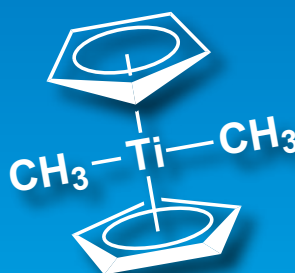
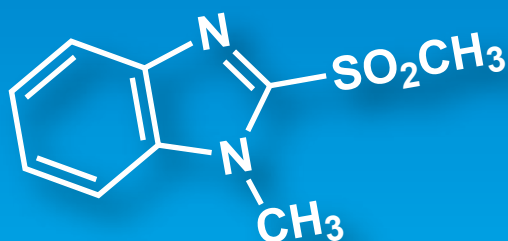
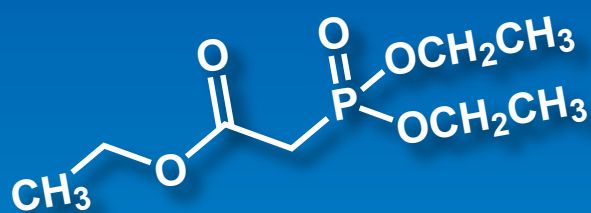
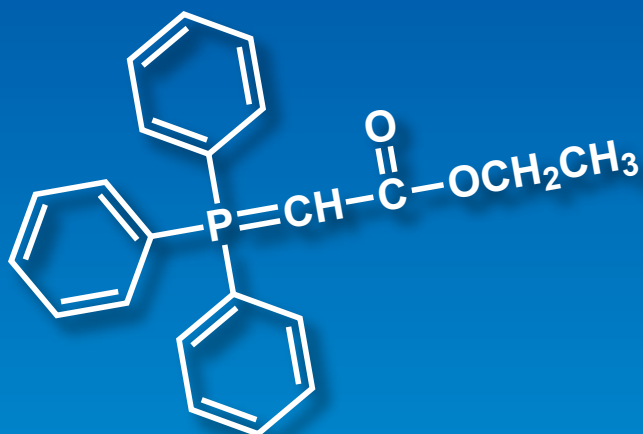


Olefination



Wittig Reagents

Horner-Wadsworth-Emmons Reagents

Z-Selective Horner-Wadsworth-Emmons Reagents

Peterson Reaction Reagents

Julia-Kocienski Olefination Reagents

Titanium Reagents

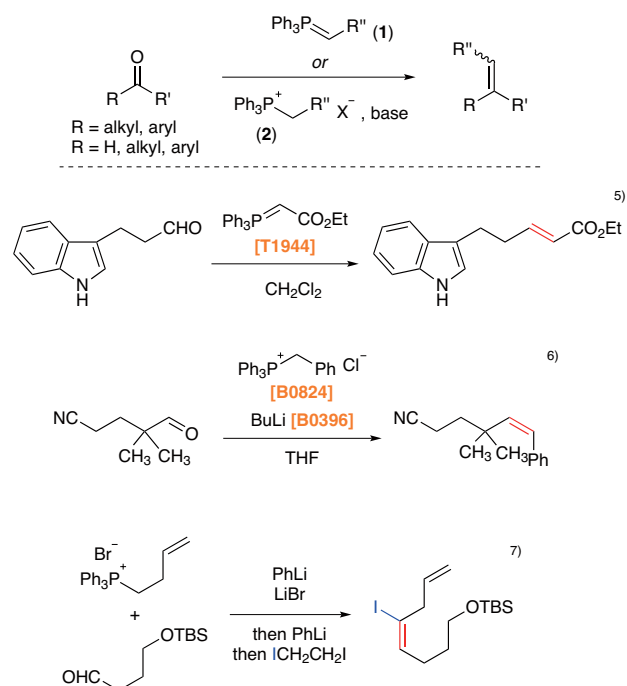
Olefination

Carbonyl olefination is one of the most fundamental conversions in organic synthesis and since the initial discovery, a wide variety of synthetic methods have been developed. In particular, synthetic methods that utilize 3rd row elements like phosphorus, silicon and sulfur atoms had received the most attention and success. Many of these transformations are classic named reactions; Peterson olefination (silicon), Julia and Julia-type (-Kocienski, -Lythgoe) (sulfur), and Horner-Wadsworth-Emmons (HWE) (phosphorus) to name a few. The most well-known carbonyl olefination reaction, The Wittig reaction, is also the most representative of the general synthetic method. A number of improved methods for it and the similar HWE reaction have been developed over the years due to their usefulness. Some of the new methods have easier work-up procedures and increased *E/Z* selectivity.¹⁾ Furthermore, it is known that organotitanium compounds can convert esters and amides (which are typically unreactive under olefination conditions) which brought wider diversity and utility to olefinations.²⁾

This brochure introduces a variety of building blocks for olefinations, sorted by their reactions.

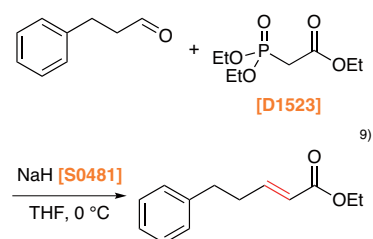
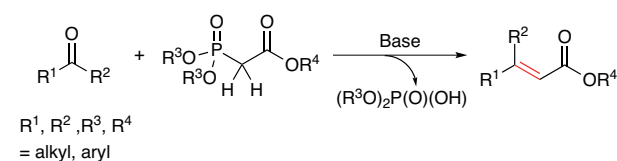
● Wittig reaction

The Wittig reaction is the classical way to install an olefin group from a parent aldehyde or ketone and is frequently utilized in organic synthesis.³⁾ This reaction is incurred using a phosphonium ylide (1), which can exist as a stable compound, or can be generated from the salt form (2) *in situ* by treatment with base. Wittig reactions often provide the *Z*-olefin as the exclusive product, but varied conditions can provide the *E*-olefin product. For instance, Schlosser modification via adding phenyllithium at elevated temperatures can provide *E*-olefins selectively from unstabilized ylides.^{4,7)}



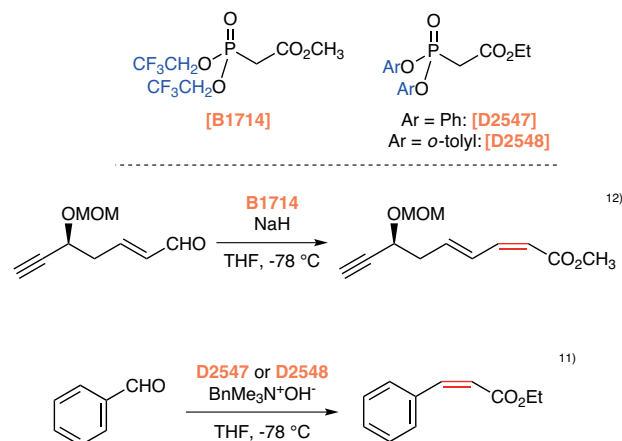
● Horner-Wadsworth-Emmons reaction

The Horner-Wadsworth-Emmons (HWE) reaction is a frequently used synthetic method to obtain substituted (di- and tri-) olefin products from aldehydes and ketones.⁸⁾ *E*-olefins are generally preferred over *Z*-olefins. Phosphonate esters are typically used with strong bases. These produce reactive and stabilized phosphonium anions, which readily react with aldehydes and ketones. The given phosphonate byproducts are easily removed by extraction.



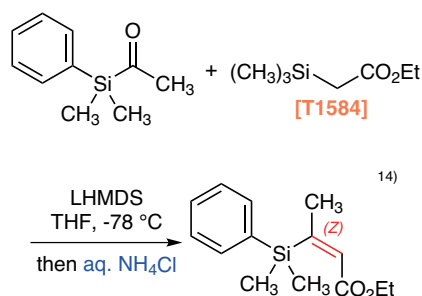
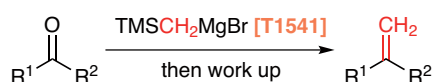
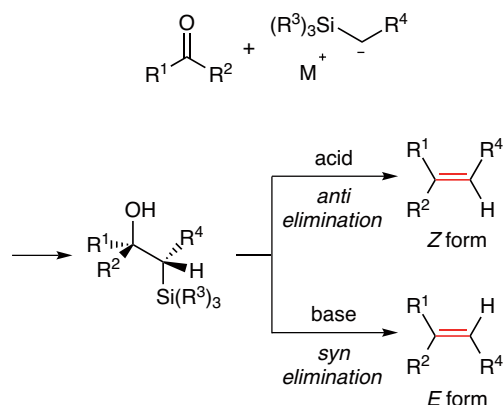
● Z-Selective Horner-Wadsworth-Emmons reaction

The HWE reaction preferably gives *E*-olefins. As a result modifications have been developed to obtain *Z*-olefins. Gennari and Still have reported the first *Z*-selective HWE reaction using bis(2,2,2-trifluoroethyl) (methoxycarbonylmethyl)phosphonate [B1714].¹⁰⁾ Later, Ando developed diaryl phosphonoacetates such as D2547 and D2548 which are able to provide *Z*- α,β -unsaturated esters in high stereoselectivity.¹¹⁾ This method uses quaternary ammonium hydroxides or DBU as the base, and it does not require any special experimental-equipment/-technique to conduct.



Peterson reaction

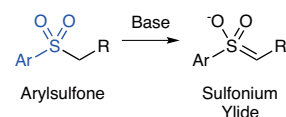
The Peterson reaction is a synthetic method that affords olefins by the addition of a α -silyl carbanion to aldehydes and ketones and successive treatment with acid or base.¹³ This reaction has the advantage that a given olefin's stereochemistry can be adjusted by adding acid or base. When an acid is added to the adduct, the *Z*-olefin is given via *anti*-elimination of a silanol. However, when base is added, *syn*-elimination proceeds to provide *E*-olefins.



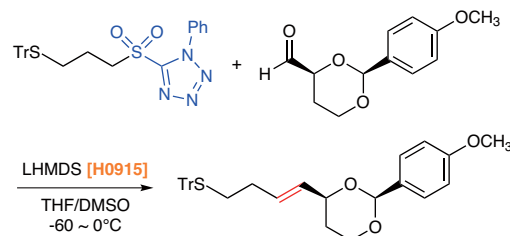
Julia-Lythgoe reaction

The Julia-Lythgoe reaction and its various sub-forms are useful synthetic methods to convert aldehydes to olefins using arylsulfones.¹⁶ This reaction occurs in a stepwise manner to provide *E*-olefins; (1) addition of a sulfonamide to an aldehyde; (2) acylation of resulting hydroxyl group; (3) reduction with Na(Hg). Later, S. A. Julia and Kocienski's group refined the transformation to be conducted in one pot by using heteroaromatic sulfone moieties,^{17,18} which are known as Modified Julia's. This method can be particularly useful in joining two complex fragments. Furthermore, Ando have reported the utility of **M2860** in Julia-Kocienski type methylenations.¹⁹

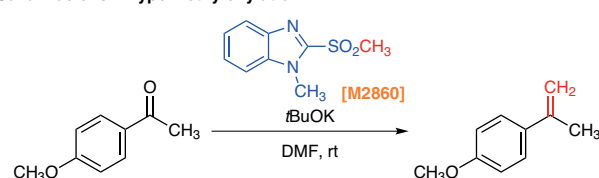
Standard Julia-Lythgoe Reaction¹⁶



Julia-Kocienski Reaction²⁰

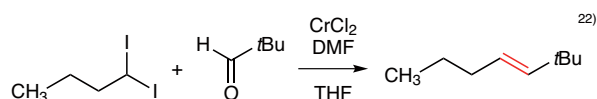
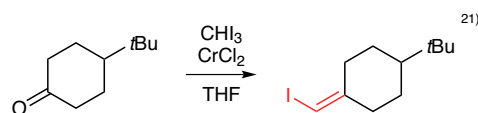
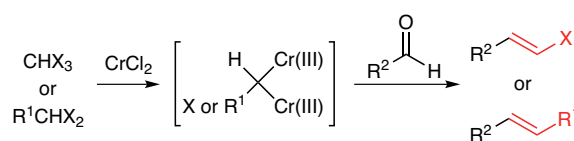


Julia-Kocienski Type Methylenation¹⁹



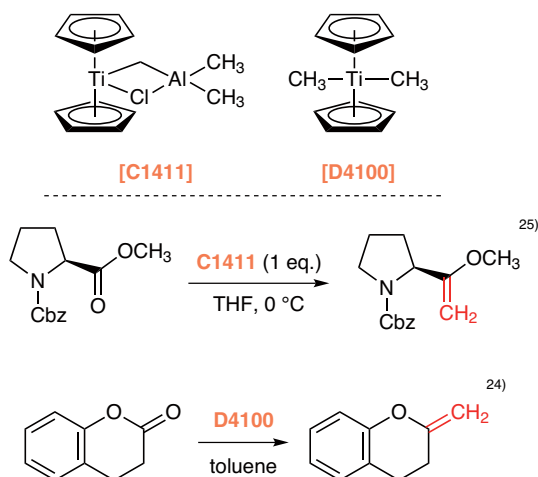
Takai-Utimoto reaction

Takai and Utimoto have reported that a *gem*-dichromium reagent prepared from a haloform and chromium(II) chloride reacts with aldehydes to provide haloolefins.²¹ This method is applicable to 1,1-dihalides²² and utilized in elongation of alkyl chains and the construction of olefins with other functional groups. The haloolefins and functionalized olefins are particularly useful substrates, such as in cross-coupling reactions.



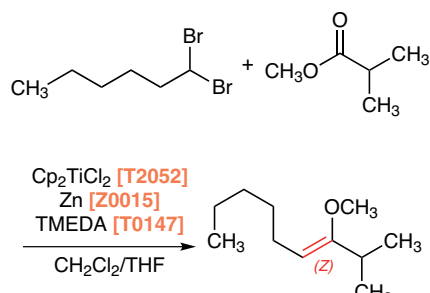
● Olefination reactions using titanium reagents

Tebbe²³⁾ and Petasis²⁴⁾ reagents are representative organotitanium reagents used in carbonyl olefination which have been used for methylenation of various carbonyl compounds. Unlike other methylenation reagents which react with only aldehydes and ketones, organotitanium reagents can react with relatively inactive carbonyl groups such as esters and amides.

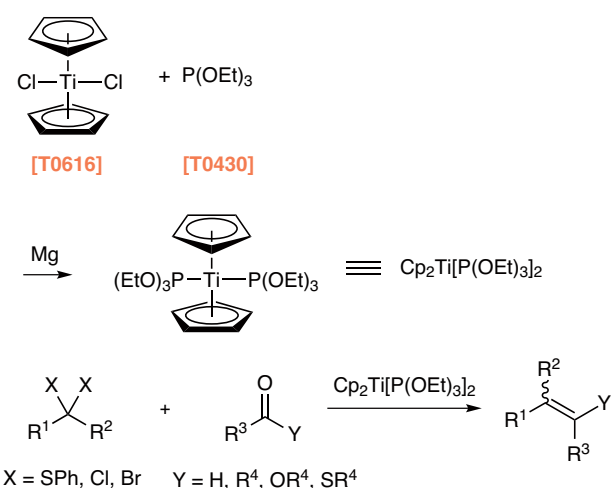


Besides the titanium compounds stated above, olefination utilizing the $RCHX_2$ - $TiCl_4$ -Zn system reported by Takai and Utimoto can also be used on carbonyl groups.²⁶⁾ In this reaction, Z-olefins are given preferentially. Takeda's group have also reported more general olefinations of carbonyl compounds by the treatment of thioacetals or *gem*-dihalides and a titanocene(II) compound $Cp_2Ti[P(OEt)_3]_2$.²⁷⁾

Takai-Utimoto's Olefination System²⁶⁾

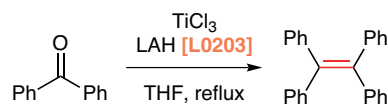


Takeda's Olefination System²⁷⁾

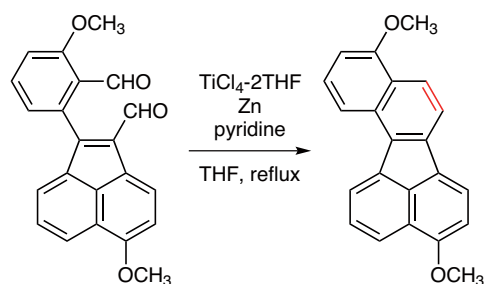


The McMurry coupling is another well-known olefination method using titanium reagents.²⁸⁾ This reaction can be applied to heterocoupling and an intramolecular olefination as well as homocoupling and the construction of medium and large sized rings utilizing.²⁹⁾ Olefinations using organotitanium compounds have unique features and reactivity, and have been used for many years.

Original McMurry Coupling²⁸⁾



McMurry Type Ring Closure²⁹⁾

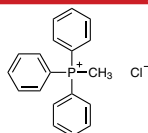


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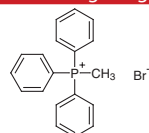
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Wittig Reagents

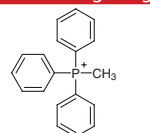
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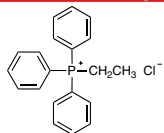
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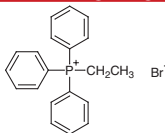
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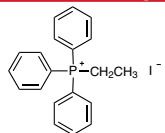
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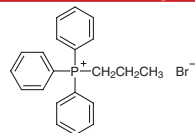
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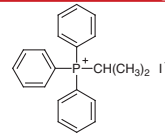
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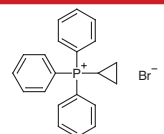
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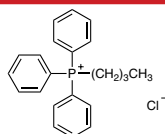
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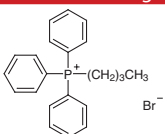
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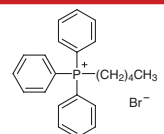
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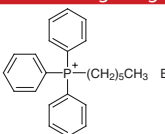
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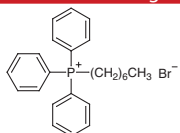
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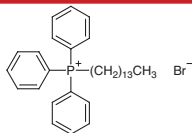
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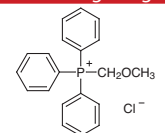
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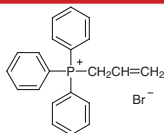
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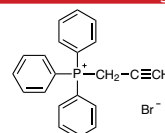
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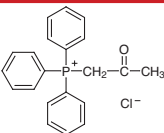
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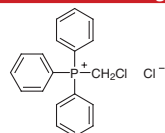
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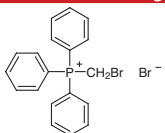
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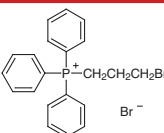
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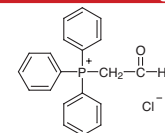
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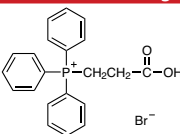
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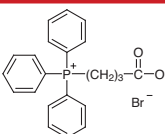
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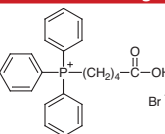
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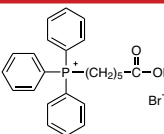
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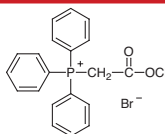
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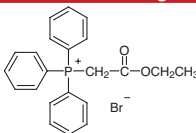
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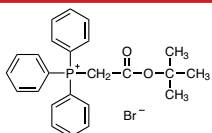
M1326 25g

Carbomethoxymethyl(triphenyl)-phosphonium Bromide
CAS RN: 1779-58-4

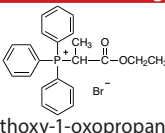
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Carboethoxymethyl(triphenyl)-phosphonium Bromide
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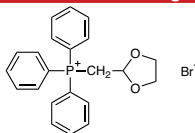
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(tert-Butoxycarbonylmethyl)-triphenylphosphonium Bromide
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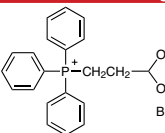
E1300 5g 25g

(1-Ethoxy-1-oxopropan-2-yl)triphenylphosphonium Bromide
CAS RN: 30018-16-7

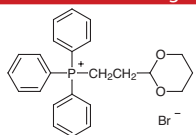
D2164 5g 25g

(1,3-Dioxolan-2-yl)methyltriphenylphosphonium Bromide
CAS RN: 52509-14-5

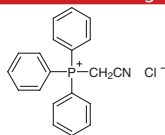
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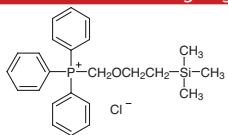
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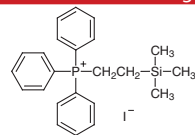
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(Cyanomethyl)-triphenylphosphonium Chloride
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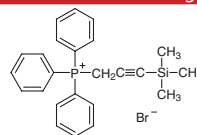
T1458 5g 25g

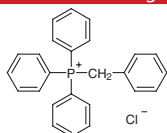
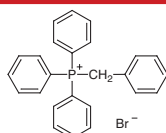
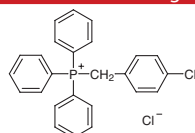
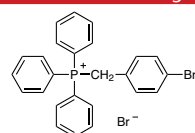
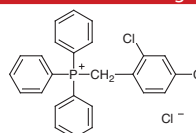
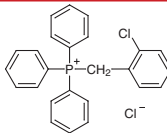
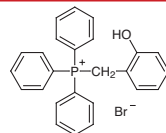
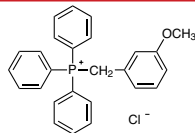
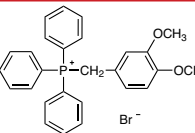
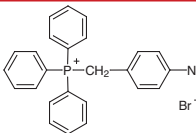
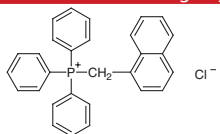
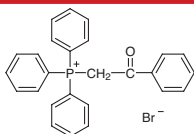
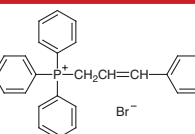
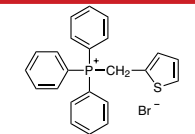
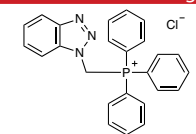
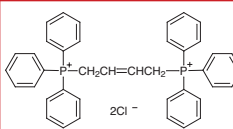
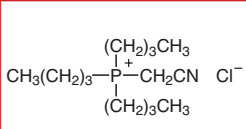
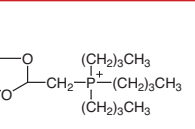
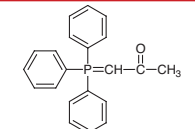
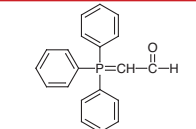
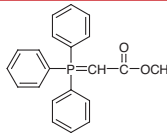
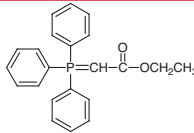
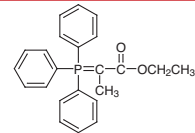
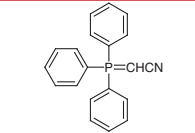
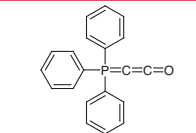
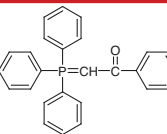
SEM-triphenylphosphonium Chloride
CAS RN: 82495-75-8

T1510 1g 5g

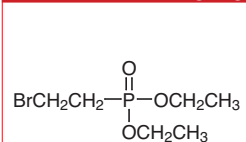
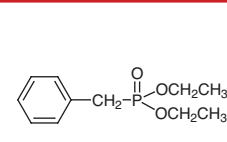
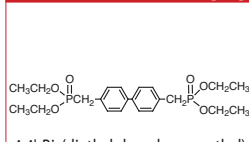
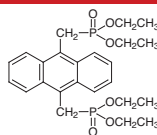
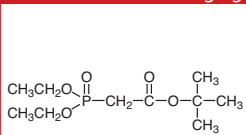
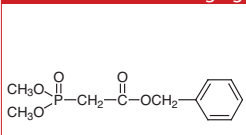
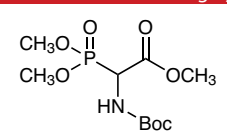
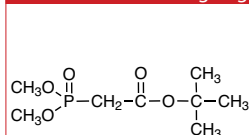
(2-Trimethylsilyl)ethyltriphenylphosphonium Iodide
CAS RN: 63922-84-9

T1498 1g 5g

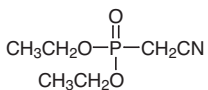
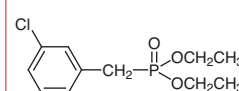
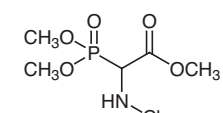
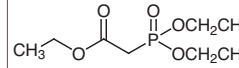
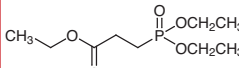
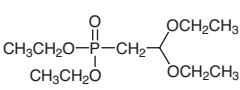
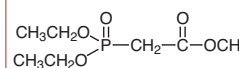
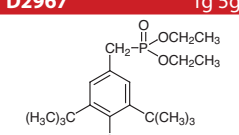
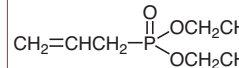
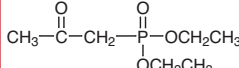
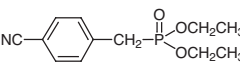
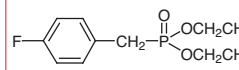
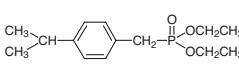
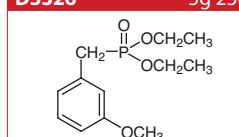
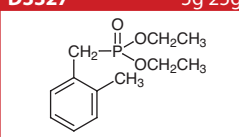
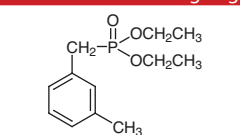
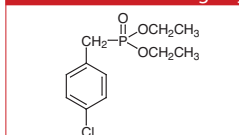
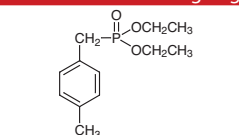
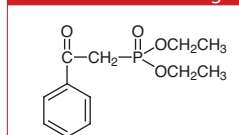
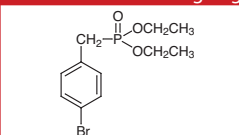
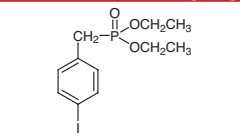
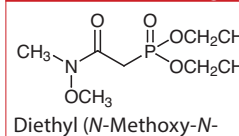
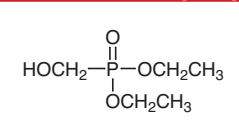
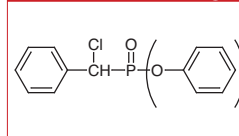
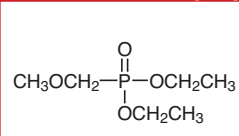
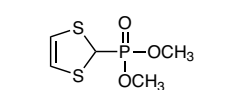
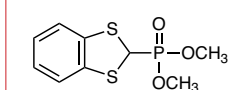
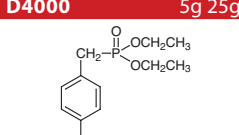
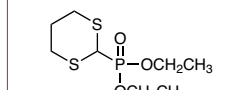
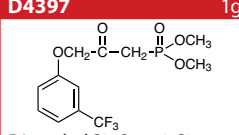
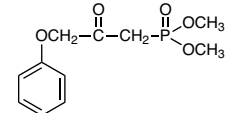
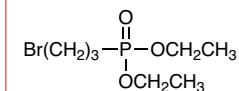
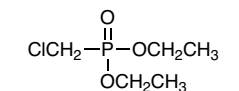
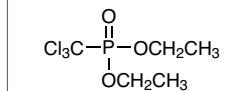
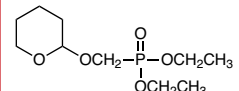
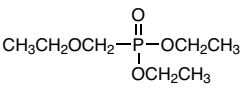
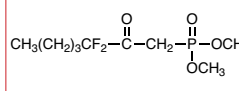
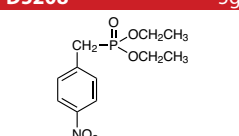
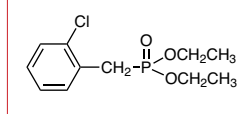
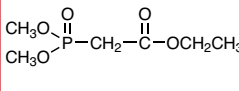
(3-Trimethylsilyl-2-propynyl)triphenylphosphonium Bromide
CAS RN: 42134-49-6

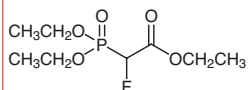
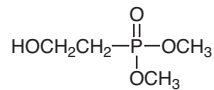
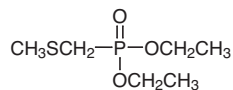
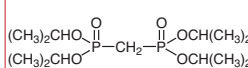
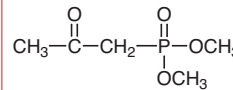
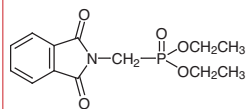
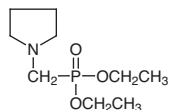
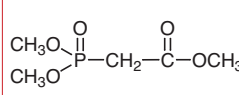
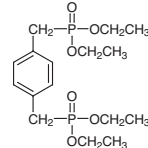
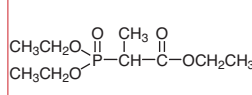
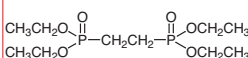
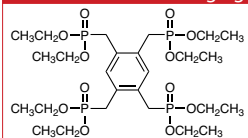
B0824 25g 500gBenzyltriphenylphosphonium Chloride
CAS RN: 1100-88-5**B2025** 25gBenzyltriphenylphosphonium Bromide
CAS RN: 1449-46-3**C1581** 5g 25g(4-Chlorobenzyl)-triphenylphosphonium Chloride
CAS RN: 1530-39-8**B5241** 5g 25g(4-Bromobenzyl)-triphenylphosphonium Bromide
CAS RN: 51044-13-4**D2907** 5g 25g(2,4-Dichlorobenzyl)-triphenylphosphonium Chloride
CAS RN: 2492-23-1**C1759** 25g(2-Chlorobenzyl)-triphenylphosphonium Chloride
CAS RN: 18583-55-6**H1240** 5g 25g(2-Hydroxybenzyl)-triphenylphosphonium Bromide
CAS RN: 70340-04-4**M2463** 1g 5g(3-Methoxybenzyl)-triphenylphosphonium Chloride
CAS RN: 18880-05-2**D4072** 5g(3,4-Dimethoxybenzyl)-triphenylphosphonium Bromide
CAS RN: 70219-09-9**N0701** 25g(4-Nitrobenzyl)-triphenylphosphonium Bromide
CAS RN: 2767-70-6**N0700** 5g 25g(1-Naphthylmethyl)-triphenylphosphonium Chloride
CAS RN: 23277-00-1**P1182** 25gPhenacyltriphenylphosphonium Bromide
CAS RN: 6048-29-9**C1286** 25gCinnamyltriphenylphosphonium Bromide
CAS RN: 7310-74-9**T3159** 1gTriphenyl(2-thienylmethyl)-phosphonium Bromide
CAS RN: 23259-98-5**B4486** 1g 5g[(1H-Benzotriazol-1-yl)methyl]-triphenylphosphonium Chloride
CAS RN: 111198-09-5**B2286** 5g*trans*-2-Butene-1,4-bis(triphenylphosphonium) Chloride
CAS RN: 106423-29-4**C1442** 10g 25gTributyl(cyanomethyl)-phosphonium Chloride
CAS RN: 82358-61-0**T2718** 5gTributyl(1,3-dioxolan-2-ylmethyl)-phosphonium Bromide
CAS RN: 115754-62-6**A1439** 25g(Acetylmethylene)-triphenylphosphorane
CAS RN: 1439-36-7**T2001** 5g 25g(Triphenylphosphoranylidene)-acetaldehyde
CAS RN: 2136-75-6**T1363** 25g 100gMethyl (Triphenylphosphoranylidene)acetate
CAS RN: 2605-67-6**T1944** 25g 100 250gEthyl (Triphenylphosphoranylidene)acetate
CAS RN: 1099-45-2**C1641** 5gEthyl 2-(Triphenylphosphoranylidene)propionate
CAS RN: 5717-37-3**T1958** 5g 25g(Triphenylphosphoranylidene)acetonitrile
CAS RN: 16640-68-9**T2565** 1g 5gBestmann Ylide
CAS RN: 15596-07-3**T2002** 1g 5g2-(Triphenylphosphoranylidene)-acetophenone
CAS RN: 859-65-4

Horner-Wadsworth-Emmons Reagents

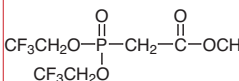
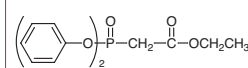
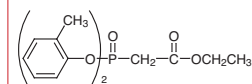
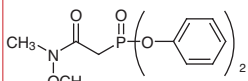
B1781 5g 25gDiethyl 2-bromoethylphosphonate
CAS RN: 5324-30-1**B1795** 25gDiethyl benzylphosphonate
CAS RN: 1080-32-6**B1923** 1g 5g4,4'-Bis(diethylphosphonomethyl)-biphenyl
CAS RN: 17919-34-5**B2801** 1g 5g9,10-Bis(diethylphosphonomethyl)anthracene
CAS RN: 60974-92-7**B2814** 1g 5g*tert*-Butyl diethylphosphonoacetate
CAS RN: 27784-76-5**B2815** 1g 5gBenzyl dimethylphosphonoacetate
CAS RN: 57443-18-2**B4011** 1g 5g*N*-Boc-2-phosphonoglycine trimethyl ester
CAS RN: 89524-98-1**B5094** 5g 25g*tert*-Butyl dimethylphosphonoacetate
CAS RN: 62327-21-3

Olefination

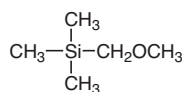
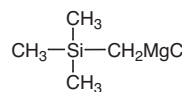
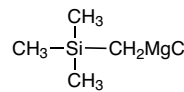
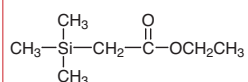
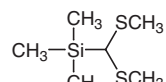
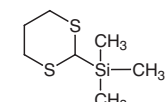
<p>C1430 5g 25g</p>  <p>Diethyl Cyanomethylphosphonate CAS RN: 2537-48-6</p>	<p>C1595 1g 5g</p>  <p>Diethyl (3-Chlorobenzyl)-phosphonate CAS RN: 78055-64-8</p>	<p>C2440 1g 5g</p>  <p>N-Cbz-2-phosphonoglycine Trimethyl Ester CAS RN: 88568-95-0</p>	<p>D1523 25g 100g 500g</p>  <p>Triethyl Phosphonoacetate CAS RN: 867-13-0</p>	<p>D1524 25g 250g</p>  <p>Triethyl 3-Phosphonopropionate CAS RN: 3699-67-0</p>
<p>D2423 5g 25g</p>  <p>Diethyl 2,2-Diethoxyethyl-phosphonate CAS RN: 7598-61-0</p>	<p>D2873 5g 25g</p>  <p>Methyl Diethylphosphonoacetate CAS RN: 1067-74-9</p>	<p>D2967 1g 5g</p>  <p>Diethyl 3,5-Di-<i>tert</i>-butyl-4-hydroxybenzylphosphonate CAS RN: 976-56-7</p>	<p>D3069 1g 5g</p>  <p>Diethyl Allylphosphonate CAS RN: 1067-87-4</p>	<p>D3174 5g 25g</p>  <p>Diethyl (2-Oxopropyl)-phosphonate CAS RN: 1067-71-6</p>
<p>D3323 5g 25g</p>  <p>Diethyl (4-Cyanobenzyl)-phosphonate CAS RN: 1552-41-6</p>	<p>D3324 5g 25g</p>  <p>Diethyl (4-Fluorobenzyl)-phosphonate CAS RN: 63909-58-0</p>	<p>D3325 5g</p>  <p>Diethyl (4-Isopropylbenzyl)-phosphonate CAS RN: 77237-55-9</p>	<p>D3326 5g 25g</p>  <p>Diethyl (3-Methoxybenzyl)-phosphonate CAS RN: 60815-18-1</p>	<p>D3327 5g 25g</p>  <p>Diethyl (2-Methylbenzyl)-phosphonate CAS RN: 62778-16-9</p>
<p>D3328 5g 25g</p>  <p>Diethyl (3-Methylbenzyl)-phosphonate CAS RN: 63909-50-2</p>	<p>D3335 5g 25g</p>  <p>Diethyl (4-Chlorobenzyl)-phosphonate CAS RN: 39225-17-7</p>	<p>D3336 5g 25g</p>  <p>Diethyl (4-Methylbenzyl)-phosphonate CAS RN: 3762-25-2</p>	<p>D3339 1g 5g</p>  <p>Diethyl Phenacylphosphonate CAS RN: 3453-00-7</p>	<p>D3688 5g 25g</p>  <p>Diethyl (4-Bromobenzyl)-phosphonate CAS RN: 38186-51-5</p>
<p>D3689 5g 25g</p>  <p>Diethyl (4-Iodobenzyl)-phosphonate CAS RN: 173443-43-1</p>	<p>D3708 1g 5g</p>  <p>Diethyl (N-Methoxy-N-methylcarbamoylmethyl)-phosphonate CAS RN: 124931-12-0</p>	<p>D3813 25g 100g</p>  <p>Diethyl (Hydroxymethyl)-phosphonate CAS RN: 3084-40-0</p>	<p>D3824 1g 5g</p>  <p>Diphenyl α-Chlorobenzylphosphonate CAS RN: 58263-67-5</p>	<p>D3873 5g 25g</p>  <p>Diethyl (Methoxymethyl)-phosphonate CAS RN: 32806-04-5</p>
<p>D3981 1g 5g</p>  <p>Dimethyl 2-(1,3-Dithiole)-phosphonate CAS RN: 133113-76-5</p>	<p>D3992 1g</p>  <p>Dimethyl 1,3-Benzodithiol-2-ylphosphonate CAS RN: 62217-35-0</p>	<p>D4000 5g 25g</p>  <p>Diethyl (4-Methoxybenzyl)-phosphonate CAS RN: 1145-93-3</p>	<p>D4074 5g</p>  <p>Diethyl (1,3-Dithian-2-yl)-phosphonate CAS RN: 62999-73-9</p>	<p>D4397 1g</p>  <p>Dimethyl [2-Oxo-3-[3-(trifluoromethyl)phenoxy]propyl]phosphonate CAS RN: 54094-19-8</p>
<p>D4408 200mg 1g</p>  <p>Dimethyl (2-Oxo-3-phenoxypropyl)phosphonate CAS RN: 40665-68-7</p>	<p>D4434 1g 5g</p>  <p>Diethyl (3-Bromopropyl)-phosphonate CAS RN: 1186-10-3</p>	<p>D4588 1g 5g</p>  <p>Diethyl (3-Bromopropyl)-phosphonate CAS RN: 3167-63-3</p>	<p>D4607 5g 25g</p>  <p>Diethyl (Trichloromethyl)-phosphonate CAS RN: 866-23-9</p>	<p>D4611 200mg 1g</p>  <p>Diethyl [(Tetrahydropyran-2-yl)oxy]methyl]phosphonate CAS RN: 71885-51-3</p>
<p>D5095 5g 25g</p>  <p>Diethyl (Ethoxymethyl)phosphonate CAS RN: 10419-80-4</p>	<p>D5176 200mg 1g</p>  <p>Dimethyl (3,3-Difluoro-2-oxoheptyl)phosphonate CAS RN: 50889-46-8</p>	<p>D5208 5g</p>  <p>Diethyl (4-Nitrobenzyl)-phosphonate CAS RN: 2609-49-6</p>	<p>D5265 1g 5g</p>  <p>Diethyl (2-Chlorobenzyl)-phosphonate CAS RN: 29074-98-4</p>	<p>E1160 25g</p>  <p>Ethyl Dimethylphosphonoacetate CAS RN: 311-46-6</p>

F0340 1g 5gTriethyl 2-Fluoro-2-phosphonoacetate
CAS RN: 2356-16-3**H0779** 5g 25gDimethyl (2-Hydroxyethyl)-phosphonate
CAS RN: 54731-72-5**M1208** 5g 25gDiethyl (Methylthiomethyl)-phosphonate
CAS RN: 28460-01-7**M1319** 25gTetraisopropyl Methylene(diphosphonate)
CAS RN: 1660-95-3**O0208** 5g 25gDimethyl (2-Oxopropyl)-phosphonate
CAS RN: 4202-14-6**P1193** 5g 25gDiethyl (Phthalimidomethyl)-phosphonate
CAS RN: 33512-26-4**P1258** 5gDiethyl 1-Pyrrolidinemethyl-phosphonate
CAS RN: 51868-96-3**P1265** 25g 100g 250gTrimethyl Phosphonoacetate
CAS RN: 5927-18-4**T1582** 5g 25g 100gTetraethyl *p*-Xylylenediphosphonate
CAS RN: 4546-04-7**T2135** 5g 25gTriethyl 2-Phosphonopropionate
CAS RN: 3699-66-9**T2294** 1g 5gTetraethyl Ethylenediphosphonate
CAS RN: 995-32-4**T3904** 1g 5g1,2,4,5-Tetrakis-(diethoxyphosphinylmethyl)benzene
CAS RN: 136455-49-7

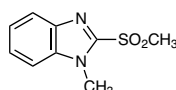
Z-Selective Horner-Wadsworth-Emmons Reagents

B1714 1g 5g 25gMethyl Bis(2,2,2-trifluoroethyl)-phosphonoacetate
CAS RN: 88738-78-7**D2547** 1g 5gEthyl Diphenylphosphonoacetate
CAS RN: 16139-79-0**D2548** 1gEthyl Di-*o*-tolylphosphonoacetate
CAS RN: 188945-41-7**D3709** 1g 5gDiphenyl (*N*-Methoxy-*N*-methylcarbamoylmethyl)-phosphonate
CAS RN: 367508-01-8

Peterson Reaction Reagents

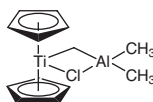
M1264 5mLMethoxymethyltrimethylsilane
CAS RN: 14704-14-4**T1451** 100mLTrimethylsilylmethylmagnesium Chloride (20% in Ethyl Ether, ca. 1mol/L)
CAS RN: 13170-43-9**T2609** 100mLTrimethylsilylmethylmagnesium Chloride (ca. 18% in Tetrahydrofuran, ca. 1mol/L)
CAS RN: 13170-43-9**T1584** 5g 25gEthyl (Trimethylsilyl)acetate
CAS RN: 4071-88-9**B2004** 1gBis(methylthio)-(trimethylsilyl)methane
CAS RN: 37891-79-5**T1514** 5g 25g2-Trimethylsilyl-1,3-dithiane
CAS RN: 13411-42-2

Julia-Kocienski Olefination Reagents

M2860 1g 5g1-Methyl-2-(methylsulfonyl)-benzimidazole
CAS RN: 61078-14-6

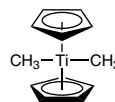
Titanium Reagents

C1411 25mL



Tebbe Reagent
(ca. 0.5mol/L in Toluene)
CAS RN: 67719-69-1

D4100 25g 100g



Petasis Reagent
(5% in Tetrahydrofuran/Toluene)
CAS RN: 1271-66-5

T0616 5g 25g



Titanocene Dichloride
CAS RN: 1271-19-8

T2052 100mL 500mL



Titanium(IV) Chloride (14% in
Dichloromethane, ca. 1.0mol/L)
CAS RN: 7550-45-0

T3238 100mL 500mL



Titanium(IV) Chloride
(ca. 19% in Toluene, ca. 1.0mol/L)
CAS RN: 7550-45-0

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