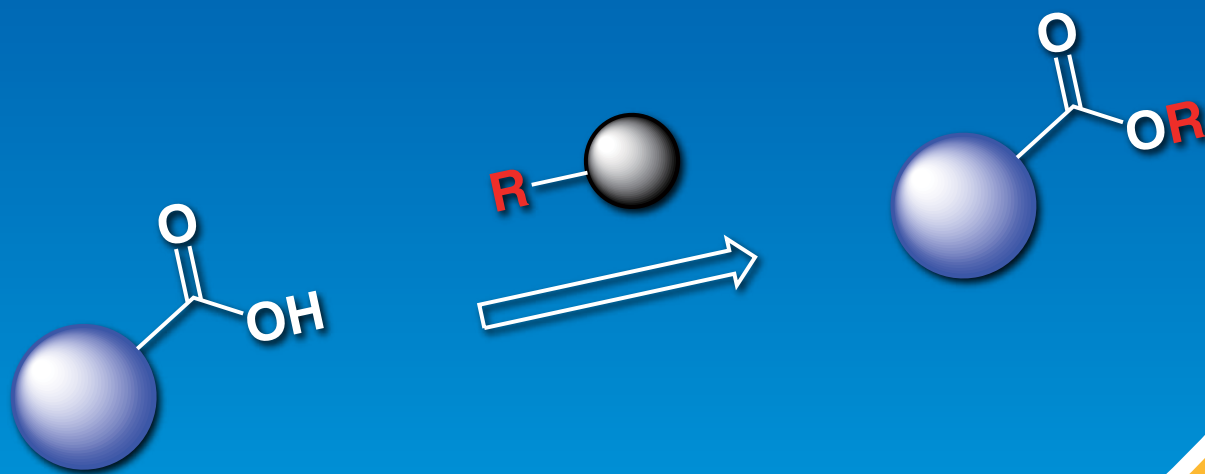


# エステル合成用アルキル化試薬

Alkylation Reagents for Ester Synthesis



メチル化剤

メチル化剤(ジアゾメタン前駆体・等価体)

エチル化剤

プロピル化剤・イソプロピル化剤

ブチル化剤・*tert*-ブチル化剤

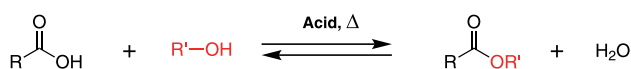
ベンジル化剤

その他のアルキル化剤

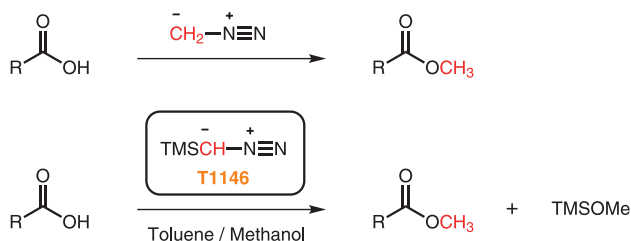
# エステル合成用アルキル化試薬

カルボン酸エステル類は有機合成において基本的な化合物群であり、医薬品、農薬、化粧品、香料や電子材料に至るまで各種化学製品およびそれらの合成中間体として幅広い用途を持っています。

エステル化合物の合成として、酸触媒の存在下でカルボン酸とアルコールから合成する“Fischerエステル合成反応”が古くから知られています<sup>1)</sup>。この反応は可逆反応であり、アルコールを過剰量使い、生成する水を系外に除去することによりエステルを得ることが可能です。

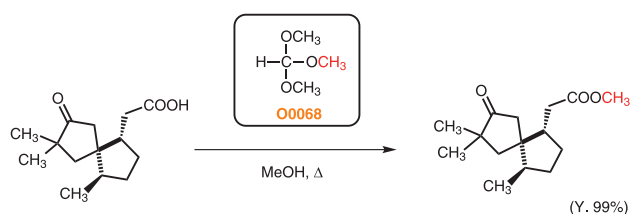


またメチルエステルを合成する手法として、系内で生成させたジアゾメタンとカルボン酸との反応による手法が知られています。本反応は中性条件下で迅速にエステル化反応が進行します。なおジアゾメタンは爆発性および発ガン性が指摘されており、より爆発性の低いトリメチルシリルジアゾメタン—ヘキサン溶液 (T1146) がジアゾメタンの代替試薬として用いられています<sup>2)</sup>。

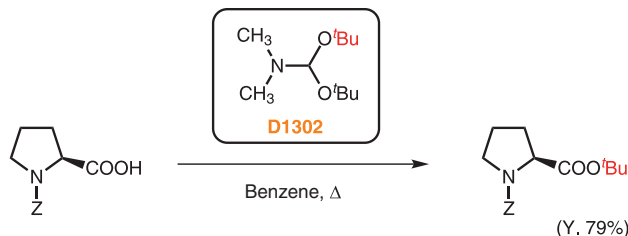


最近では以下のように、カルボン酸のアルキル化反応による種々のエステル合成反応が報告されています。

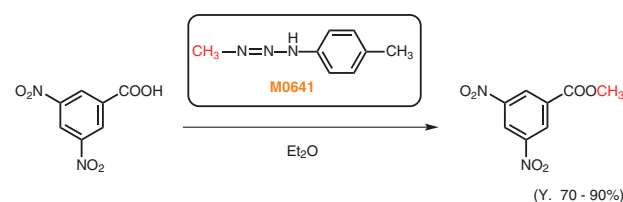
## 1. オルトエステルを用いるアルキル化反応<sup>3)</sup>



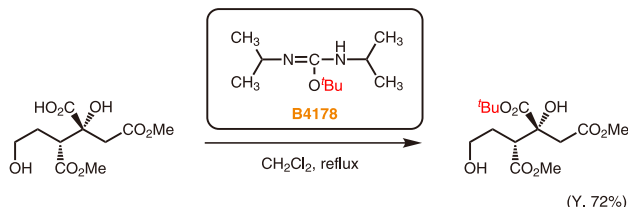
## 2. N,N-ジメチルホルムアミドジアルキルアセターを用いるアルキル化反応<sup>4)</sup>



## 3. トリアゼン誘導体を用いるアルキル化反応<sup>5)</sup>



## 4. O-アルキルイソ尿素を用いるアルキル化反応<sup>6)</sup>

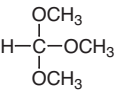
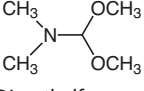
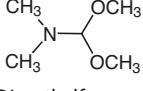
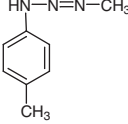
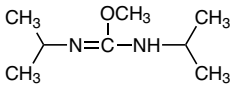
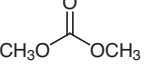
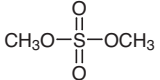
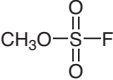
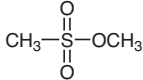
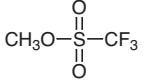
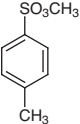
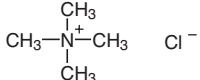
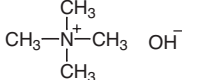
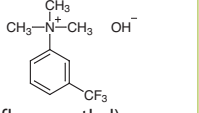
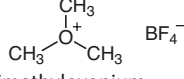
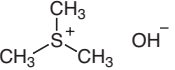


上記の製品以外にも、本パンフレットではエステル合成で利用できるアルキル化試薬を収載しています。ぜひ、ご利用ください。

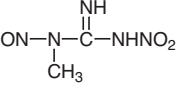
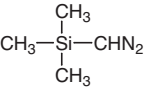
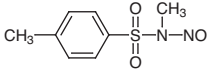
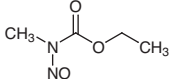
## 文献

- 1) E. Fischer, A. Speier, *Ber.* **1895**, 28, 3252.
- 2) T. Aoyama, T. Shioiri, *Tetrahedron Lett.* **1980**, 21, 46.
- 3) M. T. Crimmins, J. A. DeLoach, *J. Am. Chem. Soc.* **1986**, 108, 800.
- 4) U. Widmer, *Synthesis* **1983**, 135.
- 5) E. H. White, A. A. Baum, D. E. Eitel, *Org. Synth. Coll.* **1973**, 5, 797.
- 6) F. Calo, J. Richardson, A. G. M. Barrett, *J. Org. Chem.* **2008**, 73, 9692.

## メチル化剤

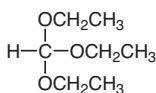
	<b>X0041</b> 25mL 100mL 500mL	<b>X0038</b> 1set	<b>X0033</b> 1set
	Hydrogen Chloride - Methanol Reagent (5-10%) CAS RN: 7647-01-0	Hydrogen Chloride - Methanol Reagent (5-10%) (1mL×10) CAS RN: 7647-01-0	Boron Trichloride - Methanol Reagent (5-10%) CAS RN: 36254-91-8
<b>X0036</b> 1set	<b>O0068</b> 25mL 500mL	<b>D2071</b> 25mL	<b>D1332</b> 1set
Boron Trifluoride - Methanol Reagent (10-20%) CAS RN: 373-57-9	 Trimethyl Orthoformate CAS RN: 149-73-5	 <i>N,N</i> -Dimethylformamide Dimethyl Acetal CAS RN: 4637-24-5	 <i>N,N</i> -Dimethylformamide Dimethyl Acetal (0.5mL×10) CAS RN: 4637-24-5
			<b>M0641</b> 1g 25g
			 1-Methyl-3- <i>p</i> -tolyltriazene CAS RN: 21124-13-0
<b>D4587</b> 5mL	<b>B1618</b> 50g	<b>B3121</b> 100mL	<b>B3122</b> 100mL
 <i>N,N</i> -Diisopropyl- <i>O</i> -methylisourea CAS RN: 54648-79-2	CH <sub>3</sub> Br Bromomethane CAS RN: 74-83-9	CH <sub>3</sub> Br Bromomethane (ca. 2mol/L in Ethyl Ether) CAS RN: 74-83-9	CH <sub>3</sub> Br Bromomethane (ca. 2mol/L in Tetrahydrofuran) CAS RN: 74-83-9
			<b>I0060</b> 10mL 100mL 300mL
			CH <sub>3</sub> I Iodomethane CAS RN: 74-88-4
<b>C0053</b> 25mL 100mL 500mL	<b>D0797</b> 25g 500g	<b>F0238</b> 5g 25g	<b>M0369</b> 25g 100g
 Dimethyl Carbonate CAS RN: 616-38-6	 Dimethyl Sulfate CAS RN: 77-78-1	 Methyl Fluorosulfonate CAS RN: 421-20-5	 Methyl Methanesulfonate CAS RN: 66-27-3
			<b>T2029</b> 5g 25g
			 Methyl Triflate CAS RN: 333-27-7
<b>T0269</b> 25g 500g	<b>T0136</b> 25g 500g	<b>T0676</b> 25mL 100mL 500mL	<b>T0961</b> 25mL
 Methyl <i>p</i> -Toluenesulfonate CAS RN: 80-48-8	 Tetramethylammonium Chloride CAS RN: 75-57-0	 Tetramethylammonium Hydroxide (10% in Methanol) CAS RN: 75-59-2	 3-(Trifluoromethyl)-phenyltrimethylammonium Hydroxide (5% in Methanol) CAS RN: 68254-41-1
			<b>T1507</b> 5g 25g
			 Trimethyloxonium Tetrafluoroborate CAS RN: 420-37-1
<b>T1576</b> 5mL 25mL			
 Trimethylsulfonium Hydroxide (0.2mol/L in Methanol) CAS RN: 17287-03-5			

## メチル化剤 (ジアゾメタン前駆体・等価体)

<b>M0527</b> 5g 25g	<b>T1146</b> 10mL 25mL 100mL	<b>T0323</b> 25g 500g	<b>N0265</b> 5g 25g
 1-Methyl-3-nitro-1-nitrosoguanidine (wetted with ca. 50% Water) CAS RN: 70-25-7	 Trimethylsilyldiazomethane (ca. 10% in Hexane, ca. 0.6mol/L) CAS RN: 18107-18-1	 <i>N</i> -Methyl- <i>N</i> -nitroso- <i>p</i> -toluenesulfonamide CAS RN: 80-11-5	 <i>N</i> -Methyl- <i>N</i> -nitrosourethane CAS RN: 615-53-2

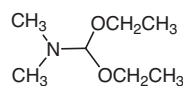
## エチル化剤

O0066 25mL 500mL



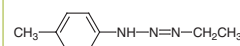
Triethyl Orthoformate  
CAS RN: 122-51-0

D1294 5mL 25mL



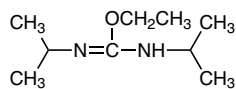
*N,N*-Dimethylformamide  
Diethyl Acetal  
CAS RN: 1188-33-6

E0292 1g



1-Ethyl-3-*p*-tolyltriazene  
CAS RN: 50707-40-9

E1058 5mL 25mL



*O*-Ethyl-*N,N'*-diisopropylisourea  
CAS RN: 60683-30-9

B0588 25g 500g



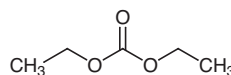
Bromoethane  
CAS RN: 74-96-4

I0058 25g 100g 500g



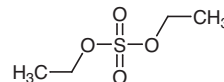
Iodoethane  
(stabilized with Copper chip)  
CAS RN: 75-03-6

C0041 25g 500g



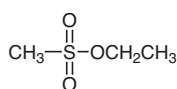
Diethyl Carbonate  
CAS RN: 105-58-8

D0525 25mL 500mL



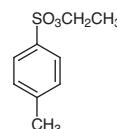
Diethyl Sulfate  
CAS RN: 64-67-5

M0607 25g 100g



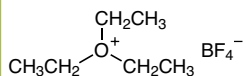
Ethyl Methanesulfonate  
CAS RN: 62-50-0

T0268 25g 500g



Ethyl *p*-Toluenesulfonate  
CAS RN: 80-40-0

T1606 100mL



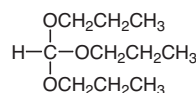
Triethyloxonium Tetrafluoroborate  
(15% in Dichloromethane, ca. 1mol/L)  
CAS RN: 368-39-8

## プロピル化剤・ インプロピル化剤

X0037 1set

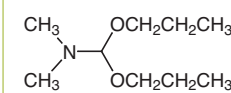
Boron Trifluoride -  
Propanol Reagent (10-20%)  
(1mL×10)  
CAS RN: 762-48-1

O0259 25mL



Tripropyl Orthoformate  
CAS RN: 621-76-1

D1301 5mL 25mL



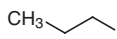
*N,N*-Dimethylformamide  
Dipropyl Acetal  
CAS RN: 6006-65-1

B0638 25g 500g



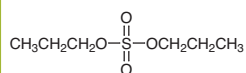
Propyl Bromide  
CAS RN: 106-94-5

I0068 25g 100g 500g



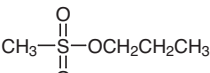
Propyl Iodide  
CAS RN: 107-08-4

D1638 25g 500g



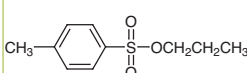
Dipropyl Sulfate  
CAS RN: 598-05-0

P1844 5g 25g



Propyl Methanesulfonate  
CAS RN: 1912-31-8

T0726 25mL 500mL

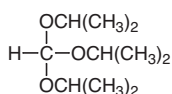


Propyl *p*-Toluenesulfonate  
CAS RN: 599-91-7

X0035 1set

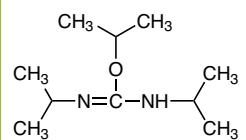
Boron Trifluoride - Isopropyl  
Alcohol Reagent (10-20%)  
(1mL×10)  
CAS RN: 676-65-3

O0215 25mL



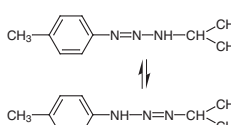
Triisopropoxymethane  
CAS RN: 4447-60-3

T3123 5mL 25mL



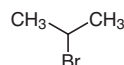
*O,N,N'*-Triisopropylisourea  
CAS RN: 63460-32-2

I0280 1g



1-Isopropyl-3-*p*-tolyltriazene  
CAS RN: 50707-41-0

B0639 25g 500g



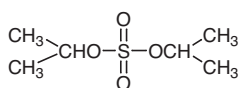
Isopropyl Bromide  
CAS RN: 75-26-3

I0069 25g 100g 500g



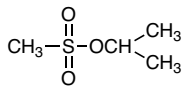
Isopropyl Iodide  
CAS RN: 75-30-9

D2954 5g 25g



Diisopropyl Sulfate  
CAS RN: 2973-10-6

I0914 1g 5g



Isopropyl  
Methanesulfonate  
CAS RN: 926-06-7

## ブチル化剤・ *tert*-ブチル化剤

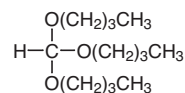
X0039 1set

Hydrogen Chloride -  
Butanol Reagent (10-20%)  
(1mL×10)  
CAS RN: 7647-01-0

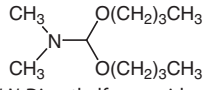
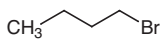
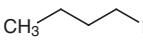
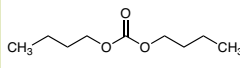
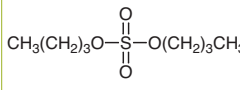
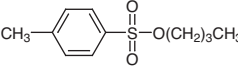
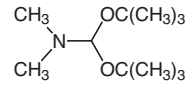
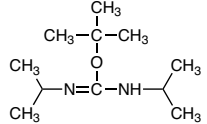
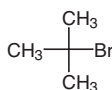
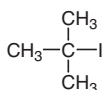
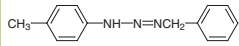
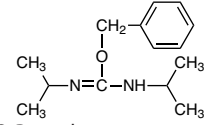
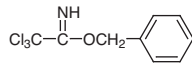
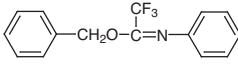
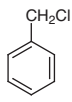
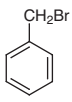
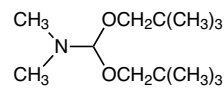
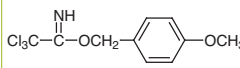
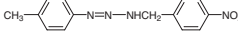
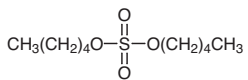
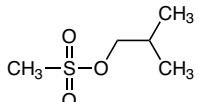
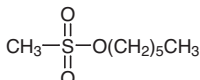
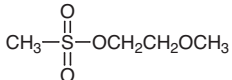
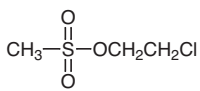
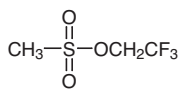
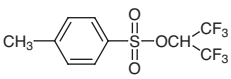
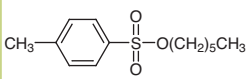
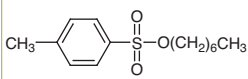
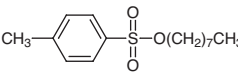
X0034 1set

Boron Trifluoride -  
Butanol Reagent (10-20%)  
(1mL×10)  
CAS RN: 692-39-7

O0269 25mL



Tributyl Orthoformate  
CAS RN: 588-43-2

<p><b>D1302</b> 5mL 25mL</p>  <p><i>N,N</i>-Dimethylformamide Dibutyl Acetal CAS RN: 18503-90-7</p>	<p><b>B0560</b> 25g 500g</p>  <p>Butyl Bromide CAS RN: 109-65-9</p>	<p><b>I0055</b> 25g 500g</p>  <p>Butyl Iodide CAS RN: 542-69-8</p>	<p><b>C0040</b> 5g 25g</p>  <p>Dibutyl Carbonate CAS RN: 542-52-9</p>	<p><b>D1633</b> 25g 500g</p>  <p>Dibutyl Sulfate CAS RN: 625-22-9</p>
<p><b>T0727</b> 25mL 500mL</p>  <p>Butyl <i>p</i>-Toluenesulfonate CAS RN: 778-28-9</p>	<p><b>D1303</b> 5mL 25mL</p>  <p><i>N,N</i>-Dimethylformamide Di-<i>tert</i>-butyl Acetal CAS RN: 36805-97-7</p>	<p><b>B4178</b> 1g 5g</p>  <p><i>O-tert</i>-Butyl-<i>N,N'</i>-diisopropylisourea CAS RN: 71432-55-8</p>	<p><b>B0617</b> 25g 100g 500g</p>  <p><i>tert</i>-Butyl Bromide CAS RN: 507-19-7</p>	<p><b>B1072</b> 25g</p>  <p><i>tert</i>-Butyl Iodide CAS RN: 558-17-8</p>
<p><b>ベンジル化剤</b></p>		<p><b>B0949</b> 1g 25g</p>  <p>1-Benzyl-3-<i>p</i>-tolyltriazenes CAS RN: 17683-09-9</p>	<p><b>B4480</b> 1mL 5mL</p>  <p><i>O</i>-Benzyl-<i>N,N'</i>-diisopropylisourea CAS RN: 2978-10-1</p>	<p><b>B1483</b> 25g</p>  <p>Benzyl 2,2,2-Trichloroacetimidate CAS RN: 81927-55-1</p>
<p><b>B3234</b> 1g 5g</p>  <p>Benzyl 2,2,2-Trifluoro-<i>N</i>-phenylacetimidate CAS RN: 952057-61-3</p>	<p><b>B0412</b> 25g 500g</p>  <p>Benzyl Chloride CAS RN: 100-44-7</p>	<p><b>B0411</b> 25g 100g 500g</p>  <p>Benzyl Bromide CAS RN: 100-39-0</p>		
<p><b>その他のアルキル化剤</b></p>		<p><b>X0032</b> 1set</p> <p>Boron Trichloride - 2-Chloroethanol Reagent (5-10%) (1mLx10) CAS RN: 75507-65-2</p>	<p><b>D1595</b> 5mL 25mL</p>  <p><i>N,N</i>-Dimethylformamide Dineopentyl Acetal CAS RN: 4909-78-8</p>	<p><b>M2016</b> 5g 25g</p>  <p>4-Methoxybenzyl 2,2,2-Trichloroacetimidate CAS RN: 89238-99-3</p>
<p><b>A5507</b> 1g</p>  <p>1-(4-Nitrobenzyl)-3-<i>p</i>-tolyltriazenes CAS RN: 60259-80-5</p>	<p><b>D2955</b> 5g</p>  <p>Diamyl Sulfate CAS RN: 5867-98-1</p>	<p><b>I1062</b> 1g 5g</p>  <p>Isobutyl Methanesulfonate CAS RN: 16156-53-9</p>	<p><b>H1282</b> 5g 25g</p>  <p>Hexyl Methanesulfonate CAS RN: 16156-50-6</p>	<p><b>M1446</b> 5g 25g</p>  <p>2-Methoxyethyl Methanesulfonate CAS RN: 16427-44-4</p>
<p><b>C2231</b> 5g</p>  <p>2-Chloroethyl Methanesulfonate CAS RN: 3570-58-9</p>	<p><b>M1193</b> 5g 25g</p>  <p>2,2,2-Trifluoroethyl Methanesulfonate CAS RN: 25236-64-0</p>	<p><b>H1281</b> 5g 25g</p>  <p>1,1,1,3,3,3-Hexafluoroisopropyl <i>p</i>-Toluenesulfonate CAS RN: 67674-48-0</p>	<p><b>T0883</b> 25g 500g</p>  <p>Hexyl <i>p</i>-Toluenesulfonate CAS RN: 3839-35-8</p>	<p><b>T0884</b> 25g 500g</p>  <p>Heptyl <i>p</i>-Toluenesulfonate CAS RN: 24767-82-6</p>
<p><b>T0885</b> 25g 500g</p>  <p><i>n</i>-Octyl <i>p</i>-Toluenesulfonate CAS RN: 3386-35-4</p>				

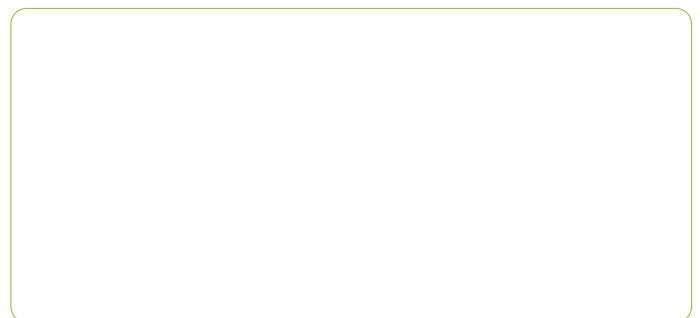


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