strong basic treatment in order to generate benzyne.

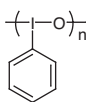


References

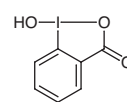
- 1) A. Varvoglis, *Synthesis* **1984**, 709; P. J. Stang, V. V. Zhdankin, *Chem. Rev.* **1996**, 96, 1123; V. V. Zhdankin, P. J. Stang, *Chem. Rev.* **2002**, 102, 2523.
- 2) M. Iinuma, K. Moriyama, H. Togo, *Eur. J. Org. Chem.* **2014**, 772.
- 3) H. Togo, S. Abe, G. Nogami, M. Yokoyama, *Bull. Chem. Soc. Jpn.* **1999**, 72, 2351; H. Togo, K. Sakuratani, *Kagaku to Kogyo (Chemistry and Chemical Industry)* **2002**, 55, 1018; H. Togo, K. Sakuratani, *Synlett* **2002**, 1966; Tokyo Kasei Kogyo, Jpn. Kokai Tokkyo Koho 2003-113131.
- 4) G. C. Geary, E. G. Hope, K. Singh, A. M. Stuart, *Chem. Commun.* **2013**, 49, 9263; N. O. Ilchenko, B. O. A. Tasch, K. J. Szabó, *Angew. Chem. Int. Ed.* **2014**, 53, 12897.
- 5) P. Eisenberger, S. Gischig, A. Togni, *Chem. Eur. J.* **2006**, 12, 2579; I. Kieltisch, P. Eisenberger, A. Togni, *Angew. Chem. Int. Ed.* **2007**, 46, 754; P. Eisenberger, I. Kieltisch, N. Armanino, A. Togni, *Chem. Commun.* **2008**, 1575.
- 6) P. Eisenberger, S. Gischig, A. Togni, *Chem. Eur. J.* **2006**, 12, 2579; X. Wang, Y. Ye, S. Zhang, J. Feng, Y. Xu, Y. Zhang, J. Wang, *J. Am. Chem. Soc.* **2011**, 133, 16410.
- 7) M. Ochiai, T. Ito, Y. Takaoka, Y. Masaki, M. Kunishima, S. Tani, Y. Nagao, *J. Chem. Soc. Chem. Commun.* **1990**, 118; M. Ochiai, *TCIMAIL*, **1999**, number 104, 2.
- 8) T. Kitamura, M. Yamane, *J. Chem. Soc. Chem. Commun.* **1995**, 983; T. Kitamura, M. Yamane, K. Inoue, M. Todaka, N. Fukatsu, Z. Meng, Y. Fujiwara, *J. Am. Chem. Soc.* **1999**, 121, 11674; T. Kitamura, M. Todaka, Y. Fujiwara, *Org. Synth.* **2002**, 78, 104.

Oxidizing Agents

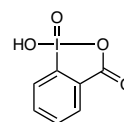
I0072 5g 25g

Iodosobenzene
CAS RN: 536-80-1

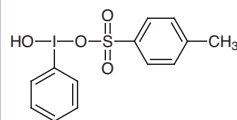
I0073 1g 10g

IBA
CAS RN: 304-91-6

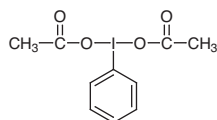
I0791 5g 25g

IBX
CAS RN: 61717-82-6

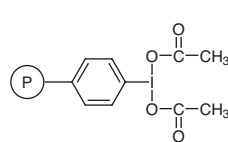
P1015 5g 25g

Koser Reagent
CAS RN: 27126-76-7

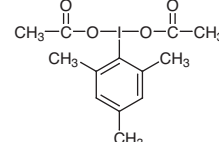
I0330 10g 25g 250g

PIDA
CAS RN: 3240-34-4

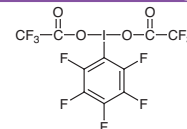
P1415 1g 5g

PSDIB
CAS RN: 36290-94-5

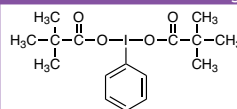
I0479 5g 25g

Iodomesitylene Diacetate
CAS RN: 33035-41-5

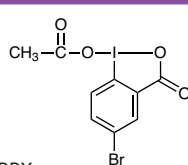
B1616 1g 5g

[Bis(trifluoroacetoxy)iodo]-
pentafluorobenzene
CAS RN: 14353-88-9

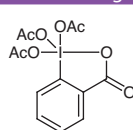
B5405 5g

[Bis(*tert*-butylcarbonyloxy)-
iodo]benzene
CAS RN: 57357-20-7

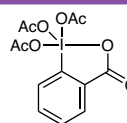
A2678 1g

ABBX
CAS RN: 1580548-81-7

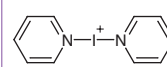
D2045 1g 5g 25g

Dess-Martin Periodinane
CAS RN: 87413-09-0

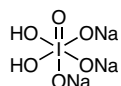
D4477 25mL 250mL

Dess-Martin Periodinane
(8-12% in Dichloromethane)
CAS RN: 87413-09-0

B2539 1g

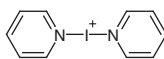
Barluenga's Reagent
CAS RN: 15656-28-7

P0077 25g

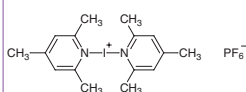
Trisodium Paraperiodate
CAS RN: 13940-38-0

Iodinating Agents

B2539 1g

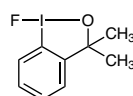
Barluenga's Reagent
CAS RN: 15656-28-7

B2359 1g 5g

Bis(2,4,6-trimethylpyridine)-
iodonium Hexafluorophosphate
CAS RN: 113119-46-3

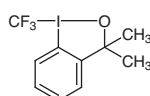
Fluorinating Agents

F0957 1g

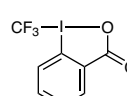
1-Fluoro-3,3-dimethyl-
1,2-benziodoxole
CAS RN: 1391728-13-4

Trifluoromethylating Agents

T2624 1g 5g

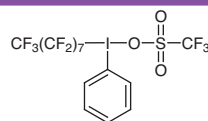
Togni Reagent
CAS RN: 887144-97-0

T3014 1g 5g

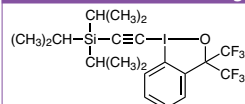
Togni Reagent II
CAS RN: 887144-94-7

Perfluoroalkylating Agents

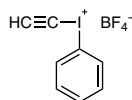
P1081 1g

(Perfluoro-*n*-octyl)phenyliodonium
Trifluoromethanesulfonate
CAS RN: 77758-89-5

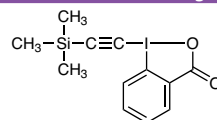
Ethynylation Reagents

T3590 200mg


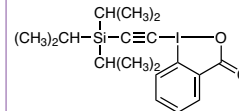
1-[2-(Triisopropylsilyl)ethynyl]-
3,3-bis(trifluoromethyl)-
1,2-benziodoxole
CAS RN: 181934-34-9

E0467 1g


Ethynyl(phenyl)iodonium
Tetrafluoroborate
CAS RN: 127783-34-0

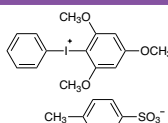
T3272 1g 5g


TMS-EBX
CAS RN: 181934-29-2

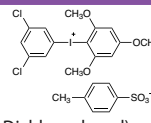
T3039 200mg 1g


TIPS-EBX
CAS RN: 181934-30-5

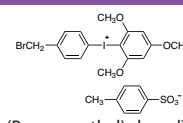
Arylation Reagents

P2412 200mg 1g


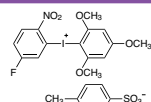
Phenyl(2,4,6-trimethoxyphenyl)-
iodonium p-Toluenesulfonate
CAS RN: 936326-60-2

D5145 200mg 1g


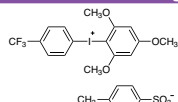
(3,5-Dichlorophenyl)-
(2,4,6-trimethoxyphenyl)-
iodonium p-Toluenesulfonate
CAS RN: 1868173-25-4

B5269 200mg


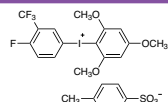
[4-(Bromomethyl)phenyl]-
(2,4,6-trimethoxyphenyl)-
iodonium p-Toluenesulfonate
CAS RN: 1453864-75-9

F1110 200mg


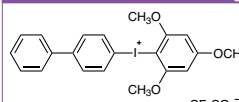
(5-Fluoro-2-nitrophenyl)-
(2,4,6-trimethoxyphenyl)-
iodonium p-Toluenesulfonate
CAS RN: 1868173-33-4

T3622 200mg 1g


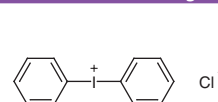
[(4-Trifluoromethyl)phenyl]-
(2,4,6-trimethoxyphenyl)-
iodonium Tosylate
CAS RN: 1868173-15-2

F1111 200mg 1g


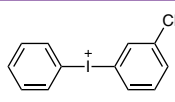
[4-Fluoro-3-(trifluoromethyl)-
phenyl]-(2,4,6-trimethoxyphenyl)-
iodonium p-Toluenesulfonate
CAS RN: 1868173-29-8

B5573 200mg


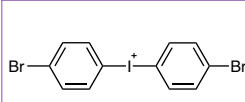
4-Biphenyl(2,4,6-trimethoxyphenyl)-
iodonium Triflate
CAS RN: 1868173-47-0

D2356 5g 25g


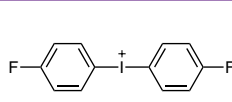
Diphenyliodonium
Chloride
CAS RN: 1483-72-3

P2413 1g 5g


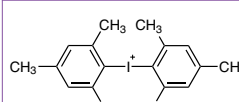
Phenyl[3-(trifluoromethyl)-
phenyl]iodonium Triflate
CAS RN: 905718-46-9

B5259 1g 5g


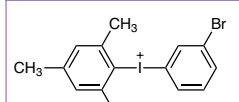
Bis(4-bromophenyl)-
iodonium Triflate
CAS RN: 139139-81-4

B5276 1g 5g


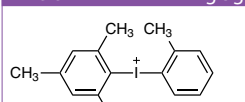
Bis(4-fluorophenyl)-
iodonium Triflate
CAS RN: 732306-64-8

B5260 1g 5g


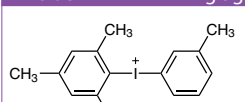
Dimesityliodonium
Triflate
CAS RN: 139139-80-3

B5277 1g 5g


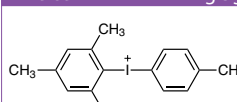
(3-Bromophenyl)(mesityl)-
iodonium Triflate
CAS RN: 1203709-76-5

M2907 1g 5g


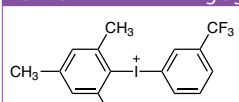
Mesityl(o-tolyl)iodonium
Triflate
CAS RN: 210823-54-4

M2908 1g 5g


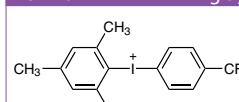
Mesityl(m-tolyl)iodonium
Triflate
CAS RN: 197245-87-7

M2909 1g 5g


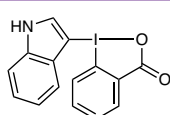
Mesityl(p-tolyl)iodonium
Triflate
CAS RN: 1204518-02-4

T3445 1g 5g


Mesityl[3-(trifluoromethyl)phenyl]-
iodonium Triflate
CAS RN: 1204518-08-0

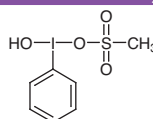
T3446 1g 5g


Mesityl[4-(trifluoromethyl)phenyl]-
iodonium Triflate
CAS RN: 1232133-62-8

I1126 250mg


N-H-IndoleBX
CAS RN: 2130906-05-5

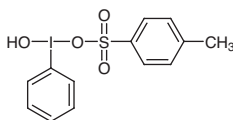
Mesyloxylation Reagents

P1298 5g 25g


[Hydroxy(mesyloxy)iodo]-
benzene
CAS RN: 105551-42-6

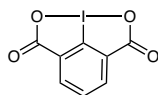
Tosyloxylation Reagents

P1015 5g 25g

Koser Reagent
CAS RN: 27126-76-7

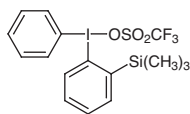
Condensation Reagents

I0865 1g

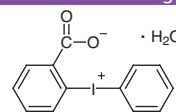
Iodosodilactone
CAS RN: 2902-68-3

Benzyne Precursors

P1620 1g 5g

Phenyl[2-(trimethylsilyl)-phenyl]iodonium Triflate
CAS RN: 164594-13-2

D2503 5g 25g

Diphenyliodonium-2-carboxylate Monohydrate
CAS RN: 96195-89-0

P2097 200mg

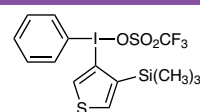
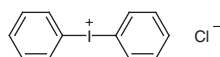
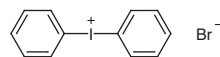
Phenyl[4-(trimethylsilyl)-3-thienyl]iodonium Triflate
CAS RN: 175224-35-8

Photo-Cationic Polymerization Initiators

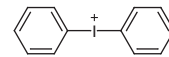
D2356 5g 25g

Diphenyliodonium Chloride
CAS RN: 1483-72-3

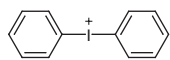
D2372 5g

Diphenyliodonium Bromide
CAS RN: 1483-73-4

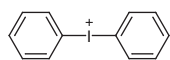
D2357 5g 25g

Diphenyliodonium Nitrate
CAS RN: 722-56-5

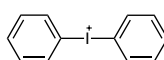
D2253 1g 5g 25g

Diphenyliodonium Trifluoromethanesulfonate
CAS RN: 66003-76-7

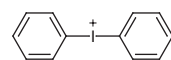
D2243 1g 5g

Diphenyliodonium Perchlorate
CAS RN: 75007-13-5

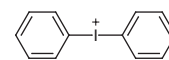
D5118 1g 5g

Diphenyliodonium Tetrafluoroborate
CAS RN: 313-39-3

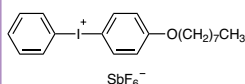
D2238 1g 5g 25g

Diphenyliodonium Hexafluorophosphate
CAS RN: 58109-40-3

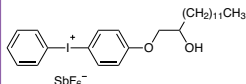
D2248 1g

Diphenyliodonium Hexafluoroarsenate
CAS RN: 62613-15-4

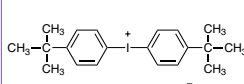
O0589 1g 5g

[4-(Octyloxy)phenyl]-(phenyl)iodonium Hexafluoroantimonate
CAS RN: 121239-75-6

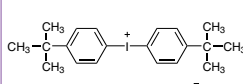
H1683 5g 25g

[4-[(2-Hydroxytetradecyl)-oxy]phenyl]phenyliodonium Hexafluoroantimonate
CAS RN: 139301-16-9

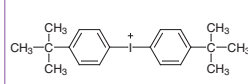
B6355 5g

Bis(4-tert-butylphenyl)-iodonium Chloride
CAS RN: 5421-53-4

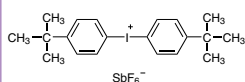
B5661 1g 5g

Bis(4-tert-butylphenyl)-iodonium Tetrafluoroborate
CAS RN: 62051-09-6

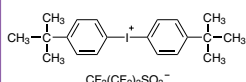
B2380 1g 5g

Bis(4-tert-butylphenyl)-iodonium Hexafluorophosphate
CAS RN: 61358-25-6

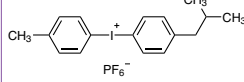
B6347 5g 25g

Bis(4-tert-butylphenyl)-iodonium Hexafluoroantimonate
CAS RN: 61358-23-4

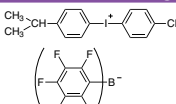
B6071 1g 5g

Bis(4-tert-butylphenyl)-iodonium Nonaflate
CAS RN: 194999-85-4

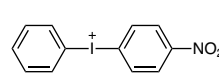
M3379 5g 25g

(4-Isobutylphenyl)(p-tolyl)-iodonium Hexafluorophosphate (ca. 70% in Propylene Carbonate)
CAS RN: 344562-80-7

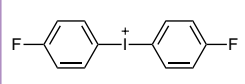
I0591 5g 25g

p-Cumenyl(p-tolyl)iodonium Tetrakis(pentafluorophenyl)-borate
CAS RN: 178233-72-2

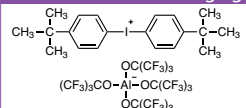
N1066 1g 5g

(4-Nitrophenyl)(phenyl)-iodonium Triflate
CAS RN: 905718-45-8

B5276 1g 5g

Bis(4-fluorophenyl)-iodonium Triflate
CAS RN: 732306-64-8

B5956 100mg 1g

Bis[4-(tert-butyl)phenyl]-iodonium Tetra(perfluoro-tert-butoxy)aluminate
CAS RN: 2350272-68-1

По вопросам продаж и поддержки обращайтесь:

Алматы (7273)495-231
Ангарск (3955)60-70-56
Архангельск (8182)63-90-72
Астрахань (8512)99-46-04
Барнаул (3852)73-04-60
Белгород (4722)40-23-64
Благовещенск (4162)22-76-07
Брянск (4832)59-03-52
Владивосток (423)249-28-31
Владикавказ (8672)28-90-48
Владимир (4922)49-43-18
Волгоград (844)278-03-48
Вологда (8172)26-4159
Воронеж (473)204-51-73
Екатеринбург (343)384-55-89
Иваново (4932)77-34-06
Ижевск (3412)26-03-58
Иркутск (395)279-98-46
Казань (843)206-01-48

Калининград (4012)72-03-81
Калуга (4842)92-23-67
Кемерово (3842)65-04-62
Киров (8332)68-02-04
Коломна (4966)23-41-49
Кострома (4942)77-07-48
Краснодар (861)203-40-90
Красноярск (391)204-63-61
Курск (4712)77-13-04
Курган (3522)50-90-47
Липецк (4742)52-20-81
Магнитогорск (3519)55-03-13
Москва (495)268-04-70
Мурманск (8152)59-64-93
Набережные Челны (8552)20-53-41
Нижний Новгород (831)429-08-12
Новокузнецк (3843)20-46-81
Ноябрьск (3496)41-32-12
Новосибирск (383)227-86-73

Омск (3812)21-46-40
Орел (4862)44-53-42
Оренбург (3532)37-68-04
Пенза (8412)22-31-16
Петрозаводск (8142)55-98-37
Псков (8112)59-10-37
Пермь (342)205-81-47
Ростов-на-Дону (863)308-18-15
Рязань (4912)46-61-64
Самара (846)206-03-16
Саранск (8342)22-96-24
Санкт-Петербург (812)309-46-40
Саратов (845)249-38-78
Севастополь (8692)22-31-93
Симферополь (3652)67-13-56
Смоленск (4812)29-41-54
Сочи (862)225-72-31
Ставрополь (8652)20-65-13
Сургут (3462)77-98-35

Сыктывкар (8212)25-95-17
Тамбов (4752)50-40-97
Тверь (4822)63-31-35
Тольятти (8482)63-91-07
Томск (3822)98-41-53
Тула (4872)33-79-87
Тюмень (3452)66-21-18
Ульяновск (8422)24-23-59
Улан-Удэ (3012)59-97-51
Уфа (347)229-48-12
Хабаровск (4212)92-98-04
Чебоксары (8352)28-53-07
Челябинск (351)202-03-61
Череповец (8202)49-02-64
Чита (3022)38-34-83
Якутск (4112)23-90-97
Ярославль (4852)69-52-93

Россия +7(495)268-04-70

Казахстан +7(7172)727-132

Киргизия +996(312)96-26-47

Адрес: <https://tci.nt-rt.ru/> || эл.почта: tic@nt-rt.ru