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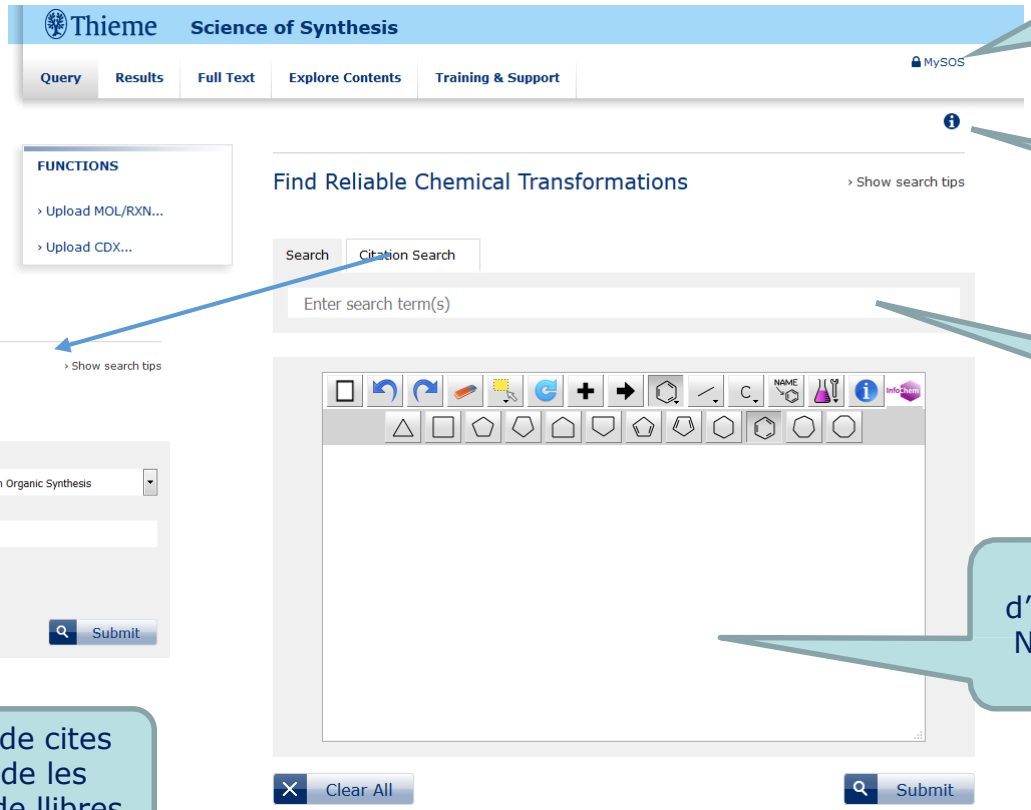

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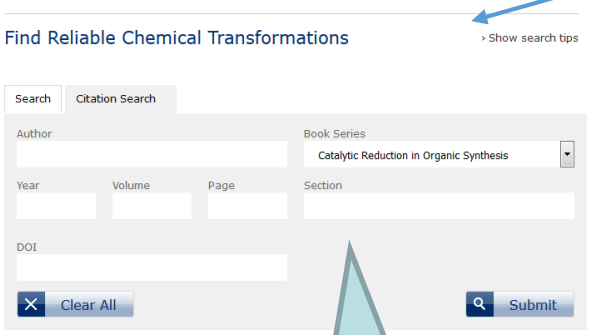

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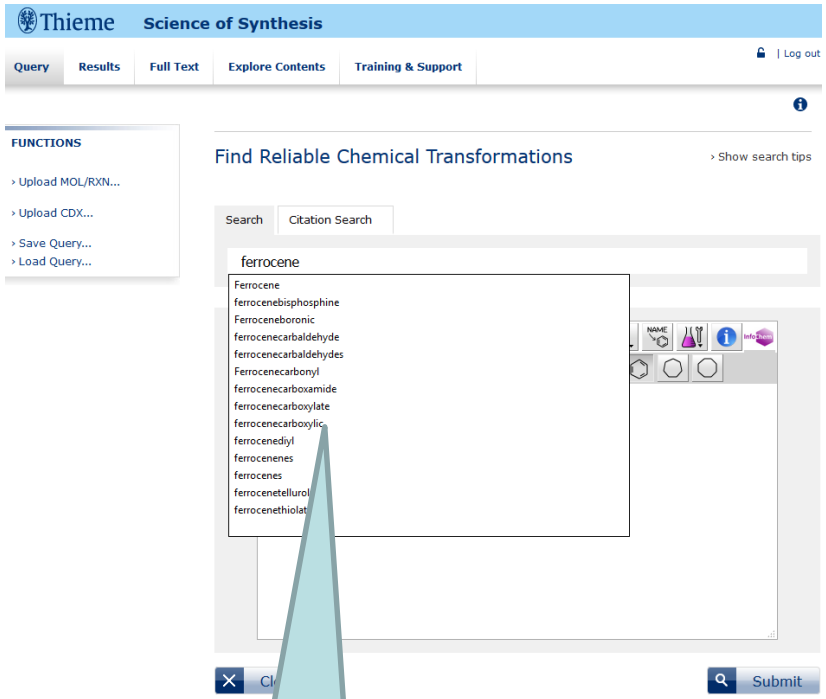

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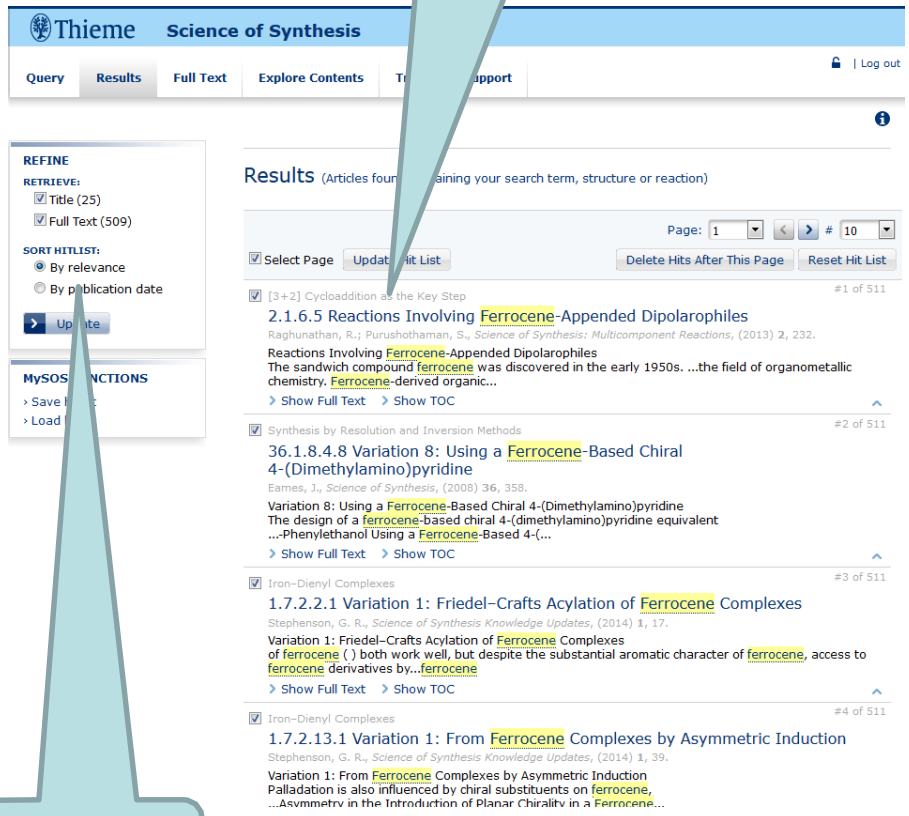

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Catalytic Transformations via C—H Activation
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Year: 2015 | Volume | Page | Section

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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 Norcoclaurine 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 Norcoclaurine 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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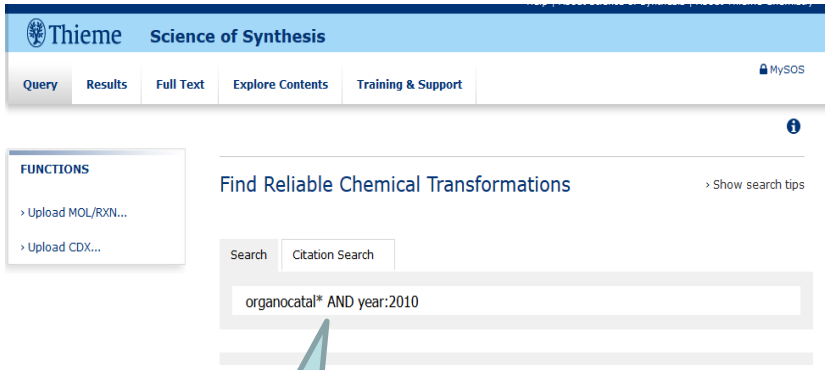

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Metal–Carbene Complexes
2.6.1 Product Subclass 1: Metal–Carbene Complexes
Poli, R.; Smith, K. M., *Science of Synthesis*, (2003) **2**, 283.
...Schrock-type carbene complexes, those of group 6 metals present marked nucleophilic undergo Wittig chemistry with X
› Show Full Text › Show TOC

The Wittig Reaction
46.1.1.1 Method 1: Synthesis from Phosphorus Ylides and Enones or
Abell, A. D.; Edmonds, M. K., *Science of Synthesis*, (2009) **46**, 24.
...phosphorus ylides. Enones and enals with various degrees of complexity can themseh

NAVIGATION
Hit 1 of 6
Previous / Next

Science of Synthesis

2.6.1 Product Subclass 1: Metal–Carbene Complexes

DOI: 10.1055/sos-SD-002-00315

Poli, 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,[5] our attention will be almost completely devoted to molybdenum and tungsten systems. These complexes are generally found in high oxidation states (≥4) and supported by electronegative, π-donor ligands (alkoxo, amido, imido). These ligands have the possibility of stabilizing low-coordination environments by π-donation in excess of the valence requirement (e.g., σ + 2π MeC or MeNR 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.[6]

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.[7] The carbene ligand usually bears hydrogen or alkyl substituents, and is normally considered as a dianionic ($=CR^1R^2$)$^{2-}$ 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 X=Y molecules, the thermodynamics favoring the M=X and R_2C=Y combination when X is harder than Y.[8] 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**).

References

[5] Harding, M. M.; Mokdsi, G.; Mackay, J. P.; Prodigalidis, M.; Lucas, S. W., *Inorg. Chem.*, (1998) **37**, 2432.
[6] Sugden, K. D.; Wetterhahn, K. E., *J. Am. Chem. Soc.*, (1996) **118**, 10811.
[7] Freudenberger, J. H.; Schrock, R. R., *Organometallics*, (1985) **4**, 1937.
[8] Schrock, R. R.; Murdzek, J. S.; Bazan, G. C.; Robbins, J.; DiMare, M.; O'Regan, M., *J. Am. Chem. Soc.*, (1990) **112**, 3875.

Related Information

1. *Houben-Weyl*, (1986) **E 18-1**, 2.

Houben-Weyl escanejat

Resultats de cerca

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

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Page: 1 # 10

Enolates #1 of 9
32.5.2.2.6 Method 6: Protonation and Deuteration of Enolates
Trauner, D., *Science of Synthesis*, (2008) **32**, 573.
› Show Reaction › Show Full Text › Show TOC › Show Single Step Reactions

Aryl Ketones with the Carbonyl in a Ring #2 of 9
26.8.3.1.9.3 Variation 3: By [4+2] Aromatic Ring Formation
Campagne, J. M.; Six, Y., *Science of Synthesis*, (2005) **26**, 1031.
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Seven-Membered and Larger-Ring Cyclic Ketones #3 of 9
26.12.1.3.5 Variation 5: Electrocyclic Ring Expansions
Scott, P. J. H., *Science of Synthesis Knowledge Updates*, (2013) **4**, 290.
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Palladium–Alkene Complexes #4 of 9
1.2.4.7.2 Oxy-Cope Rearrangement
Takacs, J. M.; Vayalakkada, S., *Science of Synthesis*, (2001) **1**, 371.
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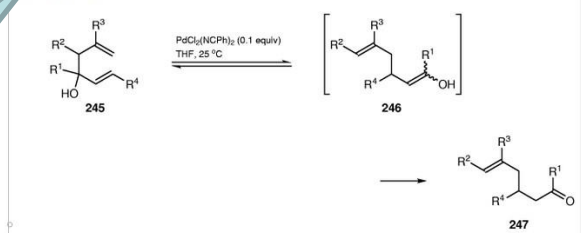

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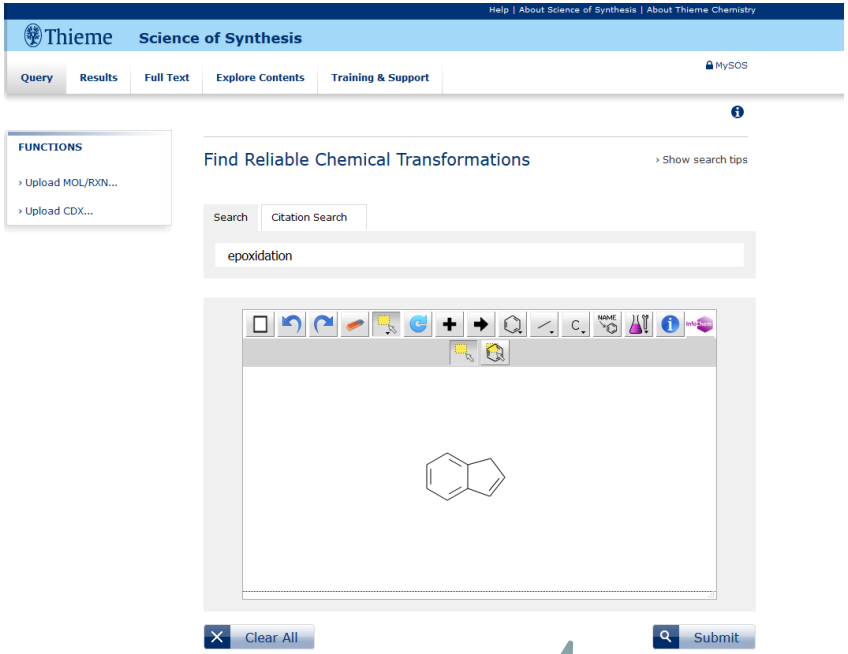

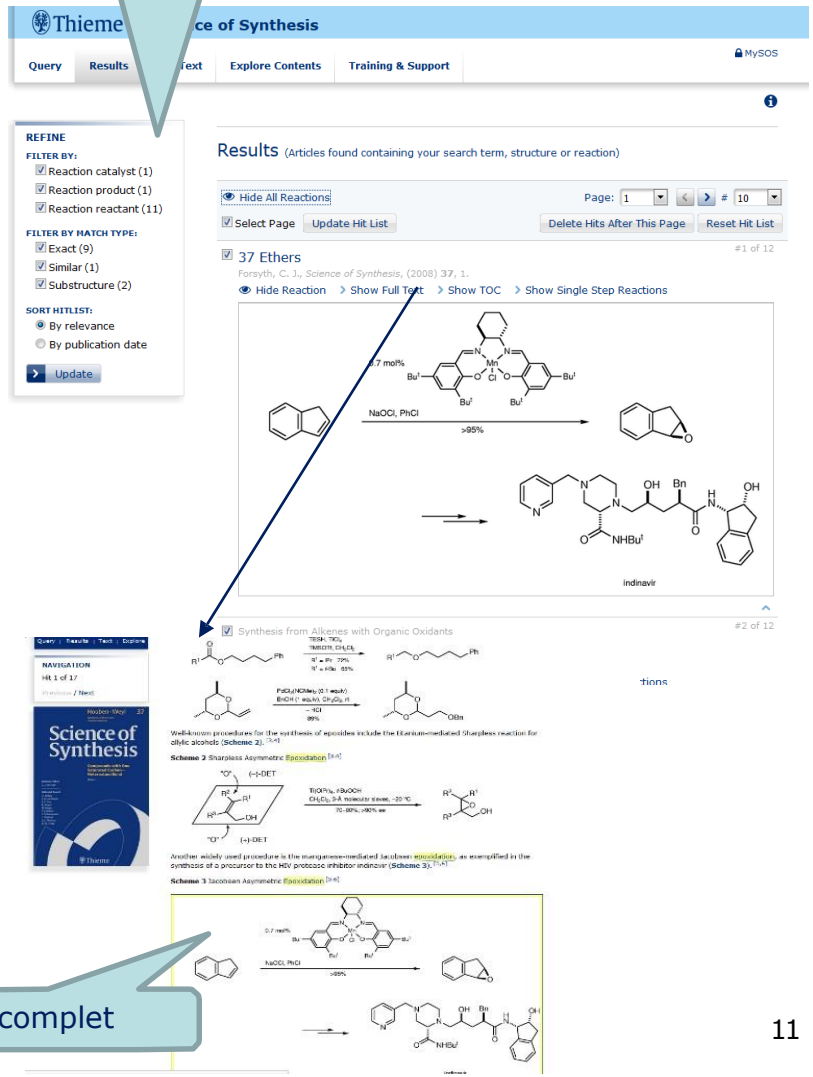

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Page: 1 # 10

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[3+2] Cycloaddition as the Key Step #1 of 511
2.1.6.5 Reactions Involving Ferrocene-Appended Dipolarophiles
Raghunathan, R.; Purushothaman, S., *Science of Synthesis: Multicomponent Reactions*, (2015) **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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#4 of 511
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

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Hit 1 of 511
Previous / Next

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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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Organometallics
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Compounds with Four and Three Carbon–Heteroatom Bonds
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Special Topics
Asymmetric Organocatalysis
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C-1 Building Blocks in Organic Synthesis
Catalytic Oxidation in Organic Synthesis
Catalytic Reduction in Organic Synthesis
C–H Activation
Cross Coupling and Heck-Type Reactions
Domino Transformations in Organic Synthesis
Metal-Catalyzed Cyclization Reactions
Multicomponent Reactions
General Discussion and Reactions Involving a Carbonyl Compound as Electrophilic Component
Reactions Involving an α,β-Unsaturated Carbonyl Compound as Electrophilic Component, Cycloadditions, and Boron-, Silicon-, Free-Radical-
Reactions Involving an α,β-Unsaturated Carbonyl Compound or Analogue as Electrophilic Component
Michael Addition as the Key Step
In Situ Generation of the α,β-Unsaturated Carbonyl Component by Wittig-Type Reaction
With Isocyanide Participation
Electron-Deficient Alkynes as Electrophiles
[2+2] Cycloaddition as the Key Step
[3+2] Cycloaddition as the Key Step
Reactions Involving Cyclic α,β-Unsaturated Carbonyl Compounds as Dipolarophiles
Reactions Involving More than Three Components
Reactions Involving β-Lactam-Derived Dipolarophiles
Reactions Involving Baylis–Hillman Adducts as Dipolarophiles
Reactions Involving Ferrocene-Appended Dipolarophiles
Transition-Metal-Catalyzed Carbonyl Ylide [3+2] Cycloadditions
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[4+2] Cycloaddition as the Key Step

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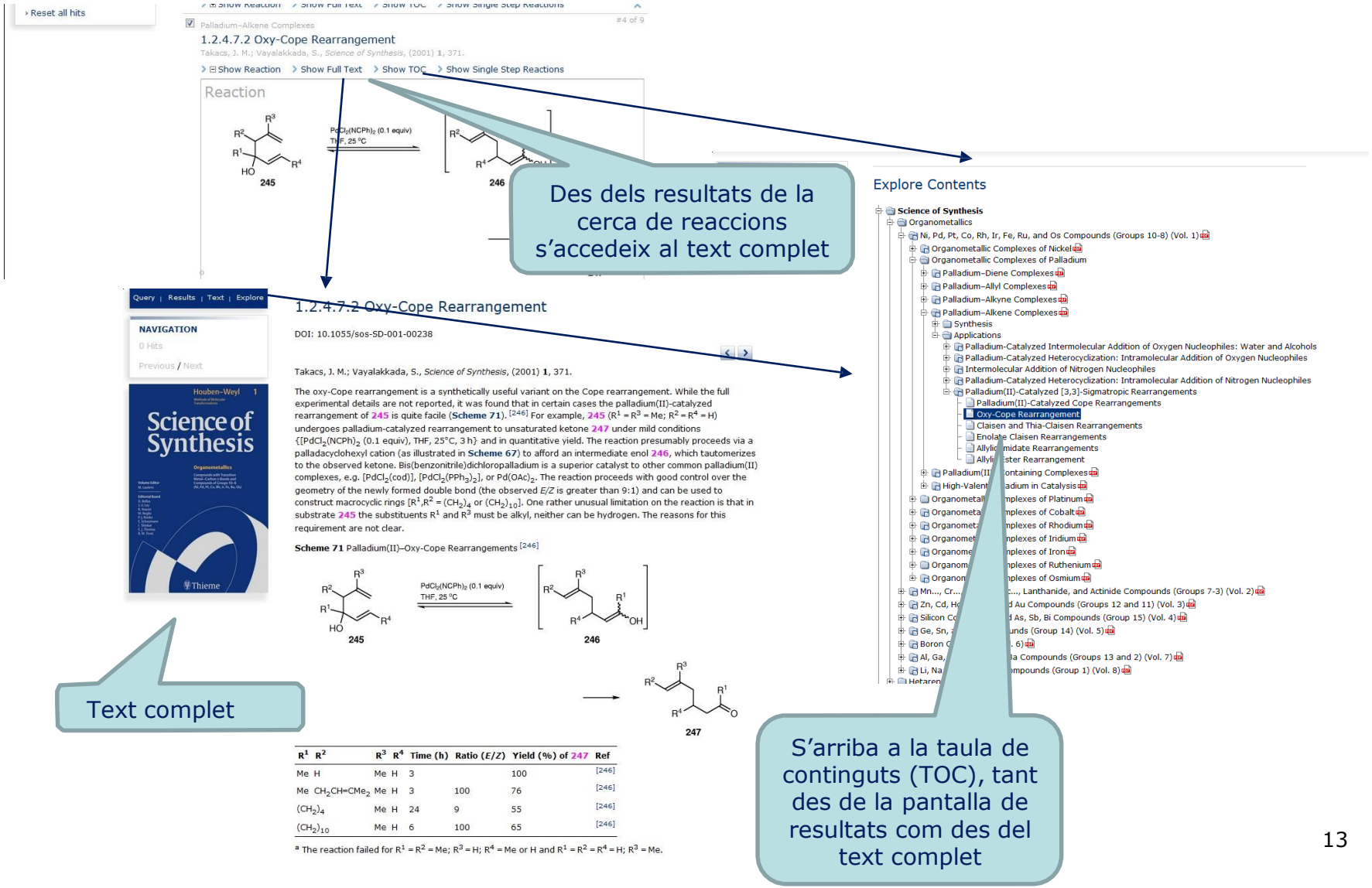

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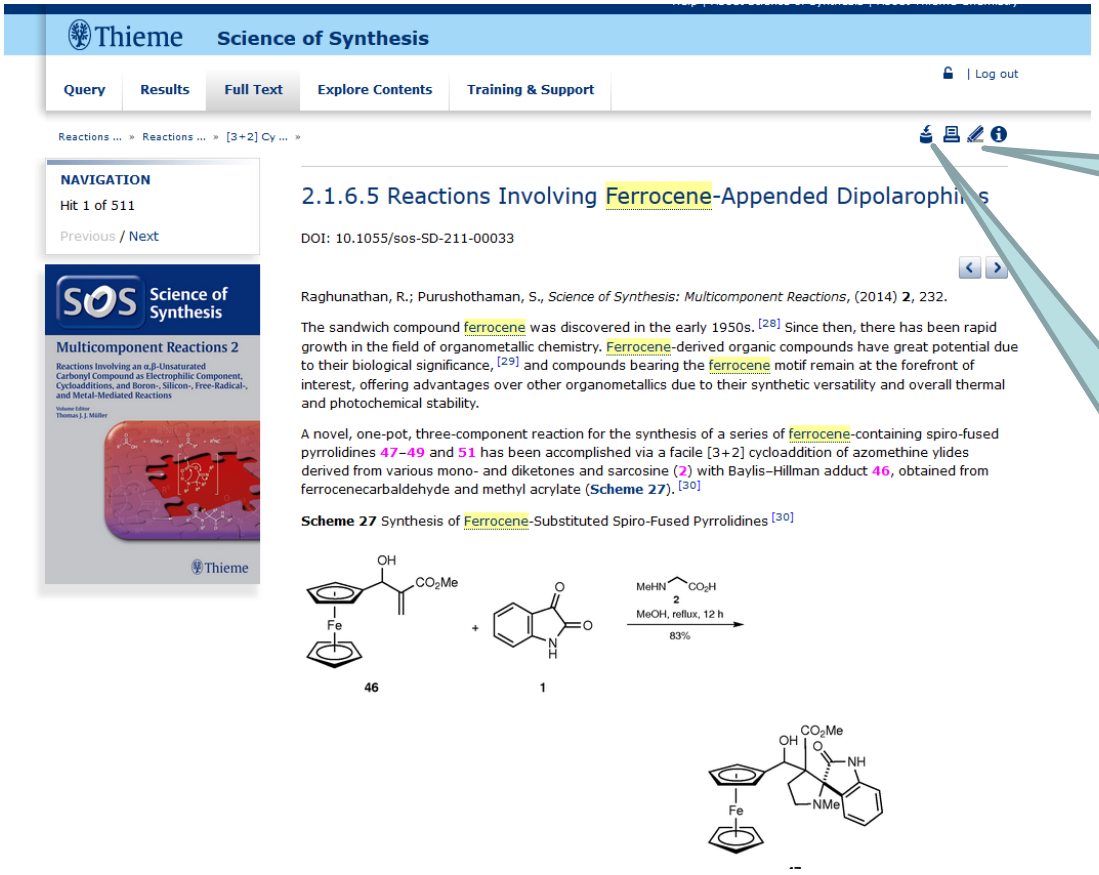

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