



UNIVERSITAT DE
BARCELONA

CRAI

Centre de Recursos per a
l'Aprenentatge i la Investigació

SCIENCE OF SYNTHESIS

Science of Synthesis és un recurs produït per Thieme que recull el text complet de la metodologia sintètica desenvolupada, des de principis del 1800 fins a l'actualitat, en els camps de la Química Orgànica i Organometàl·lica.

Pantalla inicial de cerca

Thieme Science of Synthesis

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Find Reliable Chemical Transformations > Show search tips

Search Citation Search

Enter search term(s)

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Author Book Series
Catalytic Reduction in Organic Synthesis

Year Volume Page Section

DOI

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Accés com a
usuari registrat

Informació sobre
com cercar

Cerca al text
complet

Cerca de cites
dins de les
sèries de llibres

Accés com a usuari registrat (MySOS)

The screenshot displays the Thieme Science of Synthesis website interface. At the top, a blue header bar contains the Thieme logo and the text "Science of Synthesis". Below this, a navigation bar includes links for "Query", "Results", "Full Text", "Explore Contents", and "Training & Support". In the top right corner, there is a "MySOS" link with a lock icon and an information icon.

On the left side, a "FUNCTIONS" menu lists the following options:

- > Log on
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- > Forgot password

The main content area features a "Log on" section with input fields for "Username" and "Password", and a "Log on" button. To the right of the login section, another "FUNCTIONS" menu lists:

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Below the login section, a search area titled "Find Reliable Chemical Transformations" includes a "Search" button, a "Citation Search" button, and a search input field labeled "Enter search term(s)". At the bottom of the search area, there is a "Clear All" button and a "Submit" button.

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- Top right: "Per accedir com a usuari registrat (MySOS)" pointing to the MySOS link.
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Tipus de cerques:



- Text complet
- Cites
- Avançada
- Estructural: compostos i reaccions
- Combinada: text complet i estructura

Cerca de text

Thieme Science of Synthesis

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FIND Reliable Chemical Transformations

Search Citation Search

ferrocene

Ferrocene
ferrocenebisphosphine
Ferroceneboronic
ferrocenecarbaldehyde
ferrocenecarbaldehydes
Ferrocenecarbonyl
ferrocenecarboxamide
ferrocenecarboxylate
ferrocenecarboxylic
ferrocenediyl
ferrocenes
ferrocenes
ferrocenetelluride
ferrocenethiolate

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Al posar el terme de cerca, s'obre el diccionari i ens dona diferents variacions possibles del terme

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Results (Articles found containing your search term, structure or reaction)

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[3+2] Cycloaddition at the Key Step
#1 of 511

2.1.6.5 Reactions Involving **Ferrocene**-Appended Dipolarophiles
Raghunathan, R.; Purushothaman, S., *Science of Synthesis: Multicomponent Reactions*, (2013) 2, 232.
Reactions Involving **Ferrocene**-Appended Dipolarophiles
The sandwich compound **ferrocene** was discovered in the early 1950s. ...the field of organometallic chemistry. **Ferrocene**-derived organic...
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Synthesis by Resolution and Inversion Methods
#2 of 511

36.1.8.4.8 Variation 8: Using a **Ferrocene**-Based Chiral 4-(Dimethylamino)pyridine
Eames, J., *Science of Synthesis*, (2008) 36, 358.
Variation 8: Using a **Ferrocene**-Based Chiral 4-(Dimethylamino)pyridine
The design of a **ferrocene**-based chiral 4-(dimethylamino)pyridine equivalent
...Phenylethanol Using a **Ferrocene**-Based 4-(...
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Iron-Dienyl Complexes
#3 of 511

1.7.2.2.1 Variation 1: Friedel-Crafts Acylation of **Ferrocene** Complexes
Stephenson, G. R., *Science of Synthesis Knowledge Updates*, (2014) 1, 17.
Variation 1: Friedel-Crafts Acylation of **Ferrocene** Complexes
of **ferrocene** () both work well, but despite the substantial aromatic character of **ferrocene**, access to **ferrocene** derivatives by...**ferrocene**
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Iron-Dienyl Complexes
#4 of 511

1.7.2.13.1 Variation 1: From **Ferrocene** Complexes by Asymmetric Induction
Stephenson, G. R., *Science of Synthesis Knowledge Updates*, (2014) 1, 39.
Variation 1: From **Ferrocene** Complexes by Asymmetric Induction
Palladium is also influenced by chiral substituents on **ferrocene**,
...Asymmetry in the Introduction of Planar Chirality in a **Ferrocene**...

La cerca es fa al títol i també, al text complet

Cerca de cites

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Author:

Book Series:

Year: Volume: Page:

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- Science of Synthesis
- Science of Synthesis Knowledge Updates
- Applications of Domino Transformations in Organic Synthesis
- Asymmetric Organocatalysis
- Biocatalysis in Organic Synthesis
- C-1 Building Blocks in Organic Synthesis
- Catalytic Oxidation in Organic Synthesis
- Catalytic Reduction in Organic Synthesis
- Catalytic Transformations via C-H Activation
- Cross Coupling and Heck-Type Reactions
- Metal-Catalyzed Cyclization Reactions
- Multicomponent Reactions
- N-Heterocyclic Carbenes in Catalytic Organic Synthesis
- Stereoselective Synthesis
- Water in Organic Synthesis

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Results (Articles found containing your search term, structure or reaction)

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☒ Select Page

☒ Addition to C=N Bonds #1 of 15

2.1.5 Addition to C=N Bonds

Ilari, A.; Bonamore, A.; Boffi, A., *Science of Synthesis: Biocatalysis in Organic Synthesis*, (2015) 2, 159.

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☒ Addition to C=N Bonds #2 of 15

2.1.5.1 Pictet-Spenglerases

Ilari, A.; Bonamore, A.; Boffi, A., *Science of Synthesis: Biocatalysis in Organic Synthesis*, (2015) 2, 159.

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☒ Addition to C=N Bonds #3 of 15

2.1.5.2 Noroclaurine Synthase Catalyzed Pictet-Spengler Reactions

Ilari, A.; Bonamore, A.; Boffi, A., *Science of Synthesis: Biocatalysis in Organic Synthesis*, (2015) 2, 163.

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☒ Addition to C=N Bonds #4 of 15

2.1.5.3 Strictosidine Synthase Catalyzed Pictet-Spengler Reactions

Ilari, A.; Bonamore, A.; Boffi, A., *Science of Synthesis: Biocatalysis in Organic Synthesis*, (2015) 2, 168.

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☒ Addition to C=N Bonds #5 of 15

2.1.5.1.2 Structural Basis of Noroclaurine and Strictosidine Synthases

Ilari, A.; Bonamore, A.; Boffi, A., *Science of Synthesis: Biocatalysis in Organic Synthesis*, (2015) 2, 162.

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☒ Addition to C=N Bonds #6 of 15

2.1.5.3.1 Synthesis of Strictosidine Analogues with Substituents on the Indole Unit

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partir de les
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 - OR: cerca els termes al mateix document. No cal que hi siguin tots.
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 - **author:** autors que han contribuït al SOS.
 - **year:** any de publicació del volum del SOS.
 - **title:** títol de la secció.
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 - **ref-year:** any de publicació de les referències citades.
 - **journal:** títol de la revista de les referències citades.
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Alkenes #1 of 29

47.1.3.1.2.4 Method 4: Reactions Using Chiral Organocatalysts

Fringuelli, F.; Piermatti, O.; Pizzo, F.; Vaccaro, L., *Science of Synthesis*, (2010) 47, 679.

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Alkenes #2 of 29

47.1.3.1.3.1.3 Variation 3: With Organocatalysts

Fringuelli, F.; Piermatti, O.; Pizzo, F.; Vaccaro, L., *Science of Synthesis*, (2010) 47, 700.

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Nitro, Nitroso, Azo, Azoxy, and Diazonium Compounds; Azides, Triazenes, and Tetrazenes #3 of 29

Banerji, K., *Science of Synthesis*, (2010) 41, 1.

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Nitroalkanes #4 of 29

47.1.3.1.2.4 Method 4: Reactions Using Chiral Organocatalysts

DOI: 10.1055/see-00-047-00232

Fringuelli, F.; Piermatti, O.; Pizzo, F.; Vaccaro, L., *Science of Synthesis*, (2010) 47, 679.

In addition to organometallic asymmetric catalysts, asymmetrically induced organocatalytic reactions have attracted intense interest. [131,132-133] The advantages of an organocatalyzed over a metal-promoted process are (i) no metals contaminate the reaction products, (ii) the catalysts are simple and stable molecules that can be easily modified, (iii) an aerobic atmosphere, moist solvents, and even aqueous media can be used, and (iv) the catalyst is easily immobilized on a solid support. The most generally employed strategy to perform an organo-catalyzed Diels-Alder cycloaddition is to generate an active iminium ion from an α,β -unsaturated aldehyde and an amine (the organocatalyst) that lowers the LUMO of the dienophile (analogous to the effect caused by a Lewis acid catalyst), making the cycloaddition reaction go faster. [140] Final hydrolysis of the intermediate adduct releases the product and regenerates the amine. The efficiency of the process depends upon the rate of the iminium ion generation. [141,142] Among the proposed chiral organocatalysts, the (2R)-binaphthyl-based diamine 20a exhibits unprecedentedly high eno selectivity (57-95%) in the asymmetric Diels-Alder reaction of an α,β -unsaturated aldehyde with cyclopentadiene in dichloromethane or (trifluoromethyl)benzene as the solvent (Scheme 116). [141,142] Analogous eno selectivity is observed when promoting the same type of cycloaddition with a cyclic hydroxide in a compact cage-like framework combined with trifluoromethanesulfonic acid and working in aqueous medium. [143] The pyridine derivative 20b, combined with trifluoroacetic acid, is an effective catalyst in the enantioselective synthesis of cyclohexenyl-substituted aldehydes (Scheme 116). [144]

Scheme 116 Synthesis of Cyclohexenes by Diels-Alder Reactions Promoted by Chiral Organocatalysts [141,144]

R-CHO + C1=CC=CC=C1 >> R-CHO

12 mol% 20a, TBA, CH₂Cl₂, -20 to 0 °C, 18 h

R¹ = Me: 72% yield, 88% ee

R¹ = Ph: 80% yield, 77-82% ee

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☒ Metal-Carbene Complexes

2.6.1 Product Subclass 1: Metal-Carbene Complexes

...Schrock-type carbene complexes, those of group 6 metals present marked nucleophilic undergo **Wittig chemistry** with α -phosphorus ylides. Enones and enals with various degrees of complexity can themselves

☒ The Wittig Reaction

46.1.1.1 Method 1: Synthesis from Phosphorus Ylides and Enones or Aldehydes

Abel, A. D.; Edmonds, M. K. *Science of Synthesis*, (2009) 46, 24.

Resultats de cerca

2.6.1 Product Subclass 1: Metal-Carbene Complexes

DOI: 10.1055/sos-50-002-00315

Pol, R.; Smith, K. M., *Science of Synthesis*, (2003) 2, 283.

While group 6 complexes containing carbonyl ligands (Fischer-type) are most common for chromium, those without carbonyl ligands (Schrock-type, also called alkylidene complexes) are more typical of molybdenum and tungsten. Although a few chromium examples are known,^[1] our attention will be almost completely devoted to molybdenum and tungsten systems. These complexes are generally found in high oxidation states (2-6) and supported by electronegative, π -donor ligands (alkoxy, amido, imido). These ligands have the possibility of stabilizing low-coordination environments by π -donation in excess of the valence requirement (e.g., $\sigma = 2$ for $\text{Mo}=\text{CH}$ or $\text{W}=\text{CH}$ for oxo and imido derivatives), resulting in tetrahedral species. Often, however, these complexes allow expansion of the coordination sphere by formation of dimers (e.g., halide bridged) or by addition of two-electron donor with formation of five-coordinate and occasionally six-coordinate species, the formation of which is more likely for tungsten than for molybdenum and when the metal bears electron-withdrawing ligands.^[2]

Group 6 metal-carbene complexes are most stable when devoid of β -hydrogen atoms on the carbene ligand, the latter leading to decomposition by 1,2-H migration and formation of alkene derivatives.^[3] The carbene ligand usually bears hydrogen or alkyl substituents, and is normally considered as a nucleophilic ($\text{C}=\text{R}^2$)²⁻ ligand for the purpose of formal oxidation state assignment. Like all other Schrock-type carbene complexes, those of group 6 metals present marked nucleophilic reactivity and undergo **Wittig chemistry** with α -enones, the thermodynamics favoring the $\text{M}=\text{O}$ and $\text{R}_2\text{C}=\text{C}=\text{O}$ combination when R^2 is harder than Y .^[4] This reaction, however, does not represent particular advantages over classical Wittig reagents for organic synthesis, a major use being the metal removal at the end of organic transformations carried out on carbene complexes (e.g., alkene metathesis, see Section 2.6.1.5).

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[1] Harding, M. M.; Mokide, G.; Mackay, J. P.; Probst, R.; Lucas, S. W., *Inorg. Chem.*, (1998) 37, 2423.

[2] Supple, K. D.; Watanabe, K. E., *J. Am. Chem. Soc.*, (1996) 118, 1581.

[3] Freudenberger, J. H.; Schrock, R. R., *Organometallics*, (1995) 14, 1037.

[4] Schrock, R. R.; Hurdock, J. S.; Bazan, G. C.; Robbins, J.; Dittmar, M.; O'Regan, M., *J. Am. Chem. Soc.*, (1990) 112, 3875.

Related Information

1. Houben-Weyl, (1965) E 10-1, 2.

Houben-Weyl escanejat

Text complet. Conté cites del Houben-Weyl i dona accés al corresponent document escanejat.

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37 Ethers #1 of 12

Forsyth, C. J., *Science of Synthesis*, (2008) 37, 1.

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Synthesis from Alkenes with Organic Oxidants #2 of 12

Webhook procedures for the synthesis of epoxides include the titanium-mediated Sharpless reaction for allylic alcohols (Scheme 2), ¹⁴⁻¹⁵

Scheme 2 Sharpless Asymmetric Epoxidation ¹⁴⁻¹⁵

Another widely used procedure is the manganese-mediated, Seebach epoxidation, as exemplified in the synthesis of a precursor to the HIV protease inhibitor indinavir (Scheme 3), ¹⁴⁻¹⁵

Scheme 3 Seebach Asymmetric Epoxidation ¹⁴⁻¹⁵

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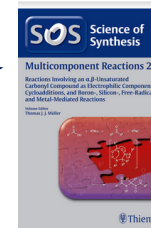
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2.1.6.5 Reactions Involving Ferrocene-Appended Dipolarophiles

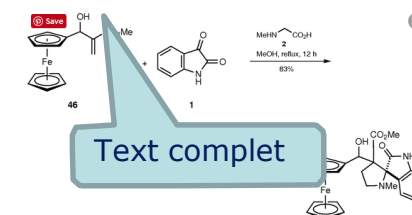
DOI: 10.1055/sos-SD-211-00033

Raghunathan, R.; Purushothaman, S., *Science of Synthesis: Multicomponent Reactions*, (2014) 2, 232.

The sandwich compound **ferrocene** was discovered in the early 1950s. [28] Since then, there has been rapid growth in the field of organometallic chemistry. **Ferrocene**-derived organic compounds have great potential due to their biological significance, [29] and compounds bearing the **ferrocene** motif remain at the forefront of interest, offering advantages over other organometallics due to their synthetic versatility and overall thermal and photochemical stability.

A novel, one-pot, three-component reaction for the synthesis of a series of **ferrocene**-containing spiro-fused pyrrolidines **47-49** and **51** has been accomplished via a facile [3+2] cycloaddition of azomethine ylides derived from various mono- and diketones and sarcosine (**2**) with Baylis-Hillman adduct **46**, obtained from ferrocenecarbaldehyde and methyl acrylate (**Scheme 27**). [30]

Scheme 27 Synthesis of **Ferrocene**-Substituted Spiro-Fused Pyrrolidines [30]



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☒ Palladium-Alkene Complexes

1.2.4.7.2 Oxy-Cope Rearrangement

Takacs, J. M.; Vayalakkada, S., *Science of Synthesis*, (2001) 1, 371.

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Organometallics

1.2.4.7.2 Oxy-Cope Rearrangement

DOI: 10.1055/sos-SD-001-00238

Takacs, J. M.; Vayalakkada, S., *Science of Synthesis*, (2001) 1, 371.

The oxy-cope rearrangement is a synthetically useful variant on the Cope rearrangement. While the full experimental details are not reported, it was found that in certain cases the palladium(II)-catalyzed rearrangement of **245** is quite facile (Scheme 71).^[246] For example, **245** (R¹ = R³ = Me; R² = R⁴ = H) undergoes palladium-catalyzed rearrangement to unsaturated ketone **247** under mild conditions ([PdCl₂(NCPh)₂ (0.1 equiv), THF, 25 °C, 3 h) and in quantitative yield. The reaction presumably proceeds via a palladacyclohexyl cation (as illustrated in Scheme 67) to afford an intermediate enol **246**, which tautomerizes to the observed ketone. Bis(benzonitrile)dichloropalladium is a superior catalyst to other common palladium(II) complexes, e.g. [PdCl₂(cod)], [PdCl₂(PPh₃)₂], or Pd(OAc)₂. The reaction proceeds with good control over the geometry of the newly formed double bond (the observed E/Z is greater than 9:1) and can be used to construct macrocyclic rings [R¹, R² = (CH₂)₄ or (CH₂)₁₀]. One rather unusual limitation on the reaction is that in substrate **245** the substituents R¹ and R² must be alkyl, neither can be hydrogen. The reasons for this requirement are not clear.

Scheme 71 Palladium(II)-Oxy-Cope Rearrangements^[246]

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- Organometallic Complexes of Ruthenium
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- Zn, Cd, Hg, and Cu Compounds (Groups 12 and 11) (Vol. 3)
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R ¹	R ²	R ³	R ⁴	Time (h)	Ratio (E/Z)	Yield (%) of 247	Ref
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Me	CH ₂ CH=CHMe	Me	H	3	100	76	[246]
(CH ₂) ₄	Me	H	H	24	9	55	[246]
(CH ₂) ₁₀	Me	H	H	6	100	65	[246]

* The reaction failed for R¹ = R² = Me; R³ = H; R⁴ = Me or H and R¹ = R² = R⁴ = H; R³ = Me.

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Herausgeber: Thomas J. Müller

2.1.6.5 Reactions Involving Ferrocene-Appended Dipolarophiles

DOI: 10.1055/sos-SD-211-00033

Raghunathan, R.; Purushothaman, S., *Science of Synthesis: Multicomponent Reactions*, (2014) **2**, 232.

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Scheme 27 Synthesis of **Ferrocene**-Substituted Spiro-Fused Pyrrolidines^[30]

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