CHEMISTRY

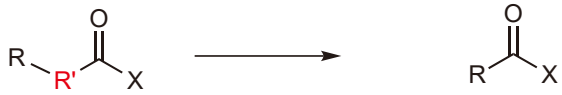
Carbon Homologation / Degradation Reagents

Carbon Homologation / Degradation Reaction means transformation reactions, in which organic compounds such as aldehydes, ketones, or carboxylic acids are converted to the corresponding higher or lower homologs by inserting or removing carbon-carbon chains (i.e. methylene group).

Homologation Reaction

R' = -CH_2-, -CH=CH-, etc
X = H, OH, OR", etc

Degradation Reaction



R' = -CH_2-, etc
X = H, etc

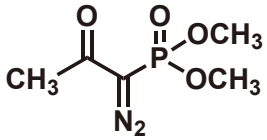
The reactions are important transformation methods in organic synthesis, thus, a number of procedures have been reported so far. From classical well-known reactions to recent reports, some examples are systematically described as below.

Aldehydes → One-carbon homologated acetylenes

CBr_4
Carbon Tetrabromide
25g / 100g / 500g
[T0038]

PPh_3
Triphenylphosphine
25g / 100g / 500g
[T0519]

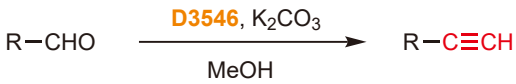
***Corey-Fuchs* Alkyne Synthesis**



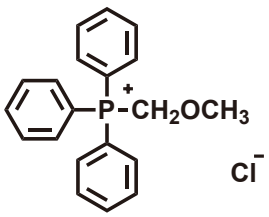
Ohira-Bestmann Reagent
1g / 5g
[D3546]

Ohira-Bestmann Reagent
(10% in Acetonitrile)
5g / 25g
[D5048]

***Ohira-Bestmann* Reagent**

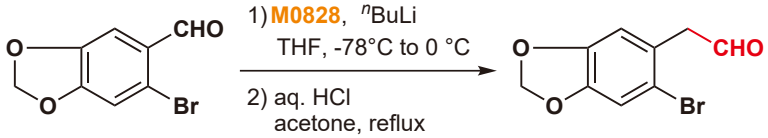


Aldehydes & Ketones → One-carbon homologated aldehydes



(Methoxymethyl)-triphenylphosphonium Chloride
25g / 100g / 500g
[M0828]

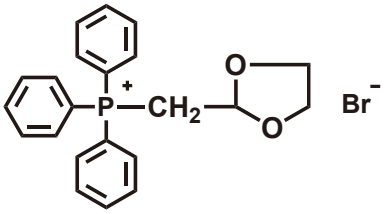
***Wittig* Reaction**



Reference
K. C. Nicolaou, A. F. Stepan, T. Lister, A. Li, A. Montero, G. S. Tria, C. I. Turner, Y. Tang, J. Wang, R. M. Denton, D. J. Edmonds, *J. Am. Chem. Soc.* **2008**, *130*, 13110.
DOI: https://doi.org/10.1021/ja8044376

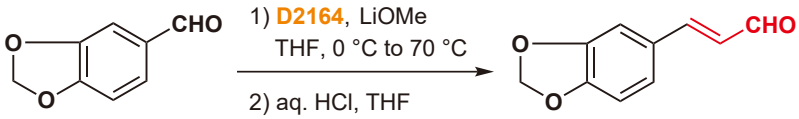
Carbon Homologation / Degradation Reaction

Aldehydes → Two-carbon homologated aldehydes



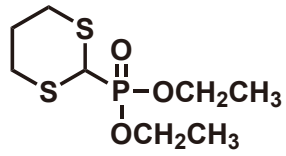
(1,3-Dioxolan-2-yl)-methyltriphenylphosphonium Bromide
5g / 25g
[D2164]

***Wittig* Reaction**

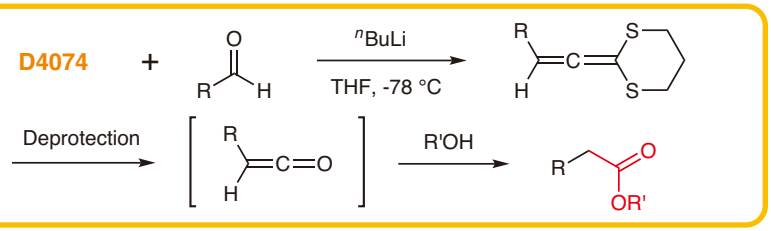


Reference T. M. Cresp, M. V. Sargent, P. Vogel, *J. C. S. Perkin Trans. 1*, **1974**, 37.
DOI: https://doi.org/10.1039/P19740000037

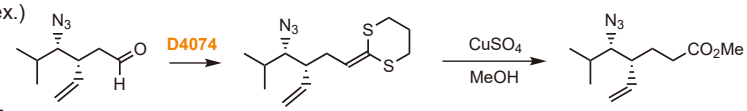
Aldehydes → One-carbon homologated carboxylic esters



Diethyl (1,3-Dithian-2-yl)phosphonate
5g
[D4074]

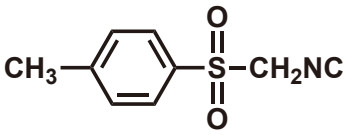


ex.)



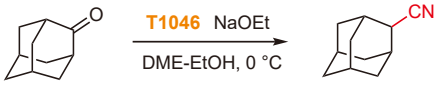
Reference
S. Hanessian, D. K. Maji, S. Govindan, R. Matera, M. T. Blomley, *J. Org. Chem.* **2010**, *75*, 2861.
DOI: https://doi.org/10.1021/jo100017t

Ketones → One-carbon homologated nitriles



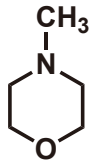
***p*-Toluenesulfonylmethyl Isocyanide (=TosMIC)**
5g / 25g
[T1046]

ex.)

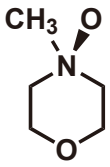


Reference O. H. Oldenziel, A. M. V. Leusen, *Tetrahedron Lett.* **1973**, 1357.
DOI: https://doi.org/10.1016/S0040-4039(01)95942-8

Aldehydes → One-carbon degraded aldehydes

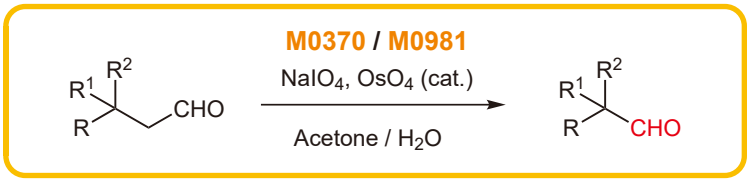


4-Methylmorpholine
25mL / 500mL
[M0370]



4-Methylmorpholine *N*-Oxide
5g / 25g
[M2192]

4-Methylmorpholine *N*-Oxide
(50% in Water, *ca.* 4.8mol/L)
25mL / 500mL
[M0981]



ex.)

Reference
D. Belotti, G. Andreatta, F. Pradaux, S. Bouz, J Cossy, *Tetrahedron Lett.* **2003**, *44*, 3613.
DOI: https://doi.org/10.1016/S0040-4039(03)00695-6

Ordering and Customer Service

TCI AMERICA
Tel : 800-423-8616 / 503-283-1681
Fax : 888-520-1075 / 503-283-1987
E-mail : Sales-US@TCIchemicals.com

TCI EUROPE N.V.
Tel : +32 (0)3 735 07 00
Fax : +32 (0)3 735 07 01
E-mail : Sales-EU@TCIchemicals.com

TCI Deutschland GmbH
Tel : +49 (0)6196 64053-00
Fax : +49 (0)6196 64053-01
E-mail : Sales-DE@TCIchemicals.com

Tokyo Chemical Industry UK Ltd.
Tel : +44 (0)1865 78 45 60
E-mail : Sales-UK@TCIchemicals.com

TCI Chemicals (India) Pvt. Ltd.
Tel : 1800 425 7889 / 044-2262 0909
Fax : 044-2262 8902
E-mail : Sales-IN@TCIchemicals.com

梯希爱(上海)化成工业发展有限公司
Tel : 800-988-0390 / 021-67121386
Fax : 021-6712-1385
E-mail : Sales-CN@TCIchemicals.com

TOKYO CHEMICAL INDUSTRY CO., LTD.
Tel : +81 (0)3-5640-8878
E-mail : globalbusiness@TCIchemicals.com