

Abstracts

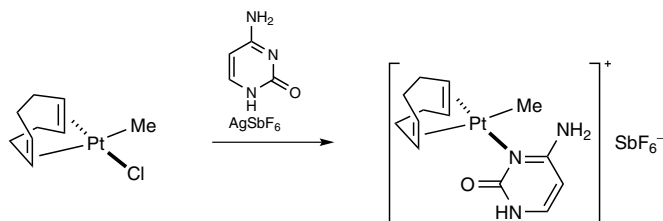
2015

p 1

1.3.6 Organometallic Complexes of Platinum

A. Nomoto and A. Ogawa

This chapter is an update to the earlier *Science of Synthesis* contribution (Section 1.3) describing methods for the synthesis of organometallic complexes of platinum and related applications in catalytic reactions using organoplatinum complexes. Recently, organometallic complexes of platinum have been used in many areas, including as medical or luminescent materials.



Keywords: Diels–Alder cycloaddition · allene complexes · dinuclear complexes · anti-cancer agents · allyl complexes · metallacycles · alkyne complexes · catalytic reactions · selenaplatinacycles · dicationic complexes

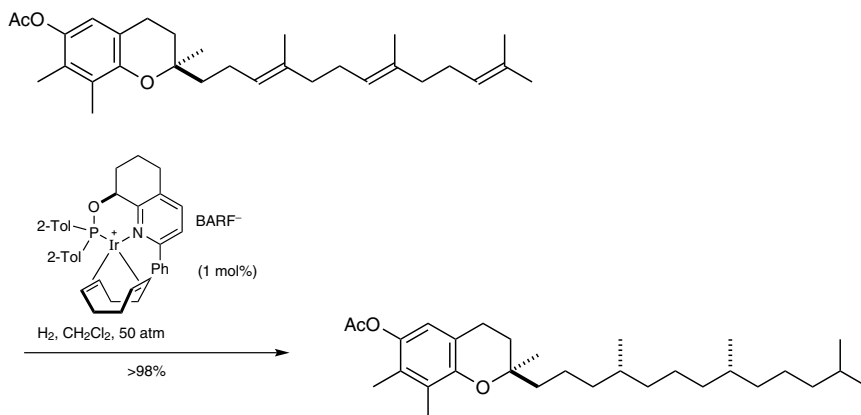
2015

p 21

1.6.9 Organometallic Complexes of Iridium

H. Li and C. Mazet

This chapter is an update to the earlier *Science of Synthesis* contribution (Section 1.6) that covers literature from 1999 to the first half of 2013. While Section 1.6 provided a fantastic overview of the different types of organometallic complexes of iridium and their preparation, this contribution aims at focusing more on their applications in homogeneous catalysis.

BARF⁻ = [3,5-(F₃C)₂C₆H₃]₄B⁻

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New Contributions

Keywords: iridium complexes · catalysis · borylation · oxidation · hydroamination · dehydrogenative coupling · hydrogenation · transfer hydrogenative coupling · transfer hydrogenation · allylic substitution · isomerization · oligomerization

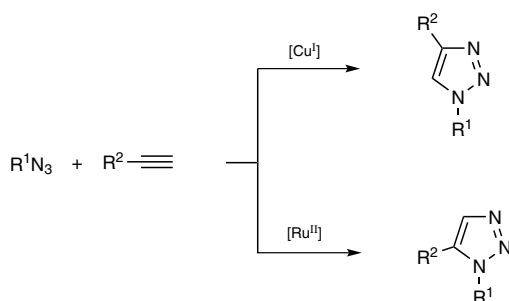
2015

p 59

13.13.6 **1,2,3-Triazoles**

A. C. Tomé

This chapter is an update to the earlier *Science of Synthesis* contribution (Section 13.13) describing methods for the synthesis of 1,2,3-triazoles. Recent interest in this area has mainly been generated by the discovery that copper(I)-catalyzed azide-alkyne cycloaddition (CuAAC) and ruthenium(II)-catalyzed azide-alkyne cycloaddition (RuAAC) regioselectively afford 1,4- or 1,5-disubstituted 1,2,3-triazoles in high yields under mild conditions. This review focuses on the contributions published between 2002 and 2013.



Keywords: 1,2,3-triazoles · azides · alkynes · click chemistry · Huisgen reaction · 1,3-dipolar cycloadditions · copper catalysts · ruthenium catalysts

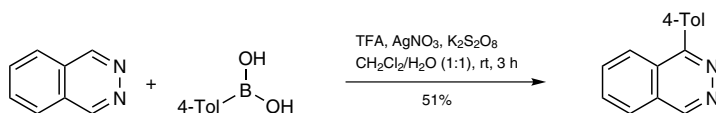
2015

p 137

16.10.5 **Phthalazines**

T. J. Hagen and T. R. Helgren

This chapter is an update to the earlier *Science of Synthesis* contribution (Section 16.10) concerning the synthesis and reactions of phthalazines. Literature from 2004 to early 2014 has been considered. The major focus since the initial publication involves phthalazine substituent modification rather than the synthesis of phthalazine rings.



Keywords: phthalazines · 2,3-dihydrophthalazine-1,4-diones · multicomponent reactions · cyclization · heteroarylation · cross coupling · hypervalent iodine

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Completely Revised Contributions ·

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New Contributions

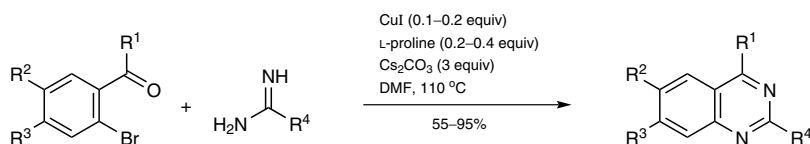
2015

p 173

16.13.5 **Quinazolines**

F.-A. Kang and S.-M. Yang

This chapter is an update to the earlier *Science of Synthesis* contribution (Section 16.13) describing methods for the synthesis of quinazolines. It summarizes new technologies and surveys the literature published in the period 2002–2012.



Keywords: quinazolines · quinazolinones · quinazolinodiones · nitriles · isocyanides · annulation · rearrangement · multicomponent condensation · cyclization · ionic liquids · copper(I) iodide · solid-phase synthesis · C–H insertion · carbon dioxide fixation · solvent free

2015

p 243

24.4.2.3 **1-(Organooxy)alk-1-yne and 1-(Heterooxy)alk-1-yne**

M. H. Larsen, M. Cacciarini, and M. Brøndsted Nielsen

This manuscript is an update to the earlier *Science of Synthesis* contribution (Section 24.4.2) describing methods for the synthesis of 1-(organooxy)alk-1-yne and 1-(heterooxy)alk-1-yne. The original contribution describes the synthesis of six subgroups: alk-1-ynyl *N,N*-dialkylcarbamates, carboxylates, ethers, sulfonates, and dialkyl phosphonates as well as 1-siloxyalk-1-yne. However, during the period covered in this update (2005–2014), new contributions have only been made in the field of alk-1-ynyl ethers and 1-siloxyalk-1-yne. These methodologies, primarily methods centering on elimination reactions, are covered in this chapter, along with a short description of the applications of these two types of compound.



Keywords: alkynyl ethers · siloxyalkynes · elimination · Meyer–Schuster rearrangement · metal catalysis

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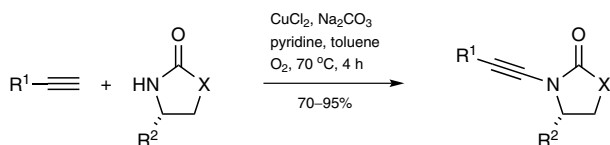
2015

p 259

24.4.4.4 **1-Nitrogen-Functionalized Alk-1-yne**

K. Banert

This chapter is an update of the earlier *Science of Synthesis* contributions (Sections 24.4.4.1–24.4.4.3) describing methods for the synthesis of ynamines, and especially those alk-1-yn-1-amines that bear electron-withdrawing units such as *N*-acyl and *N*-sulfonyl groups. Compounds with C≡C bonds directly connected to azido or nitro functionalities are likewise updated, whereas the chemistry of *N*-alk-1-ynyl-substituted sulfoximines and isocyanates is described for the first time. The update focuses on new developments published in the period 2004–2014.



Keywords: alkynes · alkynylation · amines · azides · carboxamides · copper catalysis · dehydrohalogenation · isocyanates · nitro compounds · oxazolidinones · sulfonamides · sulfoximines

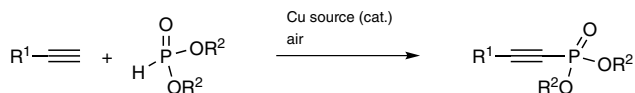
2015

p 301

24.4.5.3 **1-Phosphorus-Functionalized Alk-1-yne**

M. Cacciarini, M. H. Larsen, and M. Brøndsted Nielsen

This chapter is an update to the earlier *Science of Synthesis* contribution (Section 24.4.5) describing methods for the synthesis of 1-phosphorus-functionalized alk-1-yne. The focus is on the literature published in the period 2006–2014.



Keywords: alkynylation · oxidative coupling · metal catalysis · (alk-1-ynyl)benziodoxolone reagents · alkynyl protecting groups

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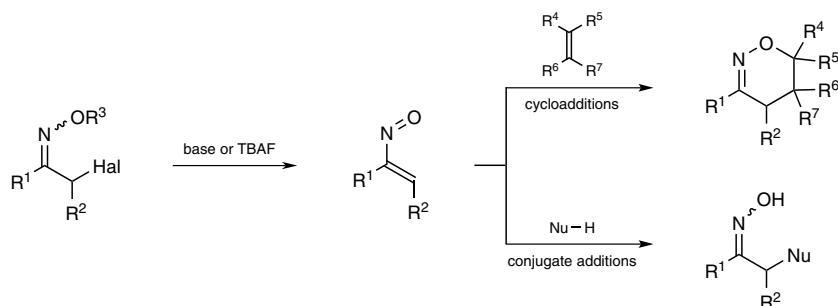
New Contributions

2015

p 315

33.4.2.3 **1-Nitrosoalkenes***H.-U. Reissig and R. Zimmer*

This chapter deals with the generation of nitrosoalkenes from suitable precursors and their application as synthetically useful key intermediates in organic synthesis, including the synthesis of natural products and biologically active compounds. This is an update to Section 33.4.2, covering selected relevant literature that has been reported since 2007.



$\text{R}^3 = \text{H}, \text{SiR}^6$; Hal = Br, Cl

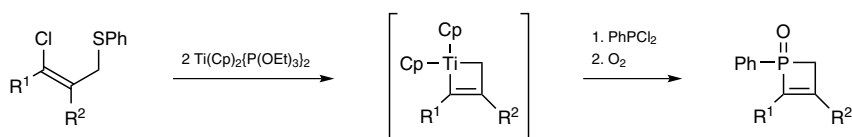
Keywords: nitrosoalkenes · dehydrohalogenation · haloalkoxyimino · nitrosoalkene reduction · [4 + 2] cycloaddition · [3 + 2] cycloaddition · hetero-Diels–Alder · *N*-hydroxypyrroles · natural products

2015

p 335

33.5.7.2 **1,2-Dihydrophosphetes and Derivatives***Gy. Keglevich and A. Grün*

This chapter is an update to the earlier *Science of Synthesis* contribution (Section 33.5.7) describing methods for the synthesis of 1,2-dihydrophosphetes. It focuses on the literature published in the period 2004–2015.



Keywords: vinyl compounds · titanium complexes · phosphorus heterocycles · phosphine oxides · metallacycles

2015

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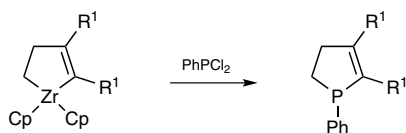
2015

p 341

33.5.8.2 **2,3-Dihydro-1H-phospholes and Derivatives**

Gy. Keglevich and A. Grün

This chapter is an update to the earlier *Science of Synthesis* contribution (Section 33.5.8) describing methods for the synthesis of 2,3-dihydro-1H-phospholes. It focuses on the literature published in the period 2004–2015.



Keywords: zirconium complexes · phosphorus heterocycles · phosphines · metallacycles · metathesis

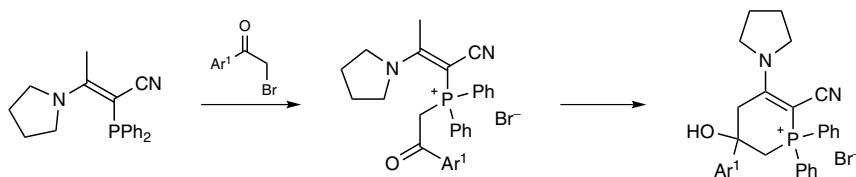
2015

p 355

33.5.9.2 **1,2,3,4-Tetrahydrophosphinines and Derivatives**

Gy. Keglevich and A. Grün

This chapter is an update to the earlier *Science of Synthesis* contribution (Section 33.5.9) describing methods for the synthesis of 1,2,3,4-tetrahydrophosphinines. It focuses on the literature published in the period 2004–2015.



Keywords: enamines · bromine compounds · phosphorus heterocycles · phosphonium salts · cyclization

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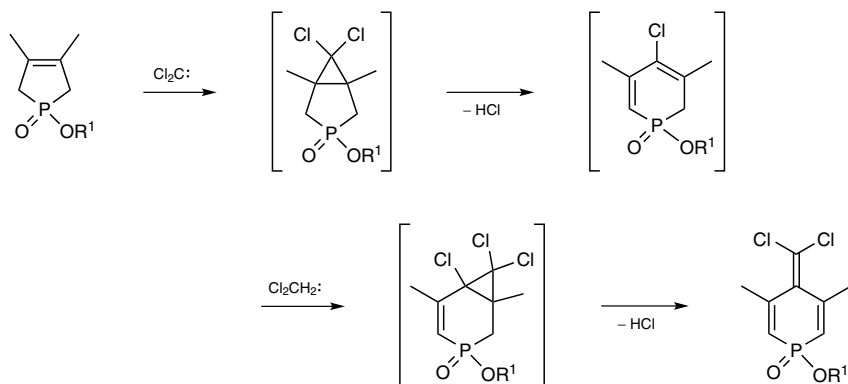
New Contributions

2015

p 357

33.5.10.2 **1,4-Dihydrophosphinines and Derivatives***Gy. Keglevich and A. Grün*

This chapter is an update to the earlier *Science of Synthesis* contribution (Section 33.5.10) describing methods for the synthesis of 1,4-dihydrophosphinines. It focuses on the literature published in the period 2004–2015.



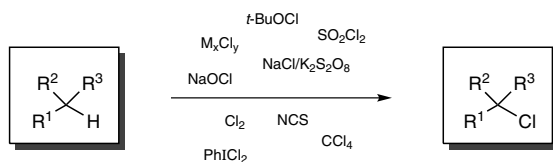
Keywords: phosphorus heterocycles · phosphinic acids · unsaturated compounds · ring expansion · carbenes

2015

p 359

35.1.1.1.9 **Synthesis by Substitution of Hydrogen***J. Iskra and S. S. Murphree*

This chapter is an update to the earlier *Science of Synthesis* contribution (Section 35.1.1.1) summarizing methodology for the chlorination of non-activated C–H bonds, with a particular focus on regioselectivity.



Keywords: chlorination · halogenation · chlorine compounds · halo compounds · chlorides · halides · alkanes · carbon–halogen bonds

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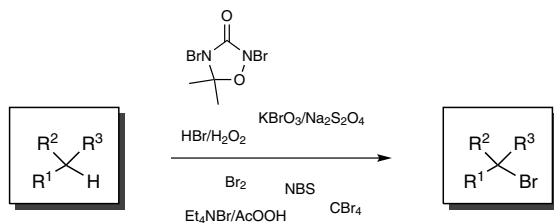
New Contributions

2015

p 375

35.2.1.1.8 **Synthesis by Substitution of Hydrogen***J. Iskra*

This chapter is an update to the earlier *Science of Synthesis* contribution (Section 35.2.1.1) summarizing methodology for the bromination of non-activated C–H bonds, with a particular focus on regioselectivity.



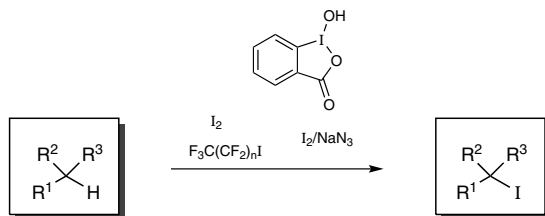
Keywords: bromination · halogenation · bromine compounds · halo compounds · bromides · halides · alkanes · carbon–halogen bonds

2015

p 387

35.3.1.1.6 **Synthesis by Substitution of Hydrogen***J. Iskra*

This chapter is an update to the earlier *Science of Synthesis* contribution (Section 35.3.1.1) summarizing methodology for the iodination of non-activated C–H bonds, with a particular focus on regioselectivity.



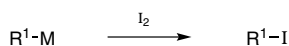
Keywords: iodination · halogenation · iodine compounds · halo compounds · iodides · halides · alkanes · carbon–halogen bonds

2015

p 391

35.3.1.2.7 **Synthesis by Substitution of Metals***M. C. Elliott and B. A. Saleh*

This chapter is an update to the earlier *Science of Synthesis* contribution (Section 35.3.1.2) describing methods for the synthesis of alkyl iodides from organometallic reagents, generally by addition of iodine, although other iodide sources have been used. It focuses on the literature published in the period 2005–2014.



Keywords: iodoalkanes · alkyl iodides · iodination · organometallic · organomercury · organozinc · organotin

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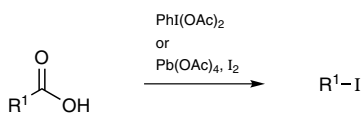
New Contributions

2015

p 399

35.3.1.3.8 **Synthesis by Substitution of Carbon Functionalities***B. A. Saleh and M. C. Elliott*

This chapter is an update to the earlier *Science of Synthesis* contribution (Section 35.3.1.3) describing methods for the synthesis of alkyl iodides from carboxylic acids and related compounds. It focuses on the literature published in the period 2005–2014.



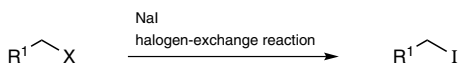
Keywords: iodoalkanes · alkyl iodides · iodination · decarboxylation · hypervalent iodine

2015

p 407

35.3.1.4.6 **Synthesis by Substitution of Other Halogens***F. V. Singh and T. Wirth*

Iodoalkanes are versatile reagents and precursors in a variety of organic reactions such as nucleophilic substitution, elimination, and metal-catalyzed C–C bond-forming reactions. In this chapter, various halogen-exchange approaches for the synthesis of iodoalkanes from other haloalkanes are described. The methods described cover the literature published in the period 2007–2014.



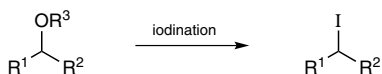
Keywords: halogen-exchange reaction · iodoalkanes · bromoalkanes · chloroalkanes · sodium iodide · phase-transfer catalyst

2015

p 415

35.3.1.5.7 **Synthesis by Substitution of Oxygen Functionalities***F. V. Singh and T. Wirth*

Iodoalkanes are important synthetic intermediates in organic chemistry. These compounds undergo various reactions such as nucleophilic substitution, elimination, and metal-catalyzed C–C bond-forming reactions. This chapter describes various synthetic approaches available for the generation of C–I bonds from different oxygen functionalities and covers the literature published in the period 2007–2014.



Keywords: iodoalkanes · iodination · ionic liquids · silicaphosphine · polymethylhydroxylane · iodotrimethylsilane · alcohols · ethers · phosphate esters · sulfonate esters · microwave irradiation

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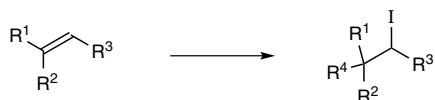
2015

p 437

35.3.1.8.7 **Synthesis by Addition to π -Type C—C Bonds**

U. Hennecke

This chapter is an update to the earlier *Science of Synthesis* contribution (Section 35.3.1.8) describing methods for the synthesis of iodoalkanes by addition reactions to π -type C—C bonds (mostly alkenes). It focuses mainly on the literature published in the period 2007–2014.



Keywords: alkyl iodides · carbocyclization · carbocyclic compounds · carboiodination · electrophilic additions · iodo compounds

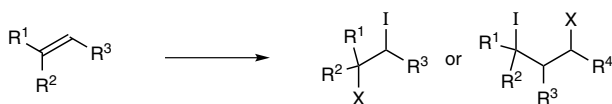
2015

p 449

35.3.5.1.5 **Synthesis by Addition across C=C Bonds**

U. Hennecke

This chapter is an update to the earlier *Science of Synthesis* contribution (Section 35.3.5.1) describing methods for the synthesis of 1-iodo-2-heteroatom-substituted alkanes by addition reactions across C=C bonds. The chapter also covers the synthesis of 1-iodo-3-heteroatom-substituted alkanes including saturated 3-iodo-substituted heterocycles. It focuses mainly on the literature published in the period 2007–2014.



Keywords: alkyl iodides · electrophilic additions · iodination · iodo compounds · iodoalcohols · iodolactonization · piperidines · Prins reaction

2015

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New Contributions