CAS SciFinder

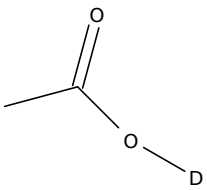
Task History

Initiating Search

February 23, 2025, 7:31 PM

Substances:

Filtered By:



Structure Match: **Substructure**

Search Tasks

Task	Search Type	View
Returned Substance Results + Filters (2,558)	Substances	View Results

Exported: Retrieved Related Reaction Results + Filters (172)

Reactions

View Results

Filtered By:

Substance Role:	Reactant, Reagent, Solvent
Catalyst:	(Acetato-κ*O*)(acetato-κ*O*,κ*O*')[(1,2,3,4,5,6-η)-1-methyl-4-(1-methylethyl)benzene]ruthenium, Bis(dichloro(η^6-*p*-cymene)ruthenium), Chloro[(1,2,5,6-η)-1,5-cyclooctadiene][(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]ruthenium, Dichloro[(1,2,3,4,5,6-η)-1-methyl-4-(1-methylethyl)benzene]ruthenium, [*N*-[(1*S*,2*S*)-2-(Amino-κ*N*)-1,2-diphenylethyl]-4-methylbenzenesulfonamidato-κ*N*]chloro[(1,2,3,4,5,6-η)-1-methyl-4-(1-methylethyl)benzene]ruthenium, Ruthenium(1+), [[4,4-bis(methoxycarbonyl)-1-cyclopenten-1-yl]hydroxymethylene]carbonyl(η^5-2,4-cyclopentadien-1-yl)[tris(1-methylethyl)phosphine]-, tetrafluoroborate(1-) (1:1), Ruthenium(1+), tris(acetonitrile)[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]-, hexafluorophosphate(1-) (1:1), Ruthenium(1+), tris(acetonitrile)[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]-, (*OC*-6-11)-hexafluoroantimonate(1-), Ruthenium(2+), tris(acetonitrile)[(1,2,3,4,5,6-η)-1-methyl-4-(1-methylethyl)benzene]-, (*OC*-6-11)-hexafluoroantimonate(1-) (1:2), (*SP*-5-43)-Carbonylchlorohydrobis(tricyclohexylphosphine)ruthenium, Tris(2,2'-bipyridine)ruthenium(2+) bis(hexafluorophosphate)
Document Type:	Journal
Language:	English

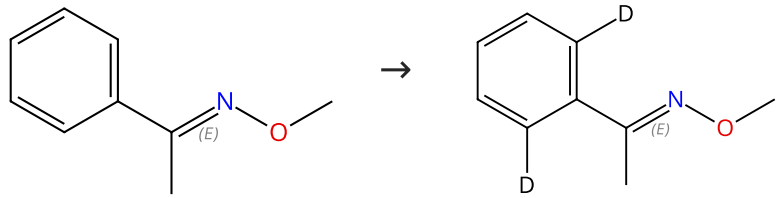
CAS SciFinder

Reactions (127)

View in CAS SciFinder

Scheme 1 (1 Reaction)

Steps: **1** Yield: **98%**



Double bond geometry shown

Double bond geometry shown

Suppliers (7)

31-116-CAS-14215581

Steps: **1** Yield: **98%**

1.1 **Reagents:** Acetic acid-d_4, Silver hexafluoroantimonate
Catalysts: Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethane; 4 h, rt

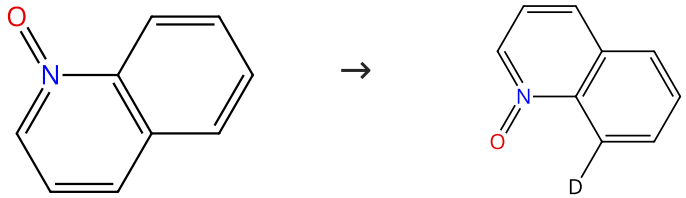
Ruthenium-Catalyzed Oxidant-Free Allylation of Aromatic Ketoximes with Allylic Acetates at Room Temperature

By: Manikandan, Rajendran; et al

Chemistry - A European Journal (2015), 21(40), 13934-13938.

Scheme 2 (1 Reaction)

Steps: **1** Yield: **98%**



Suppliers (56)

Supplier (1)

31-116-CAS-22659494

Steps: **1** Yield: **98%**

1.1 **Reagents:** Acetic acid-*d*
Catalysts: Pivalic acid, Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethane; 36 h, 110 °C

Experimental Protocols

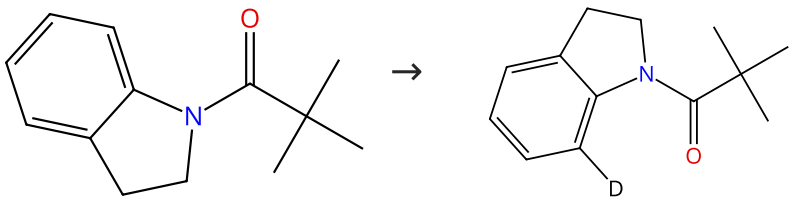
Cobalt-Catalyzed C8-Dienylation of Quinoline-N-Oxides

By: Shukla, Rahul K.; et al

Angewandte Chemie, International Edition (2020), 59(39), 17042-17048.

Scheme 3 (1 Reaction)

Steps: **1** Yield: **98%**



Suppliers (10)

31-116-CAS-17932231 Steps: **1** Yield: **98%**

1.1 **Reagents:** Pivalic acid, Acetic acid-d_4, Silver hexafluoro antimonate
Catalysts: Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 2,2,2-Trifluoroethanol; 24 h, 30 °C

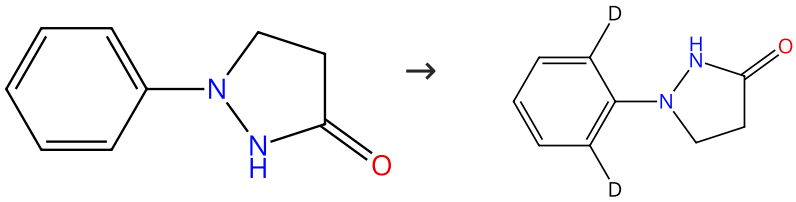
Experimental Protocols

Ru(II)-Catalyzed C-H Amidation of Indoline at the C7-Position Using Dioxazolone as an Amidating Agent: Synthesis of 7-Amino Indoline Scaffold

By: Hande, Akshay Ekanath; et al

Journal of Organic Chemistry (2017), 82(24), 13405-13413.

Scheme 4 (1 Reaction) Steps: **1** Yield: **98%**



Suppliers (92)

31-614-CAS-31446855 Steps: **1** Yield: **98%**

1.1 **Reagents:** Zinc acetate, Acetic acid-*d*
Catalysts: Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: Acetonitrile; 16 h, 60 °C

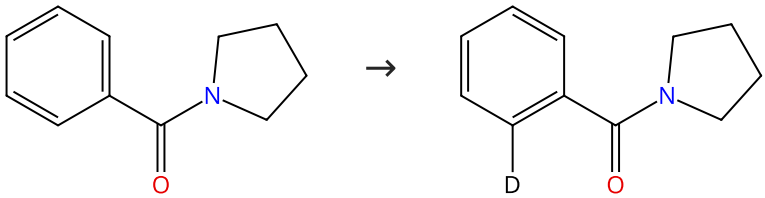
Experimental Protocols

Rapid Construction of Hexacyclic Indolines via the Ru(II)-Catalyzed C-H Activation Initiated Cascade Cyclization of Phenidones with Enynones

By: Li, Yang; et al

Organic Letters (2022), 24(1), 435-440.

Scheme 5 (1 Reaction) Steps: **1** Yield: **97%**



Suppliers (43)

31-116-CAS-15725061 Steps: **1** Yield: **97%**

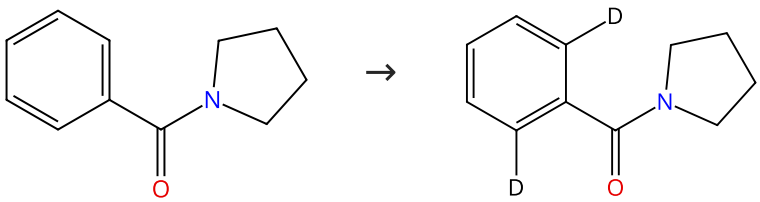
1.1 **Reagents:** Acetic acid-d_4, Silver hexafluoroantimonate
Catalysts: Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethane; 28 h, rt

Temperature-controlled redox-neutral ruthenium(II)-catalyzed regioselective allylation of benzamides with allylic acetates

By: Manikandan, Rajendran; et al

Organic & Biomolecular Chemistry (2016), 14(32), 7691-7701.

Scheme 6 (1 Reaction) Steps: **1** Yield: **97%**



Suppliers (43)

31-116-CAS-17921250 Steps: **1** Yield: **97%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethane; 4 h, rt

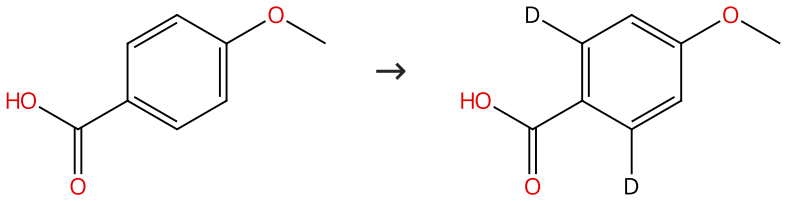
Experimental Protocols

Ruthenium-Catalyzed C-H Benzoxylation of tert-Benzamides with Aromatic Acids by Weak Coordination

By: More, Nagnath Yadav; et al

Journal of Organic Chemistry (2017), 82(23), 12691-12700.

Scheme 7 (1 Reaction) Steps: **1** Yield: **96%**



Suppliers (115) Supplier (1)

31-116-CAS-18656664 Steps: **1** Yield: **96%**

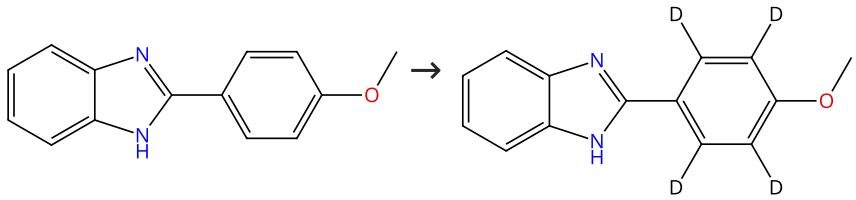
1.1 **Reagents:** Potassium carbonate, Acetic acid-d_4
Catalysts: Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: Dimethylformamide; 12 h, 100 °C

Ruthenium(II)-Catalyzed Cyclization of Aromatic Acids with Allylic Acetates via Redox-Free Two-Fold Aromatic/Allylic C-H Activations: Combined Experimental and DFT Studies

By: Jambu, Subramanian; et al

Organic Letters (2018), 20(7), 1982-1986.

Scheme 8 (1 Reaction) Steps: **1** Yield: **96%**



Suppliers (47)

31-116-CAS-20829297 Steps: **1** Yield: **96%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver acetate, Triphenylphosphine, Bis(dichloro(η^6-*p*-cymene)ruthenium); 24 h, 150 °C

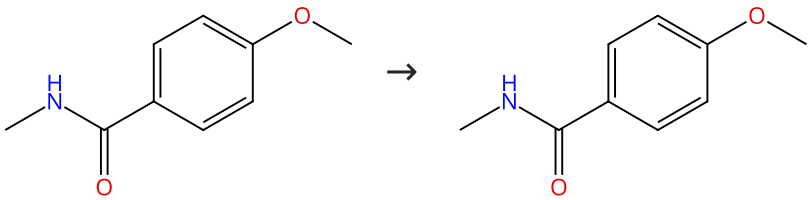
Experimental Protocols

Ruthenium-Catalyzed ortho- and meta-H/D Exchange of Arenes

By: Zhao, Liang-Liang; et al

Organic Letters (2019), 21(24), 10023-10027.

Scheme 9 (1 Reaction) Steps: **1** Yield: **96%**



Suppliers (60)

31-614-CAS-25537529 Steps: **1** Yield: **96%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Ruthenium(2+), tris(acetonitrile)[(1,2,3,4,5,6-η)-1-methyl-4-(1-methylethyl)benzene]-, (*OC*-6-11)-hexafluoro antimonate(1-) (1:2)
Solvents: 1,4-Dioxane; 6 h, 120 °C

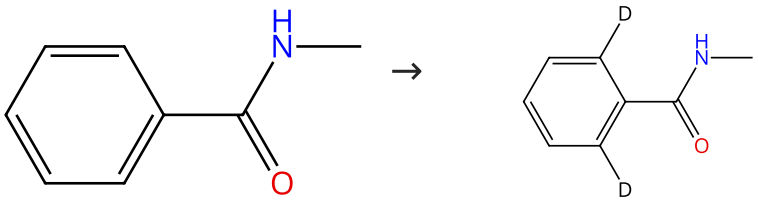
Experimental Protocols

Ruthenium(II)-Catalyzed Redox-Neutral C-H Alkylation of Arylamides with Unactivated Olefins

By: Shambhavi, Chikkabagilu Nagaraju; et al

Organic Letters (2021), 23(12), 4849-4854.

Scheme 10 (2 Reactions) Steps: **1** Yield: **96%**



Suppliers (72)

31-116-CAS-17921249 Steps: **1** Yield: **96%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethane; 4 h, rt

Experimental Protocols

Ruthenium-Catalyzed C-H Benzoxylation of tert-Benzamides with Aromatic Acids by Weak Coordination

By: More, Nagnath Yadav; et al

Journal of Organic Chemistry (2017), 82(23), 12691-12700.

31-116-CAS-5014594 Steps: **1** Yield: **96%**

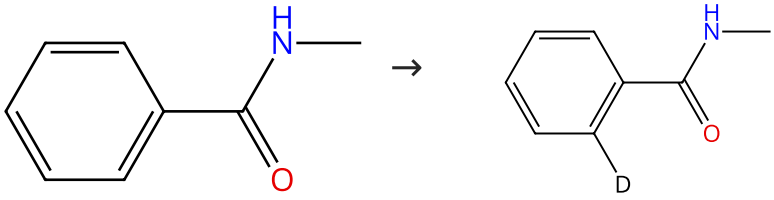
1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethane; 6 h, rt

Ruthenium-Catalyzed ortho Alkenylation of Aromatics with Alkenes at Room Temperature with Hydrogen Evolution

By: Manikandan, Rajendran; et al

ACS Catalysis (2016), 6(1), 230-234.

Scheme 11 (1 Reaction) Steps: **1** Yield: **96%**



Suppliers (72)

31-116-CAS-15725062 Steps: **1** Yield: **96%**

1.1 **Reagents:** Acetic acid-d_4, Silver hexafluoroantimonate
Catalysts: Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethane; 4 h, rt

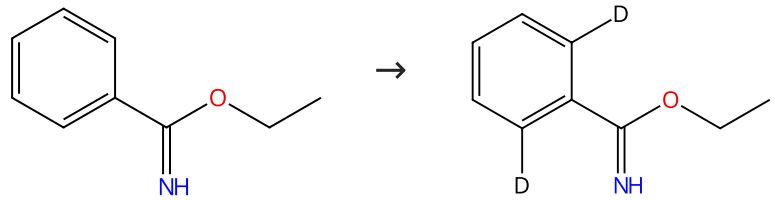
Temperature-controlled redox-neutral ruthenium(II)-catalyzed regioselective allylation of benzamides with allylic acetates

By: Manikandan, Rajendran; et al

Organic & Biomolecular Chemistry (2016), 14(32), 7691-7701.

Scheme 12 (2 Reactions)

Steps: **1** Yield: **92-96%**



Suppliers (20)

31-116-CAS-18298343

Steps: **1** Yield: **96%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: Ethanol; 6 h, rt

Experimental Protocols

Ruthenium(II)-Catalyzed Redox-Neutral Oxidative Cyclization of Benzimidates with Alkenes with Hydrogen Evolution

By: Manikandan, Rajendran; et al

Organic Letters (2017), 19(24), 6678-6681.

31-614-CAS-40879666

Steps: **1** Yield: **92%**

1.1 **Reagents:** Sodium acetate, Acetic acid-d_4
Catalysts: Copper diacetate monohydrate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 2,2,2-Trifluoroethanol; 6 h, 75 °C

Experimental Protocols

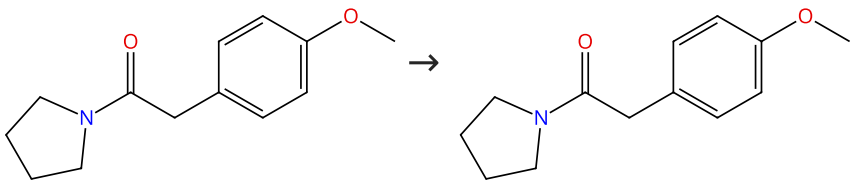
Synthesis of 1H-Isoindoles via Ruthenium(II)-Catalyzed Cyclization of Benzimidates with Alkenes

By: Shambhavi, Chikkabagilu Nagaraju; et al

Journal of Organic Chemistry (2024), 89(14), 9896-9909.

Scheme 13 (1 Reaction)

Steps: **1** Yield: **95%**



Suppliers (10)

31-614-CAS-31013104

Steps: **1** Yield: **95%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Ruthenium(2+), tris(acetonitrile)[(1,2,3,4,5,6-η)-1-methyl-4-(1-methylethyl)benzene]-, (*OC*-6-11)-hexafluoro antimonate(1-) (1:2)
Solvents: 1,2-Dichloroethane; 6 h, 120 °C

Experimental Protocols

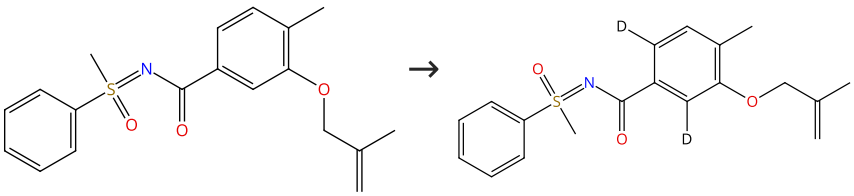
Ruthenium(II)-Catalyzed Distal Weak O-Coordinating C-H Alkylation of Arylacetamides with Alkenes: Combined Experimental and DFT Studies

By: Sivasakthikumaran, Ramakrishnan; et al

Journal of Organic Chemistry (2019), 84(7), 3977-3989.

Scheme 14 (2 Reactions)

Steps: **1** Yield: **93-95%**



31-116-CAS-19145667 Steps: **1** Yield: **95%**

1.1 **Reagents:** 4-Octyne, Copper diacetate monohydrate
Catalysts: Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethane, Acetic acid-d_4; 5 min, 50 °C

Sulfoximine-Assisted One-Pot Unsymmetrical Multiple Annulation of Arenes: A Combined Experimental and Computational Study

By: Ghosh, Koushik; et al

Journal of Organic Chemistry (2018), 83(17), 9667-9681.

31-116-CAS-19145666 Steps: **1** Yield: **93%**

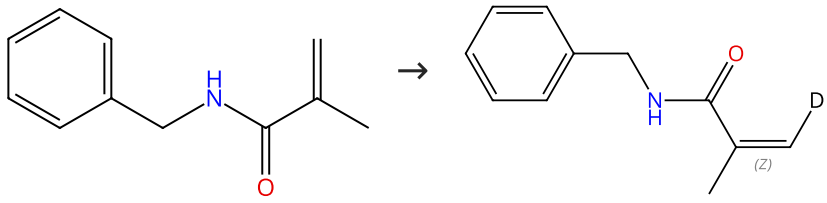
1.1 **Reagents:** Copper diacetate monohydrate
Catalysts: Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethane, Acetic acid-d_4; 5 min, 50 °C

Sulfoximine-Assisted One-Pot Unsymmetrical Multiple Annulation of Arenes: A Combined Experimental and Computational Study

By: Ghosh, Koushik; et al

Journal of Organic Chemistry (2018), 83(17), 9667-9681.

Scheme 15 (1 Reaction) Steps: **1** Yield: **95%**



Suppliers (20)

Double bond geometry shown

31-116-CAS-2266825 Steps: **1** Yield: **95%**

1.1 **Reagents:** Cupric acetate, Acetic acid-*d*
Catalysts: Potassium hexafluorophosphate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,4-Dioxane, Acetic acid-*d*, Water-d_2; 1 h, rt → 100 °C

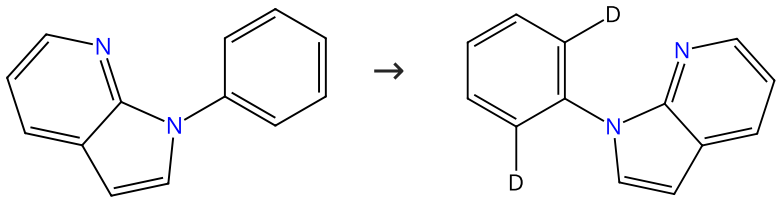
Experimental Protocols

Ruthenium- and rhodium-catalyzed cross-coupling reaction of acrylamides with alkenes: efficient access to (Z, E)-dienamides

By: Zhang, Jian; et al

Chemical Communications (Cambridge, United Kingdom) (2012), 48(91), 11232-11234.

Scheme 16 (1 Reaction) Steps: **1** Yield: **95%**



Suppliers (6)

31-116-CAS-23703959 Steps: **1** Yield: **95%**

1.1 **Reagents:** Potassium carbonate, Acetic acid-*d*, *N*-(2,2-Dimethyl-1-oxopropyl)-L-valine
Catalysts: Triphenylphosphine, Nickel dichloride, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethane; 2 h, 140 °C

Experimental Protocols

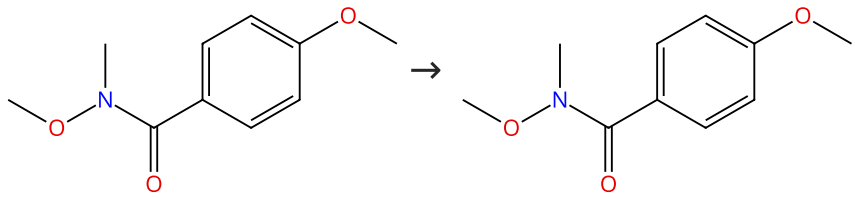
Ru(II)-Catalyzed Difluoromethylations of 7-Azaindoles: Access to Novel Fluoro-7-Azaindole Derivatives

By: Zhu, Yan-Ying; et al

Asian Journal of Organic Chemistry (2021), 10(6), 1410-1413.

Scheme 17 (1 Reaction)

Steps: **1** Yield: **95%**



Suppliers (65)

31-614-CAS-33435180

Steps: **1** Yield: **95%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver triflate, Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethane; 24 h, 100 °C

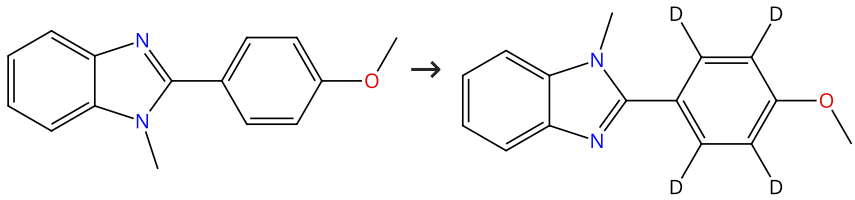
A Ruthenium-Catalyzed Cyclization to Dihydrobenzo[c]phenanthridinone from 7-Azabenzonorbornadienes with Aryl Amides

By: Aravindan, Narasingan; et al

Organic Letters (2022), 24(29), 5260-5265.

Scheme 18 (1 Reaction)

Steps: **1** Yield: **94%**



Suppliers (15)

31-116-CAS-22369763

Steps: **1** Yield: **94%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver acetate, Triphenylphosphine, Bis(dichloro(η^6-*p*-cymene)ruthenium); 24 h, 150 °C

Experimental Protocols

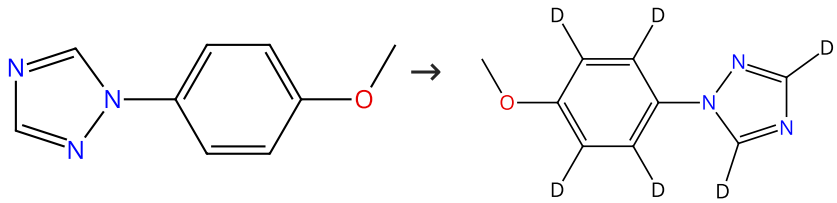
Ruthenium-Catalyzed ortho- and meta-H/D Exchange of Arenes

By: Zhao, Liang-Liang; et al

Organic Letters (2019), 21(24), 10023-10027.

Scheme 19 (1 Reaction)

Steps: **1** Yield: **94%**



Suppliers (38)

31-116-CAS-20829302

Steps: **1** Yield: **94%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver acetate, Triphenylphosphine, Bis(dichloro(η^6-*p*-cymene)ruthenium); 24 h, 150 °C

Experimental Protocols

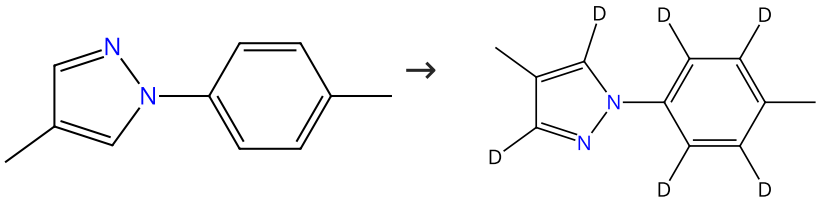
Ruthenium-Catalyzed ortho- and meta-H/D Exchange of Arenes

By: Zhao, Liang-Liang; et al

Organic Letters (2019), 21(24), 10023-10027.

Scheme 20 (1 Reaction)

Steps: **1** Yield: **94%**



Suppliers (5)

31-116-CAS-20829289

Steps: **1** Yield: **94%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver acetate, Triphenylphosphine, Bis(dichloro(η^6-*p*-cymene)ruthenium); 24 h, 150 °C

Experimental Protocols

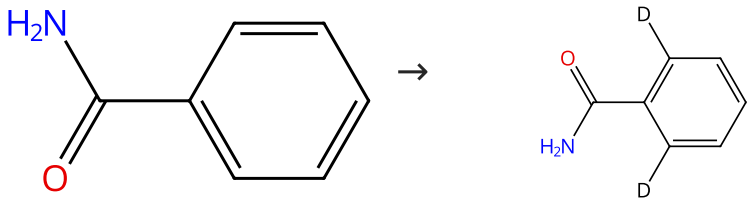
Ruthenium-Catalyzed ortho- and meta-H/D Exchange of Arenes

By: Zhao, Liang-Liang; et al

Organic Letters (2019), 21(24), 10023-10027.

Scheme 21 (2 Reactions)

Steps: **1** Yield: **61-92%**



Suppliers (115)

31-116-CAS-21553465

Steps: **1** Yield: **92%**

1.1 **Reagents:** Cupric acetate, Acetic acid-d_4, Silver tetrafluoroborate
Catalysts: Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethane; 5 h, 100 °C

One-Pot Synthesis of Orange-Red Fluorescent Dimeric 2H-Pyrrolo[2,3-c]isoquinoline-2,5(3H)-diones from Benzamides and Maleimides via Ru(II)-Catalyzed Sequential C-C/C-N/C-C Bond Formation

By: Jaiswal, Yogesh; et al

Organic Letters (2020), 22(4), 1605-1610.

31-614-CAS-34763786

Steps: **1** Yield: **61%**

1.1 **Reagents:** Silver carbonate, Acetic acid-d_4
Catalysts: Sodium acetate, Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethane; 12 h, 110 °C

Experimental Protocols

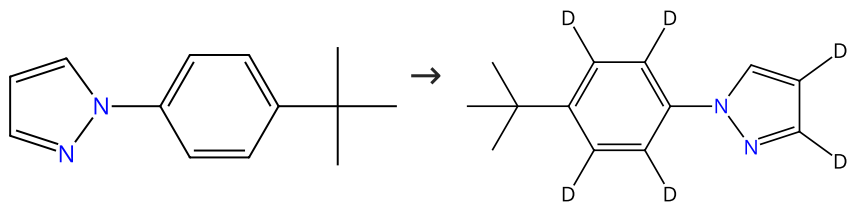
Ru(II)-catalyzed external auxiliary-free primary amide-directed inverse Sonogashira reaction on (hetero)arylamides

By: Baghel, Akanksha Singh; et al

Chemical Communications (Cambridge, United Kingdom) (2022), 58(80), 11304-11307.

Scheme 22 (1 Reaction)

Steps: **1** Yield: **91%**



Suppliers (3)

31-116-CAS-20829282 Steps: **1** Yield: **91%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver acetate, Triphenylphosphine, Bis(dichloro(η^6-*p*-cymene)ruthenium); 24 h, 150 °C

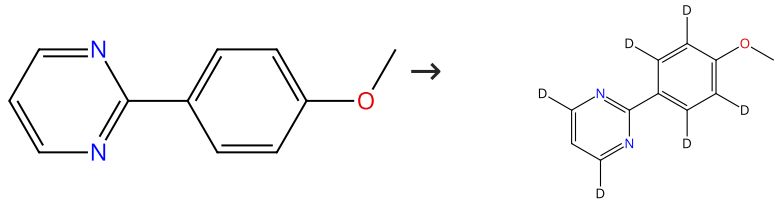
Experimental Protocols

Ruthenium-Catalyzed ortho- and meta-H/D Exchange of Arenes

By: Zhao, Liang-Liang; et al

Organic Letters (2019), 21(24), 10023-10027.

Scheme 23 (1 Reaction) Steps: **1** Yield: **91%**



Suppliers (8)

31-116-CAS-20829299 Steps: **1** Yield: **91%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver acetate, Triphenylphosphine, Bis(dichloro(η^6-*p*-cymene)ruthenium); 24 h, 150 °C

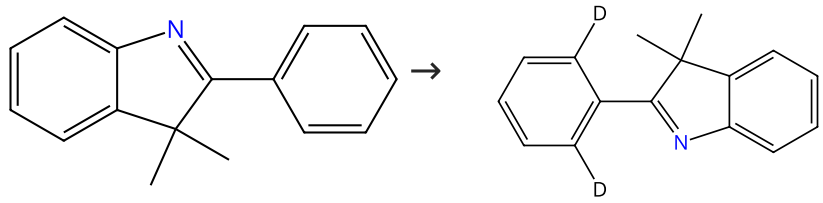
Experimental Protocols

Ruthenium-Catalyzed ortho- and meta-H/D Exchange of Arenes

By: Zhao, Liang-Liang; et al

Organic Letters (2019), 21(24), 10023-10027.

Scheme 24 (1 Reaction) Steps: **1** Yield: **90%**



Suppliers (9)

31-614-CAS-42973757 Steps: **1** Yield: **90%**

1.1 **Reagents:** Acetic acid-*d*
Catalysts: Ruthenium(1+), tris(acetonitrile)[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]-, hexafluoro phosphate(1-) (1:1)
Solvents: Methanol; 16 h, 80 °C

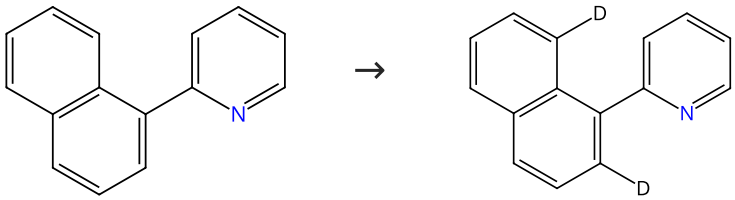
Experimental Protocols

Rhodium(III)-catalyzed direct C-H activation of 2-aryl-3H-indoles: a strategy for 4- heteroaryl pyrazole synthesis

By: Yang, Zi; et al

Organic & Biomolecular Chemistry (2025), 23(2), 323-327.

Scheme 25 (1 Reaction) Steps: **1** Yield: **90%**



Suppliers (24)

31-116-CAS-447198 Steps: **1** Yield: **90%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: Dichloromethane, Acetonitrile-d_3; 1 h, 70 °C; 1 h, 150 °C

1.2 **Reagents:** Hydrochloric acid
Solvents: Dichloromethane, Water

1.3 **Reagents:** Potassium carbonate
Solvents: Water; neutralized

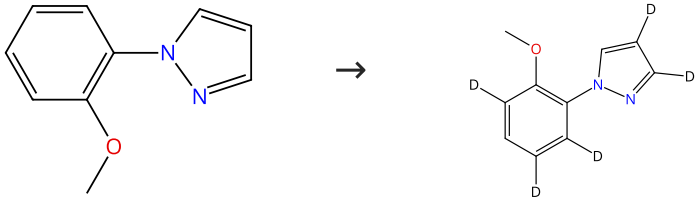
Experimental Protocols

Regioselectivity in C-H activation: reagent control in cyclometallation of 2-(1-naphthyl)-pyridine

By: Kondrashov, Mikhail; et al

Dalton Transactions (2016), 45(2), 525-531.

Scheme 26 (1 Reaction) Steps: **1** Yield: **89%**



Suppliers (55)

31-116-CAS-20829287 Steps: **1** Yield: **89%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver acetate, Triphenylphosphine, Bis(dichloro(η^6-*p*-cymene)ruthenium); 24 h, 150 °C

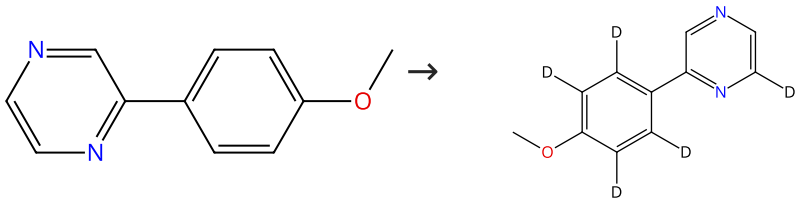
Experimental Protocols

Ruthenium-Catalyzed ortho- and meta-H/D Exchange of Arenes

By: Zhao, Liang-Liang; et al

Organic Letters (2019), 21(24), 10023-10027.

Scheme 27 (1 Reaction) Steps: **1** Yield: **89%**



Suppliers (12)

31-116-CAS-20829301 Steps: **1** Yield: **89%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver acetate, Triphenylphosphine, Bis(dichloro(η^6-*p*-cymene)ruthenium); 24 h, 150 °C

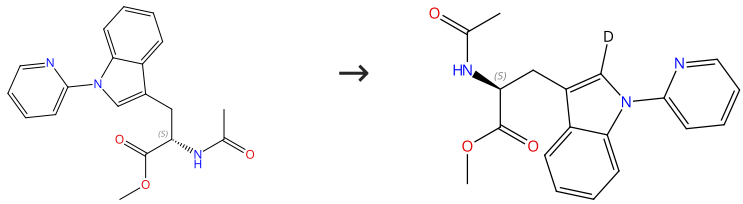
Experimental Protocols

Ruthenium-Catalyzed ortho- and meta-H/D Exchange of Arenes

By: Zhao, Liang-Liang; et al

Organic Letters (2019), 21(24), 10023-10027.

Scheme 28 (1 Reaction) Steps: **1** Yield: **89%**



Absolute stereochemistry shown

Absolute stereochemistry shown

31-614-CAS-24184220 Steps: **1** Yield: **89%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: Toluene; 1 h, rt → 80 °C

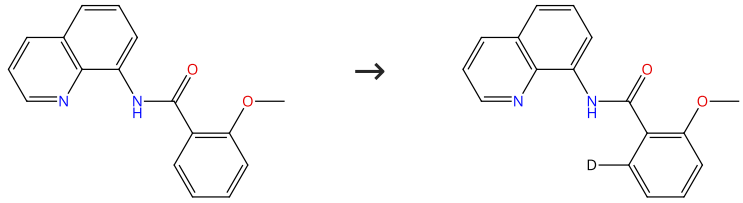
Experimental Protocols

Late-stage peptide C-H alkylation for bioorthogonal C-H activation featuring solid phase peptide synthesis

By: Schischko, Alexandra; et al

Nature Communications (2019), 10(1), 1-9.

Scheme 29 (1 Reaction) Steps: **1** Yield: **89%**



Suppliers (7)

31-116-CAS-18349311 Steps: **1** Yield: **89%**

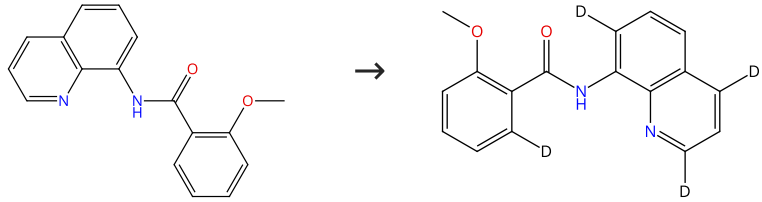
1.1 **Reagents:** Acetic acid-*d*
Catalysts: Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethane; 48 h, 120 °C

Ruthenium-Catalyzed Difluoroalkylation of 8-Aminoquinoline Amides at the C5-Position

By: Chen, Changpeng; et al

European Journal of Organic Chemistry (2017), 2017(46), 6947-6950.

Scheme 30 (1 Reaction) Steps: **1** Yield: **89%**



Suppliers (7)

31-116-CAS-18349316 Steps: **1** Yield: **89%**

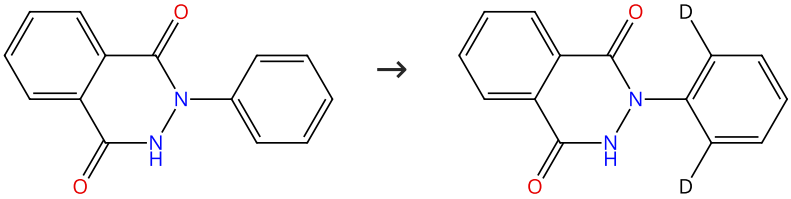
1.1 **Reagents:** Acetic acid-*d*
Catalysts: Bis(dichloro(η^6-*p*-cymene)ruthenium); 48 h, 120 °C

Ruthenium-Catalyzed Difluoroalkylation of 8-Aminoquinoline Amides at the C5-Position

By: Chen, Changpeng; et al

European Journal of Organic Chemistry (2017), 2017(46), 6947-6950.

Scheme 31 (1 Reaction) Steps: **1** Yield: **89%**



Suppliers (38)

31-116-CAS-21543805 Steps: **1** Yield: **89%**

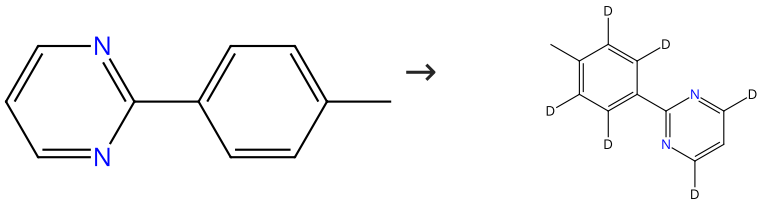
1.1 **Reagents:** Acetic acid-d_4
Catalysts: Sodium acetate, Bis(dichloro(η^6-*p*-cymene) ruthenium), [1,1,1-Trifluoro-*N*-[(trifluoromethyl)sulfonyl-κ*O*] methanesulfonamidato-κ*O*]silver
Solvents: 1,2-Dichloroethane; 20 h, 40 °C

Ru(II)-Catalyzed C-H Hydroxyalkylation and Mitsunobu Cyclization of N-Aryl Phthalazinones

By: Kim, Kunyoung; et al

Journal of Organic Chemistry (2020), 85(4), 2520-2531.

Scheme 32 (1 Reaction) Steps: **1** Yield: **89%**



Suppliers (48)

31-116-CAS-20829300 Steps: **1** Yield: **89%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver acetate, Triphenylphosphine, Bis(dichloro(η^6-*p*-cymene)ruthenium); 24 h, 150 °C

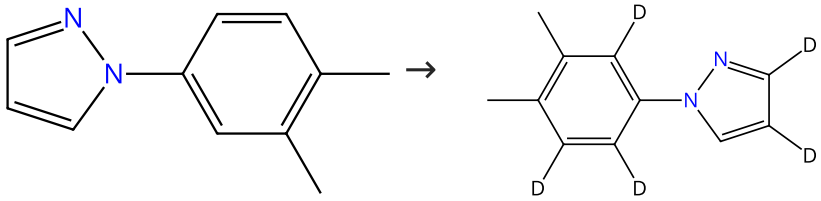
Experimental Protocols

Ruthenium-Catalyzed ortho- and meta-H/D Exchange of Arenes

By: Zhao, Liang-Liang; et al

Organic Letters (2019), 21(24), 10023-10027.

Scheme 33 (1 Reaction) Steps: **1** Yield: **88%**



31-116-CAS-20829288 Steps: **1** Yield: **88%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver acetate, Triphenylphosphine, Bis(dichloro(η^6-*p*-cymene)ruthenium); 24 h, 150 °C

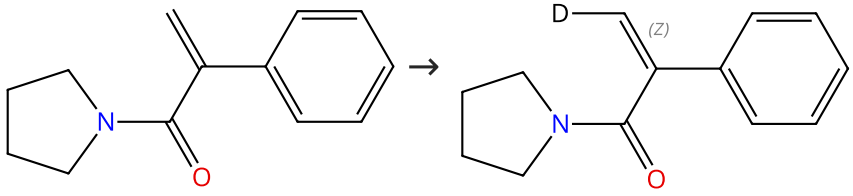
Experimental Protocols

Ruthenium-Catalyzed ortho- and meta-H/D Exchange of Arenes

By: Zhao, Liang-Liang; et al

Organic Letters (2019), 21(24), 10023-10027.

Scheme 34 (3 Reactions) Steps: **1** Yield: **53-88%**



Supplier (1)

Double bond geometry shown

31-116-CAS-19337588 Steps: **1** Yield: **88%**

1.1 **Reagents:** Acetic acid-*d*
Catalysts: Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethane; rt; rt → 110 °C; 2 h, 110 °C

Experimental Protocols

Facile preparation of (2Z,4E)-dienamides by the olefination of electrondeficient alkenes with allyl acetate

By: Ding, Liyuan; et al

Journal of Visualized Experiments (2017), (124), e55766/1-e55766/9.

31-116-CAS-16131638 Steps: **1** Yield: **88%**

1.1 **Reagents:** Acetic acid-*d*
Catalysts: Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethane; rt → 110 °C; 2 h, 110 °C; cooled

Experimental Protocols

Olefination of Electron-Deficient Alkenes with Allyl Acetate: Stereo- and Regioselective Access to (2*Z*,4*E*)-Dienamides

By: Li, Feifei; et al

Organic Letters (2016), 18(18), 4582-4585.

31-116-CAS-17212735 Steps: **1** Yield: **53%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: Tetrahydrofuran; 3 h, 100 °C

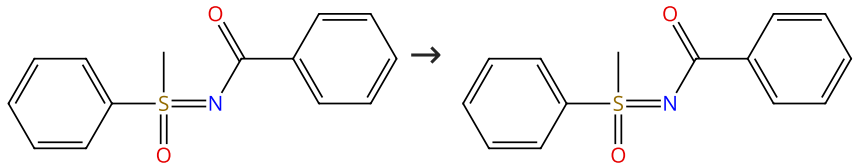
Experimental Protocols

Amide Directed Cross-Coupling between Alkenes and Alkynes: A Regio- and Stereoselective Approach to Substituted (2*Z*,4*Z*)-Dienamides

By: Meng, Keke; et al

Organic Letters (2017), 19(10), 2498-2501.

Scheme 35 (1 Reaction) Steps: **1** Yield: **88%**



Suppliers (4)

31-614-CAS-26207804 Steps: **1** Yield: **88%**

1.1 **Reagents:** Acetic acid-d_4, Ammonium persulfate
Catalysts: Potassium hexafluorophosphate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethane; 22 h, 110 °C

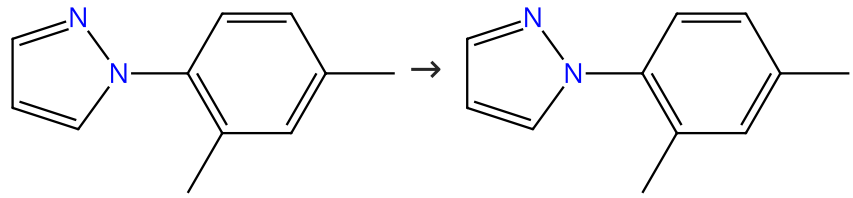
Experimental Protocols

Ruthenium(II)-Catalyzed C-H Oxygenations of Reusable Sulfoximine Benzamides

By: Raghuvanshi, Keshav; et al

Organic Letters (2017), 19(6), 1278-1281.

Scheme 36 (1 Reaction) Steps: **1** Yield: **88%**



Suppliers (4)

31-614-CAS-27929722 Steps: **1** Yield: **88%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver acetate, Triphenylphosphine, Bis(dichloro(η^6-*p*-cymene)ruthenium); 24 h, 150 °C

Experimental Protocols

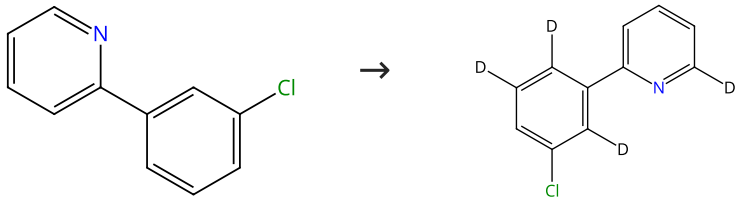
Ruthenium-Catalyzed ortho- and meta-H/D Exchange of Arenes

By: Zhao, Liang-Liang; et al

Organic Letters (2019), 21(24), 10023-10027.

Scheme 37 (1 Reaction)

Steps: **1** Yield: **87%**



Suppliers (26)

31-116-CAS-20829294

Steps: **1** Yield: **87%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver acetate, Triphenylphosphine, Bis(dichloro(η^6-*p*-cymene)ruthenium); 24 h, 150 °C

Experimental Protocols

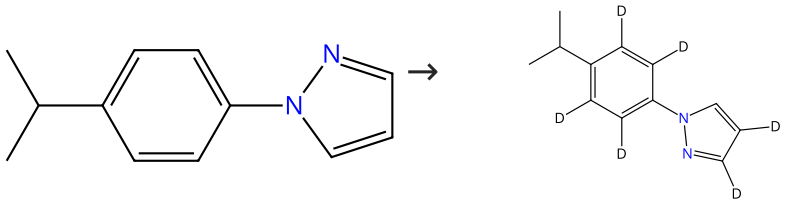
Ruthenium-Catalyzed ortho- and meta-H/D Exchange of Arenes

By: Zhao, Liang-Liang; et al

Organic Letters (2019), 21(24), 10023-10027.

Scheme 38 (1 Reaction)

Steps: **1** Yield: **86%**



Suppliers (12)

31-116-CAS-20829281

Steps: **1** Yield: **86%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver acetate, Triphenylphosphine, Bis(dichloro(η^6-*p*-cymene)ruthenium); 24 h, 150 °C

Experimental Protocols

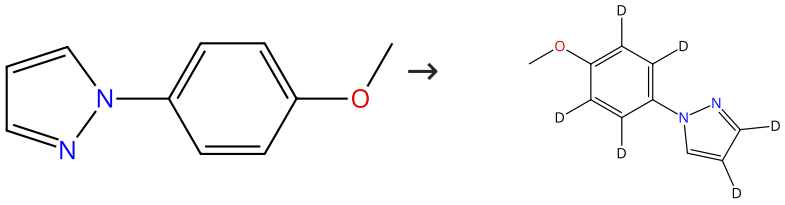
Ruthenium-Catalyzed ortho- and meta-H/D Exchange of Arenes

By: Zhao, Liang-Liang; et al

Organic Letters (2019), 21(24), 10023-10027.

Scheme 39 (1 Reaction)

Steps: **1** Yield: **86%**



Suppliers (63)

31-116-CAS-20829283

Steps: **1** Yield: **86%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver acetate, Triphenylphosphine, Bis(dichloro(η^6-*p*-cymene)ruthenium); 24 h, 150 °C

Experimental Protocols

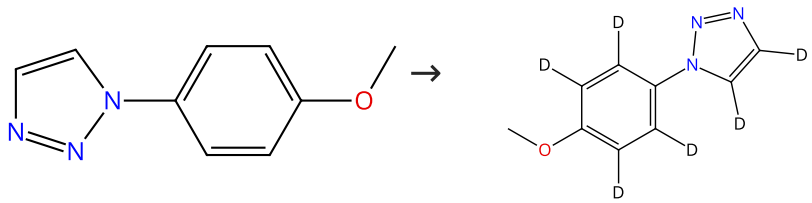
Ruthenium-Catalyzed ortho- and meta-H/D Exchange of Arenes

By: Zhao, Liang-Liang; et al

Organic Letters (2019), 21(24), 10023-10027.

Scheme 40 (1 Reaction)

Steps: **1** Yield: **86%**



Suppliers (10)

31-116-CAS-20829303

Steps: **1** Yield: **86%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver acetate, Triphenylphosphine, Bis(dichloro(η^6-*p*-cymene)ruthenium); 24 h, 150 °C

Experimental Protocols

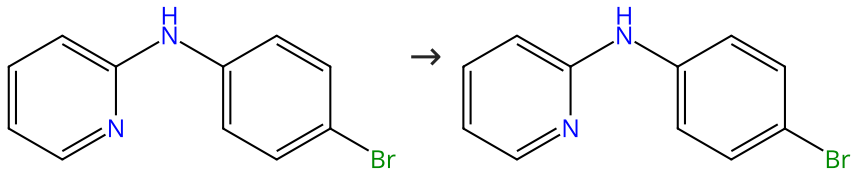
Ruthenium-Catalyzed ortho- and meta-H/D Exchange of Arenes

By: Zhao, Liang-Liang; et al

Organic Letters (2019), 21(24), 10023-10027.

Scheme 41 (1 Reaction)

Steps: **1** Yield: **85%**



Suppliers (14)

31-614-CAS-25980850

Steps: **1** Yield: **85%**

1.1 **Reagents:** Lithium carbonate (Li_2CO_3), Acetic acid-*d*
Catalysts: Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: Toluene; 24 h, 120 °C

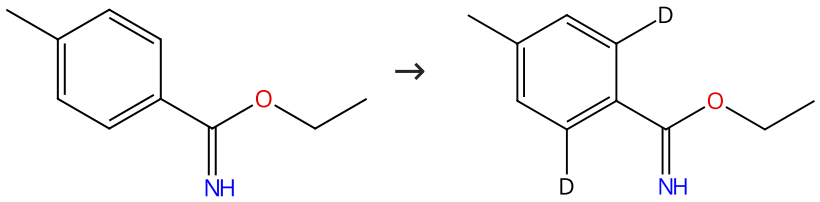
Ruthenium-Catalyzed Remote C-H Sulfonylation of N-Aryl-2-aminopyridines with Aromatic Sulfonyl Chlorides

By: Ramesh, Balu; et al

Organic Letters (2017), 19(21), 6000-6003.

Scheme 42 (1 Reaction)

Steps: **1** Yield: **85%**



Suppliers (16)

31-116-CAS-18984194

Steps: **1** Yield: **85%**

1.1 **Reagents:** Acetic acid-d_4, Disodium phosphate
Catalysts: Ruthenium(2+), tris(acetonitrile)[(1,2,3,4,5,6-η)-1-methyl-4-(1-methylethyl)benzene]-, (*OC*-6-11)-hexafluoro antimonate(1-) (1:2)
Solvents: 1,2-Dichloroethane; 12 h, 60 °C

Experimental Protocols

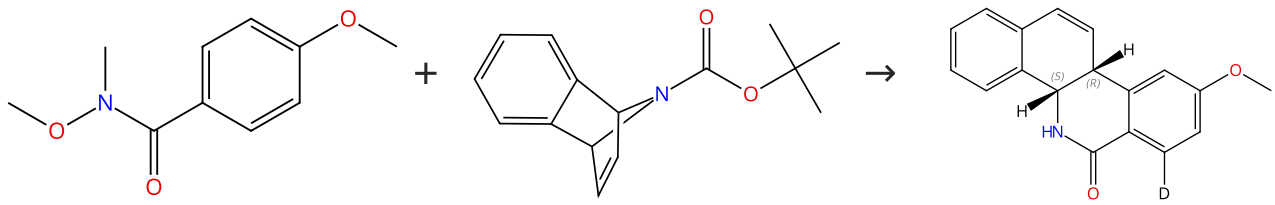
Ruthenium(II)-Catalyzed Regioselective-Controlled Allenylation/Cyclization of Benzimides with Propargyl Alcohols

By: Anukumar, Adapa; et al

Journal of Organic Chemistry (2018), 83(15), 8567-8580.

Scheme 43 (1 Reaction)

Steps: **1** Yield: **84%**



Suppliers (65)

Suppliers (49)

Relative stereochemistry shown

31-614-CAS-33435179

Steps: **1** Yield: **84%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver triflate, Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: Water; 24 h, 100 °C

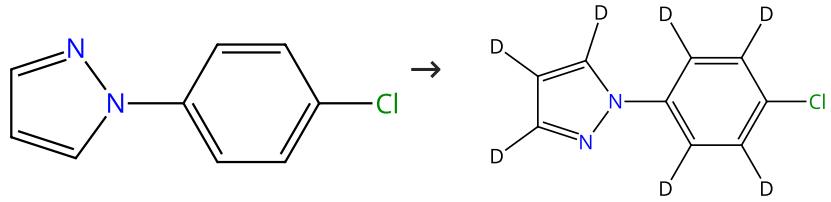
A Ruthenium-Catalyzed Cyclization to Dihydrobenzo[c] phenanthridinone from 7-Azabenzonorbornadienes with Aryl Amides

By: Aravindan, Narasingan; et al

Organic Letters (2022), 24(29), 5260-5265.

Scheme 44 (1 Reaction)

Steps: **1** Yield: **82%**



Suppliers (52)

31-116-CAS-20829285

Steps: **1** Yield: **82%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver acetate, Triphenylphosphine, Bis(dichloro(η^6-*p*-cymene)ruthenium); 24 h, 150 °C

Experimental Protocols

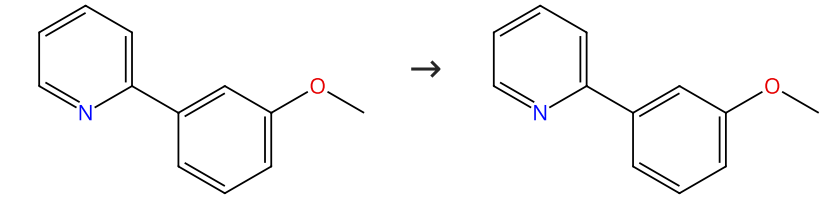
Ruthenium-Catalyzed ortho- and meta-H/D Exchange of Arenes

By: Zhao, Liang-Liang; et al

Organic Letters (2019), 21(24), 10023-10027.

Scheme 45 (1 Reaction)

Steps: **1** Yield: **82%**



Suppliers (18)

31-614-CAS-27890837

Steps: **1** Yield: **82%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver acetate, Triphenylphosphine, Bis(dichloro(η^6-*p*-cymene)ruthenium); 24 h, 150 °C

Experimental Protocols

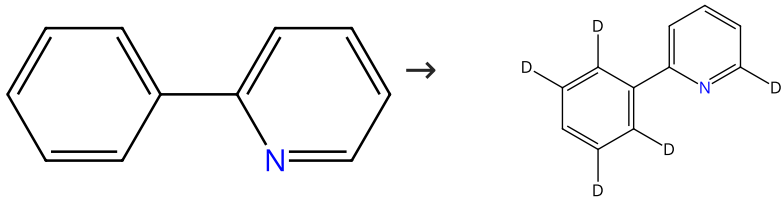
Ruthenium-Catalyzed ortho- and meta-H/D Exchange of Arenes

By: Zhao, Liang-Liang; et al

Organic Letters (2019), 21(24), 10023-10027.

Scheme 46 (1 Reaction)

Steps: **1** Yield: **81%**



Suppliers (93)

31-116-CAS-20829296

Steps: **1** Yield: **81%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver acetate, Triphenylphosphine, Bis(dichloro(η^6-*p*-cymene)ruthenium); 24 h, 150 °C

Experimental Protocols

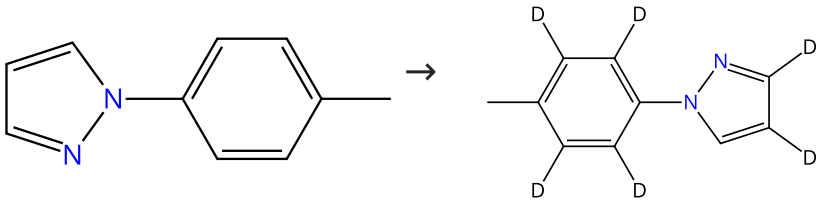
Ruthenium-Catalyzed ortho- and meta-H/D Exchange of Arenes

By: Zhao, Liang-Liang; et al

Organic Letters (2019), 21(24), 10023-10027.

Scheme 47 (1 Reaction)

Steps: **1** Yield: **81%**



Suppliers (60)

31-116-CAS-20829280

Steps: **1** Yield: **81%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver acetate, Triphenylphosphine, Bis(dichloro(η^6-*p*-cymene)ruthenium); 24 h, 150 °C

Experimental Protocols

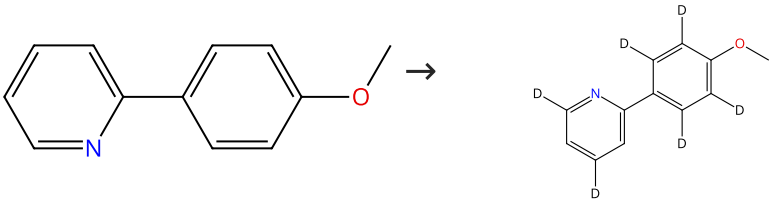
Ruthenium-Catalyzed ortho- and meta-H/D Exchange of Arenes

By: Zhao, Liang-Liang; et al

Organic Letters (2019), 21(24), 10023-10027.

Scheme 48 (1 Reaction)

Steps: **1** Yield: **81%**



Suppliers (65)

31-116-CAS-20829292

Steps: **1** Yield: **81%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver acetate, Triphenylphosphine, Bis(dichloro(η^6-*p*-cymene)ruthenium); 24 h, 150 °C

Experimental Protocols

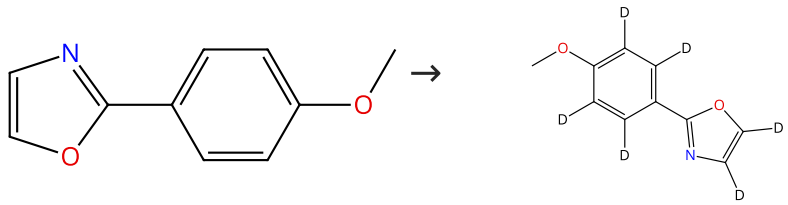
Ruthenium-Catalyzed ortho- and meta-H/D Exchange of Arenes

By: Zhao, Liang-Liang; et al

Organic Letters (2019), 21(24), 10023-10027.

Scheme 49 (1 Reaction)

Steps: **1** Yield: **80%**



Suppliers (29)

31-116-CAS-20829304

Steps: **1** Yield: **80%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver acetate, Triphenylphosphine, Bis(dichloro(η^6-*p*-cymene)ruthenium); 24 h, 150 °C

Experimental Protocols

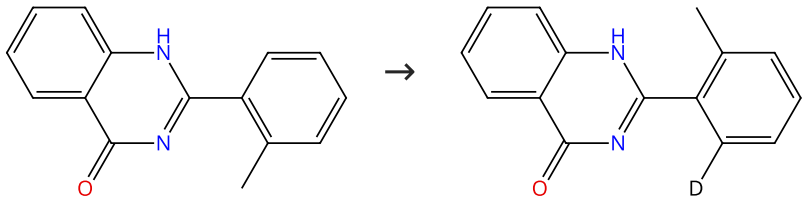
Ruthenium-Catalyzed ortho- and meta-H/D Exchange of Arenes

By: Zhao, Liang-Liang; et al

Organic Letters (2019), 21(24), 10023-10027.

Scheme 50 (1 Reaction)

Steps: **1** Yield: **80%**



Suppliers (21)

31-116-CAS-22922501

Steps: **1** Yield: **80%**

1.1 **Reagents:** Sodium acetate, Acetic acid-d_4
Catalysts: Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethane; rt; 20 h, 80 °C

Experimental Protocols

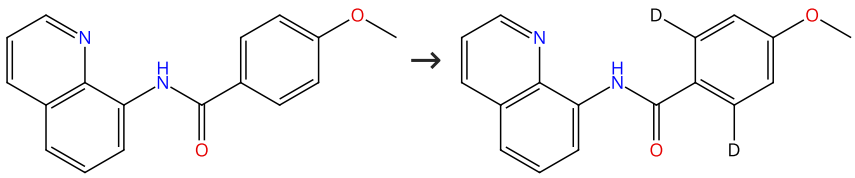
Ru(II)-Catalyzed C-H addition and oxidative cyclization of 2-aryl quinazolinones with activated aldehydes

By: Choi, Jin Ho; et al

Organic & Biomolecular Chemistry (2020), 18(47), 9611-9622.

Scheme 51 (1 Reaction)

Steps: **1** Yield: **80%**



Suppliers (6)

31-116-CAS-18735636

Steps: **1** Yield: **80%**

1.1 **Reagents:** Potassium acetate, Acetic acid-d_4
Catalysts: Triphenylphosphine, Bis(dichloro(η^6-*p*-cymene) ruthenium)
Solvents: 1,2-Dichlorobenzene; 36 h, 120 °C

Experimental Protocols

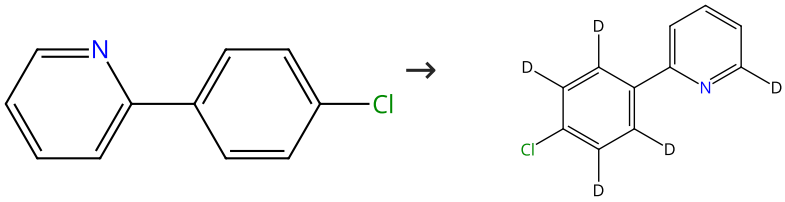
Remote alkylation of N-(quinolin-8-yl)benzamides with alkyl bromides via ruthenium(ii)-catalyzed C-H bond activation

By: Mariappan, Arumugam; et al

Organic & Biomolecular Chemistry (2018), 16(18), 3419-3427.

Scheme 52 (1 Reaction)

Steps: **1** Yield: **80%**



Suppliers (68)

31-116-CAS-20829293

Steps: **1** Yield: **80%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver acetate, Triphenylphosphine, Bis(dichloro(η^6-*p*-cymene)ruthenium); 24 h, 150 °C

Experimental Protocols

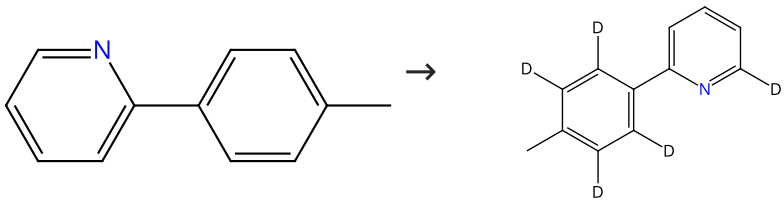
Ruthenium-Catalyzed ortho- and meta-H/D Exchange of Arenes

By: Zhao, Liang-Liang; et al

Organic Letters (2019), 21(24), 10023-10027.

Scheme 53 (1 Reaction)

Steps: **1** Yield: **79%**



Suppliers (80)

31-116-CAS-20829291

Steps: **1** Yield: **79%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver acetate, Triphenylphosphine, Bis(dichloro(η^6-*p*-cymene)ruthenium); 24 h, 150 °C

Experimental Protocols

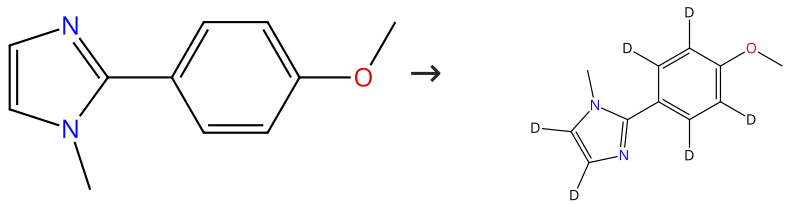
Ruthenium-Catalyzed ortho- and meta-H/D Exchange of Arenes

By: Zhao, Liang-Liang; et al

Organic Letters (2019), 21(24), 10023-10027.

Scheme 54 (1 Reaction)

Steps: **1** Yield: **78%**



Suppliers (6)

31-116-CAS-20829298

Steps: **1** Yield: **78%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver acetate, Triphenylphosphine, Bis(dichloro(η^6-*p*-cymene)ruthenium); 24 h, 150 °C

Experimental Protocols

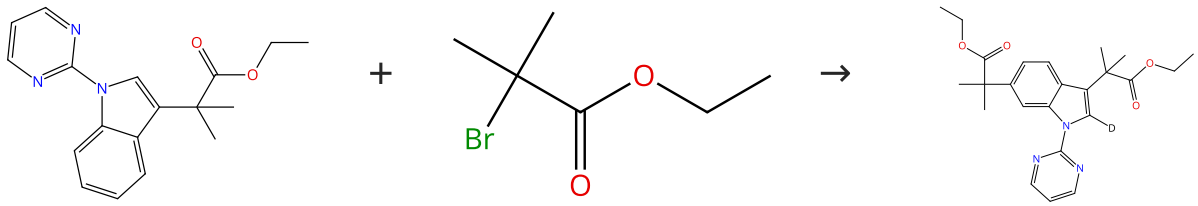
Ruthenium-Catalyzed ortho- and meta-H/D Exchange of Arenes

By: Zhao, Liang-Liang; et al

Organic Letters (2019), 21(24), 10023-10027.

Scheme 55 (1 Reaction)

Steps: **1** Yield: **74%**



Suppliers (60)

31-085-CAS-16939182

Steps: **1** Yield: **74%**

1.1 **Reagents:** Potassium acetate, Acetic acid-*d*
Catalysts: Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,4-Dioxane; rt → 120 °C; 16 h, 120 °C

Experimental Protocols

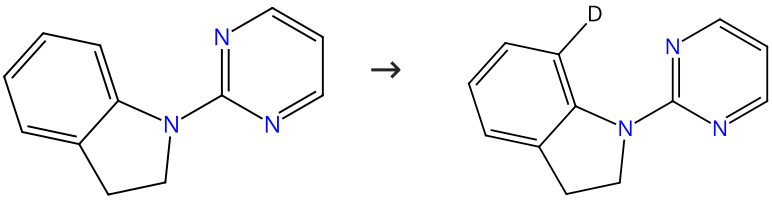
Remote C6-Selective Ruthenium-Catalyzed C-H Alkylation of Indole Derivatives via σ-Activation

By: Leitch, Jamie A.; et al

ACS Catalysis (2017), 7(4), 2616-2623.

Scheme 56 (1 Reaction)

Steps: **1** Yield: **73%**



Suppliers (10)

31-614-CAS-42086613

Steps: **1** Yield: **73%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 2,2,2-Trifluoroethan-*1,1*-d_2-ol-*d*; 3 h, 100 °C

Experimental Protocols

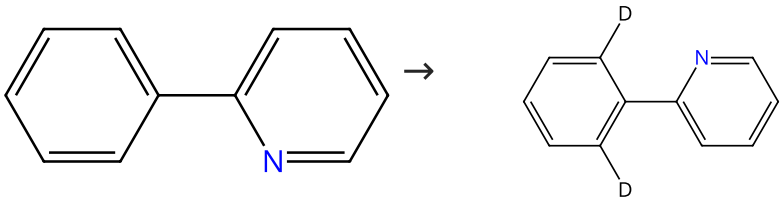
Ru(II)-catalyzed C7 trifluoromethylthiolation and thioarylation of indolines using bench-stable reagents

By: Sumit; et al

Journal of Organic Chemistry (2024), 89(21), 15893-15900.

Scheme 57 (1 Reaction)

Steps: **1** Yield: **72%**



Suppliers (93)

Supplier (1)

31-116-CAS-16445132

Steps: **1** Yield: **72%**

1.1 **Reagents:** Potassium carbonate, Acetic acid-*d*
Catalysts: Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: Water-d_2; 20 h, 100 °C

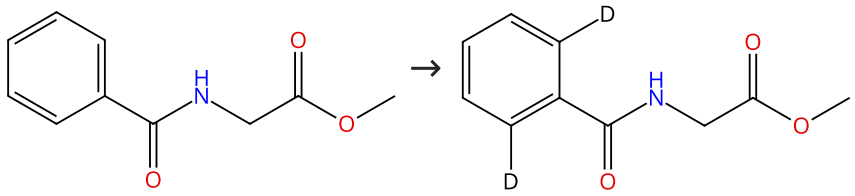
Mechanistic insight into ruthenium catalysed meta-sulfonation of 2-phenylpyridine

By: Marce, Patricia; et al

Catalysis Science & Technology (2016), 6(19), 7068-7076.

Scheme 58 (1 Reaction)

Steps: **1** Yield: **72%**



Suppliers (80)

31-614-CAS-37169162

Steps: **1** Yield: **72%**

1.1 **Reagents:** Cupric acetate, Acetic acid-d_4
Catalysts: Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,1,2,2-Tetrachloroethane; 4 h, 120 °C

Experimental Protocols

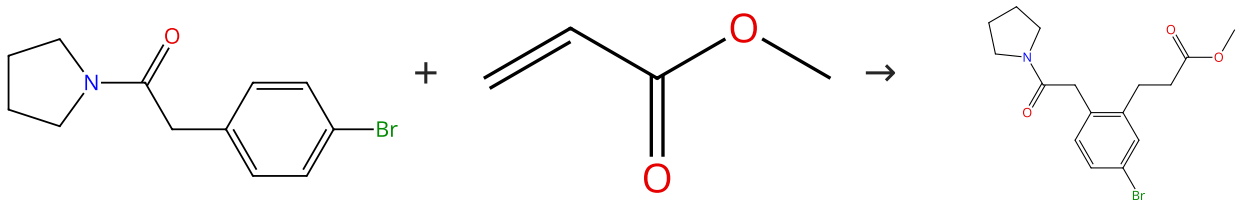
Ru(II)/Ru(IV)-catalyzed C(sp^2)-H allylation with alkene difunctionalization to access isochroman-1-imines

By: Joshi, Ashish; et al

Chemical Communications (Cambridge, United Kingdom) (2023), 59(62), 9497-9500.

Scheme 59 (1 Reaction)

Steps: **1** Yield: **70%**



Suppliers (36)

Suppliers (65)

31-614-CAS-25968650

Steps: **1** Yield: **70%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Ruthenium(2+), tris(acetonitrile)[(1,2,3,4,5,6-η)-1-methyl-4-(1-methylethyl)benzene]-, (*OC*-6-11)-hexafluoro antimonate(1-) (1:2)
Solvents: 1,2-Dichloroethane; 12 h, 120 °C

Experimental Protocols

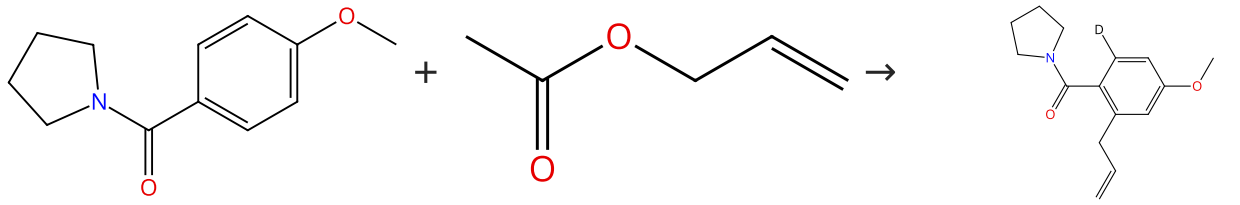
Ruthenium(II)-Catalyzed Distal Weak O-Coordinating C-H Alkylation of Arylacetamides with Alkenes: Combined Experi mental and DFT Studies

By: Sivasakthikumaran, Ramakrishnan; et al

Journal of Organic Chemistry (2019), 84(7), 3977-3989.

Scheme 60 (1 Reaction)

Steps: **1** Yield: **69%**



Suppliers (17)

Suppliers (50)

31-085-CAS-15725063

Steps: **1** Yield: **69%**

1.1 **Reagents:** Acetic acid-d_4, Silver hexafluoroantimonate
Catalysts: Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethane; 36 h, rt

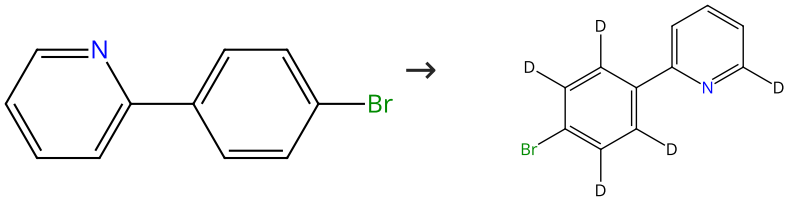
Temperature-controlled redox-neutral ruthenium(II)-catalyzed regioselective allylation of benzamides with allylic acetates

By: Manikandan, Rajendran; et al

Organic & Biomolecular Chemistry (2016), 14(32), 7691-7701.

Scheme 61 (1 Reaction)

Steps: **1** Yield: **67%**



Suppliers (74)

31-116-CAS-20829295

Steps: **1** Yield: **67%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver acetate, Triphenylphosphine, Bis(dichloro(η^6-*p*-cymene)ruthenium); 24 h, 150 °C

Experimental Protocols

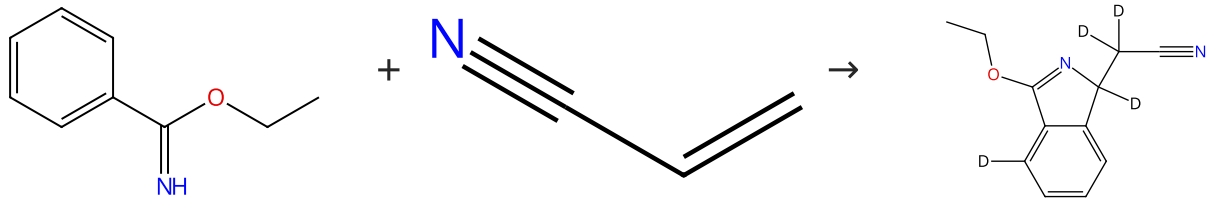
Ruthenium-Catalyzed ortho- and meta-H/D Exchange of Arenes

By: Zhao, Liang-Liang; et al

Organic Letters (2019), 21(24), 10023-10027.

Scheme 62 (1 Reaction)

Steps: **1** Yield: **64%**



Suppliers (20)

Suppliers (76)

31-614-CAS-40879671

Steps: **1** Yield: **64%**

1.1 **Reagents:** Sodium acetate, Acetic acid-d_4
Catalysts: Copper diacetate monohydrate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 2,2,2-Trifluoroethanol; 5 min; 16 h, 75 °C

Experimental Protocols

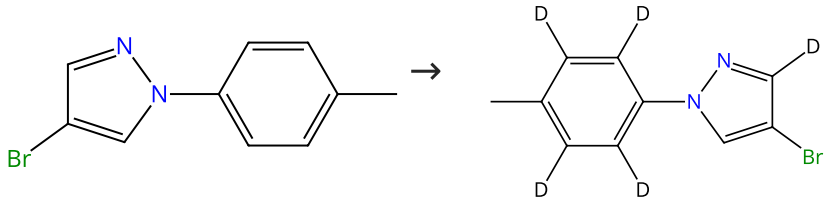
Synthesis of 1 H-Isoindoles via Ruthenium(II)-Catalyzed Cyclization of Benzimidates with Alkenes

By: Shambhavi, Chikkabagilu Nagaraju; et al

Journal of Organic Chemistry (2024), 89(14), 9896-9909.

Scheme 63 (1 Reaction)

Steps: **1** Yield: **64%**



Suppliers (50)

31-116-CAS-20829290

Steps: **1** Yield: **64%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver acetate, Triphenylphosphine, Bis(dichloro(η^6-*p*-cymene)ruthenium); 24 h, 150 °C

Experimental Protocols

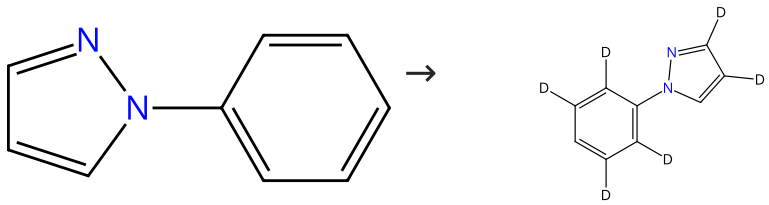
Ruthenium-Catalyzed ortho- and meta-H/D Exchange of Arenes

By: Zhao, Liang-Liang; et al

Organic Letters (2019), 21(24), 10023-10027.

Scheme 64 (1 Reaction)

Steps: **1** Yield: **60%**



Suppliers (90)

31-116-CAS-20829286

Steps: **1** Yield: **60%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver acetate, Triphenylphosphine, Bis(dichloro(η^6-*p*-cymene)ruthenium); 24 h, 150 °C

Experimental Protocols

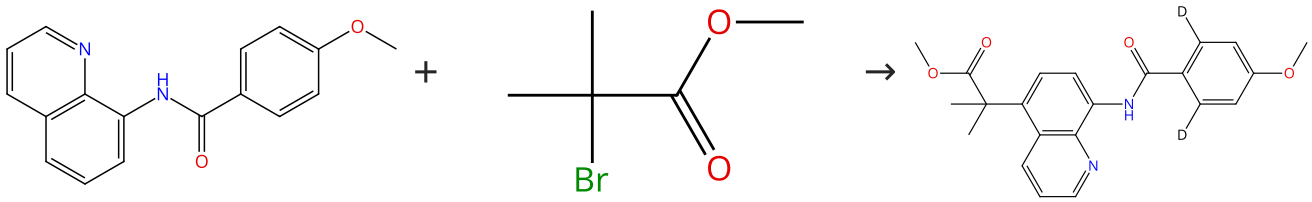
Ruthenium-Catalyzed ortho- and meta-H/D Exchange of Arenes

By: Zhao, Liang-Liang; et al

Organic Letters (2019), 21(24), 10023-10027.

Scheme 65 (1 Reaction)

Steps: **1** Yield: **60%**



Suppliers (6)

Suppliers (66)

31-085-CAS-18735637

Steps: **1** Yield: **60%**

1.1 **Reagents:** Potassium acetate, Acetic acid-d_4
Catalysts: Triphenylphosphine, Bis(dichloro(η^6-*p*-cymene) ruthenium)
Solvents: 1,2-Dichlorobenzene; 36 h, 120 °C

Experimental Protocols

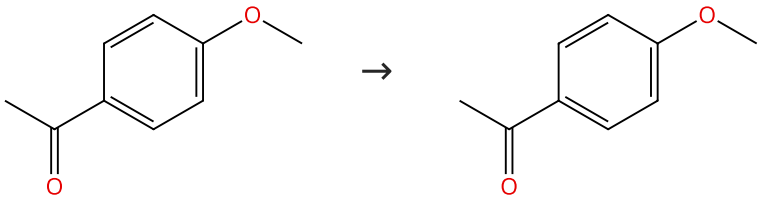
Remote alkylation of N-(quinolin-8-yl)benzamides with alkyl bromides via ruthenium(ii)-catalyzed C-H bond activation

By: Mariappan, Arumugam; et al

Organic & Biomolecular Chemistry (2018), 16(18), 3419-3427.

Scheme 66 (1 Reaction)

Steps: **1** Yield: **55%**



Suppliers (103)

31-614-CAS-24200512

Steps: **1** Yield: **55%**

1.1 **Reagents:** Cupric acetate, Acetic acid-d_4, (2-Propen-1-ylsulfonyl)benzene, Silver hexafluoroantimonate
Catalysts: Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethane; 5 min, rt; 5 min, rt; 10 h, 110 °C

Experimental Protocols

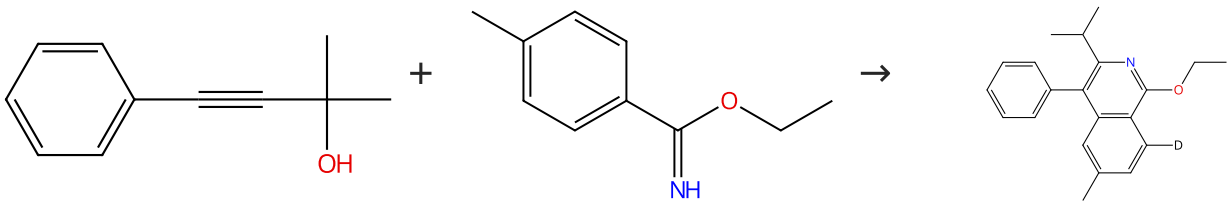
Ruthenium(II)-Catalyzed Regioselective C-H Olefination of Aromatic Ketones and Amides with Allyl Sulfones

By: Dana, Suman; et al

Organic Letters (2021), 23(17), 6855-6860.

Scheme 67 (1 Reaction)

Steps: **1** Yield: **55%**



Suppliers (80)

Suppliers (16)

31-116-CAS-18984195

Steps: **1** Yield: **55%**

1.1 **Reagents:** Acetic acid-d_4, Disodium phosphate
Catalysts: Ruthenium(2+), tris(acetonitrile)[(1,2,3,4,5,6-η)-1-methyl-4-(1-methylethyl)benzene]-, (*OC*-6-11)-hexafluoro antimonate(1-) (1:2)
Solvents: 1,2-Dichloroethane; 12 h, 60 °C

Experimental Protocols

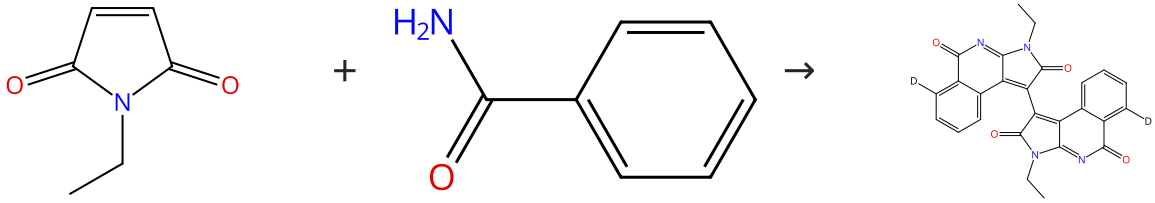
Ruthenium(II)-Catalyzed Regioselective-Controlled Allenylation/Cyclization of Benzimides with Propargyl Alcohols

By: Anukumar, Adapa; et al

Journal of Organic Chemistry (2018), 83(15), 8567-8580.

Scheme 68 (1 Reaction)

Steps: **1** Yield: **54%**



Suppliers (113)

Suppliers (115)

31-116-CAS-21553464

Steps: **1** Yield: **54%**

1.1 **Reagents:** Cupric acetate, Acetic acid-d_4, Silver tetrafluoroborate
Catalysts: Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethane; 5 h, 100 °C

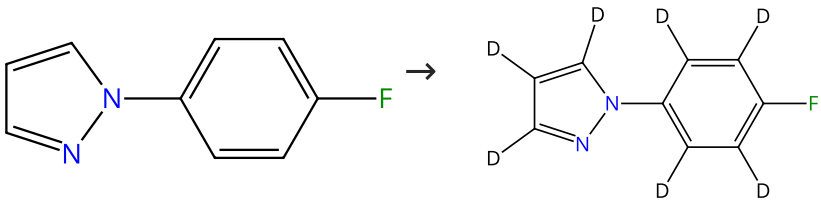
One-Pot Synthesis of Orange-Red Fluorescent Dimeric 2H-Pyrrolo[2,3-c]isoquinoline-2,5(3H)-diones from Benzamides and Maleimides via Ru(II)-Catalyzed Sequential C-C/C-N/C-C Bond Formation

By: Jaiswal, Yogesh; et al

Organic Letters (2020), 22(4), 1605-1610.

Scheme 69 (1 Reaction)

Steps: **1** Yield: **50%**



Suppliers (55)

31-116-CAS-20829284

Steps: **1** Yield: **50%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver acetate, Triphenylphosphine, Bis(dichloro(η^6-*p*-cymene)ruthenium); 24 h, 150 °C

Experimental Protocols

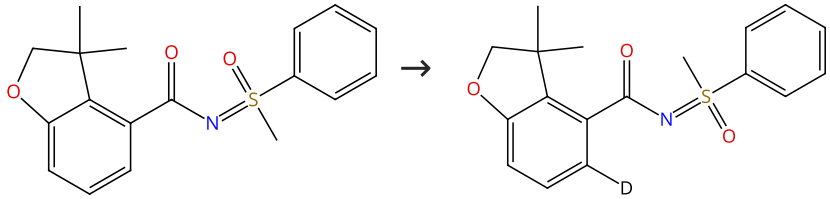
Ruthenium-Catalyzed ortho- and meta-H/D Exchange of Arenes

By: Zhao, Liang-Liang; et al

Organic Letters (2019), 21(24), 10023-10027.

Scheme 70 (1 Reaction)

Steps: **1** Yield: **48%**



31-116-CAS-19145668

Steps: **1** Yield: **48%**

1.1 **Reagents:** Copper diacetate monohydrate
Catalysts: Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethane, Acetic acid-d_4; 10 min, rt

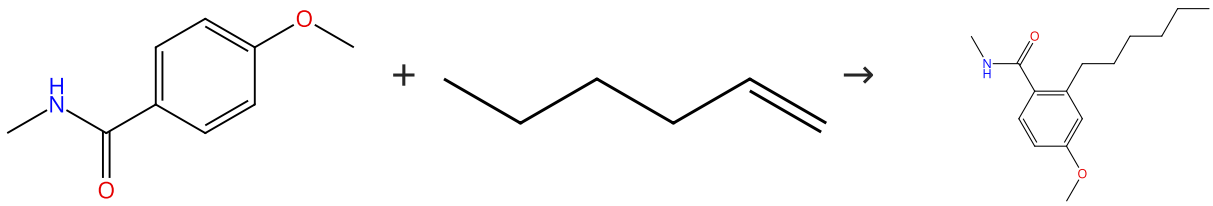
Sulfoximine-Assisted One-Pot Unsymmetrical Multiple Annulation of Arenes: A Combined Experimental and Computational Study

By: Ghosh, Koushik; et al

Journal of Organic Chemistry (2018), 83(17), 9667-9681.

Scheme 71 (1 Reaction)

Steps: **1** Yield: **46%**



Suppliers (60)

Suppliers (81)

31-614-CAS-26470945

Steps: **1** Yield: **46%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Ruthenium(2+), tris(acetonitrile)[(1,2,3,4,5,6-η)-1-methyl-4-(1-methylethyl)benzene]-, (*OC*-6-11)-hexafluoro antimonate(1-) (1:2)
Solvents: 1,4-Dioxane; 6 h, 120 °C

Experimental Protocols

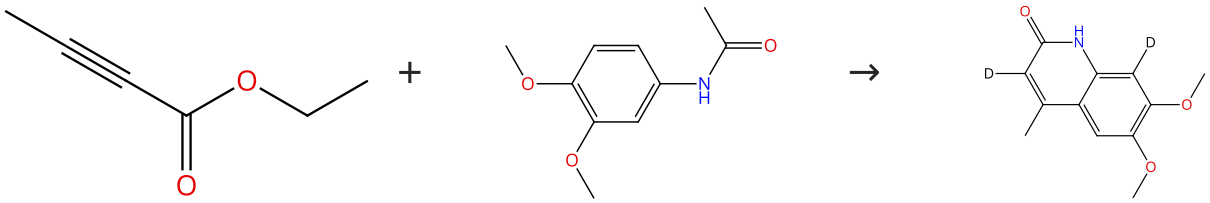
Ruthenium(II)-Catalyzed Redox-Neutral C-H Alkylation of Arylamides with Unactivated Olefins

By: Shambhavi, Chikkabagilu Nagaraju; et al

Organic Letters (2021), 23(12), 4849-4854.

Scheme 72 (1 Reaction)

Steps: **1** Yield: **40%**



Suppliers (86)

Suppliers (42)

31-116-CAS-6495796

Steps: **1** Yield: **40%**

1.1 **Catalysts:** Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: Isopropanol, Acetic acid-d_4; 24 h, 130 °C

Experimental Protocols

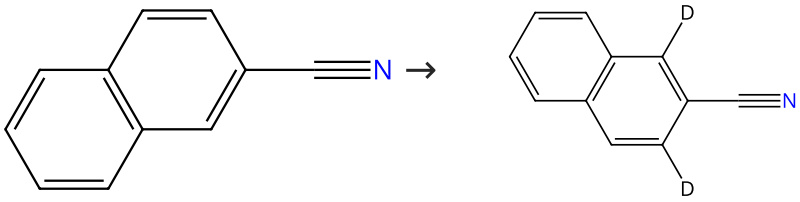
Ruthenium-Catalyzed Cyclization of Anilides with Substituted Propiolates or Acrylates: An Efficient Route to 2-Quinolinones

By: Manikandan, Rajendran; et al

Organic Letters (2014), 16(13), 3568-3571.

Scheme 73 (1 Reaction)

Steps: **1** Yield: **40%**



Suppliers (74)

31-116-CAS-684770

Steps: **1** Yield: **40%**

1.1 **Reagents:** Silver acetate
Catalysts: Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethane, Acetic acid-d_4; > 1 s, rt; 14 h, 120 °C

Experimental Protocols

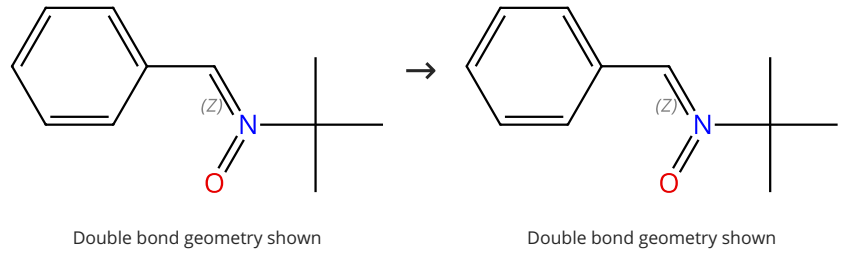
Ruthenium-catalyzed ortho alkenylation of aromatic nitriles with activated alkenes via C-H bond activation

By: Reddy, Mallu Chenna; et al

Chemical Communications (Cambridge, United Kingdom) (2015), 51(53), 10738-10741.

Scheme 74 (1 Reaction)

Steps: **1** Yield: **38%**



Double bond geometry shown

Double bond geometry shown

Suppliers (17)

31-614-CAS-30931921

Steps: **1** Yield: **38%**

1.1 **Reagents:** Dipotassium phosphate
Catalysts: Silver hexafluorophosphate, Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethane; > 1 s, rt

1.2 **Reagents:** Acetic acid-d_4; 16 h, 120 °C

Experimental Protocols

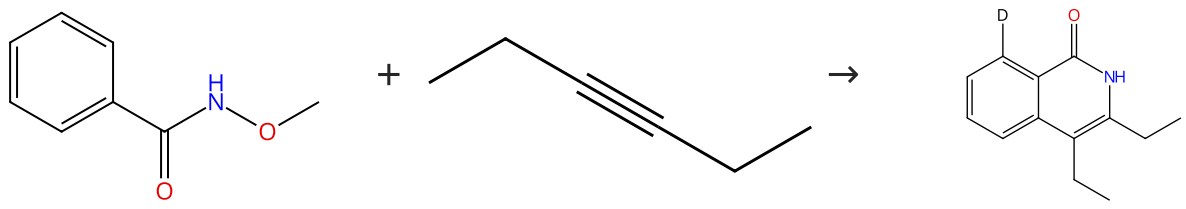
Regio- and Diastereoselective Access to Fused Isoxazolidines via Ru(II)-Catalyzed C-H Activation of Nitrones and Coupling with Perfluoroalkylolefins

By: Li, Yunyun; et al

Organic Letters (2018), 20(2), 437-440.

Scheme 75 (1 Reaction)

Steps: **1** Yield: **35%**



Suppliers (49)

Suppliers (53)

31-116-CAS-20668512

Steps: **1** Yield: **35%**

1.1 **Reagents:** Cupric acetate, Acetic acid-d_4
Catalysts: Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethane; 1 h, 120 °C

Experimental Protocols

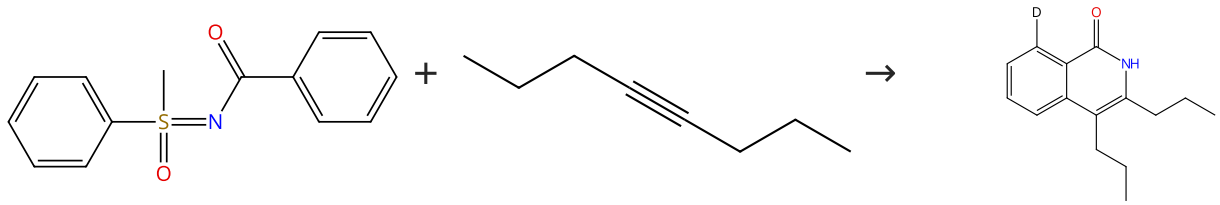
Construction of Pyranoisoquinolines via Ru(II)-Catalyzed Unsymmetrical Double Annulation of N-Methoxybenzamides with Unactivated Alkynes

By: Guntreddi, Tirumaleswararao; et al

Journal of Organic Chemistry (2019), 84(20), 13033-13044.

Scheme 76 (1 Reaction)

Steps: **1** Yield: **33%**



Suppliers (4)

Suppliers (47)

31-116-CAS-19145579

Steps: **1** Yield: **33%**

1.1 **Reagents:** Cupric acetate, Acetic acid-d_4
Catalysts: Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,4-Dioxane; 6 h, 120 °C

Experimental Protocols

One-Pot Unsymmetrical {[4 + 2] and [4 + 2] } Double Annulations of o/o'-C-H Bonds of Arenes: Access to Unusual Pyranoisoquinolines

By: Shankar, Majji; et al

Organic Letters (2018), 20(17), 5144-5148.

Scheme 77 (1 Reaction)

Steps: **1** Yield: **33%**

31-116-CAS-19145580

Steps: **1** Yield: **33%**

1.1 **Reagents:** Cupric acetate, Acetic acid-d_4
Catalysts: Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,4-Dioxane; 6 h, 120 °C

Experimental Protocols

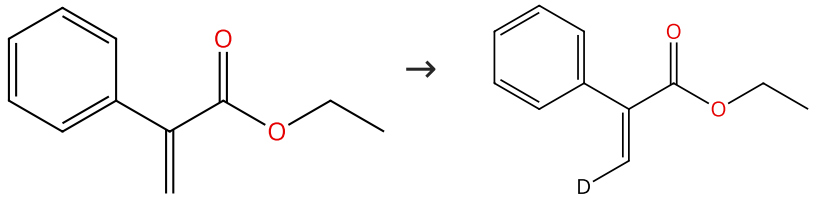
One-Pot Unsymmetrical {[4 + 2] and [4 + 2] } Double Annulations of o/o'-C-H Bonds of Arenes: Access to Unusual Pyranoisoquinolines

By: Shankar, Majji; et al

Organic Letters (2018), 20(17), 5144-5148.

Scheme 78 (1 Reaction)

Steps: **1** Yield: **26%**



Suppliers (59)

31-116-CAS-2327109

Steps: **1** Yield: **26%**

1.1 **Reagents:** Cupric acetate
Catalysts: Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,4-Dioxane, Acetic acid-*d*; rt → 135 °C; 2 h, 135 °C; cooled

Experimental Protocols

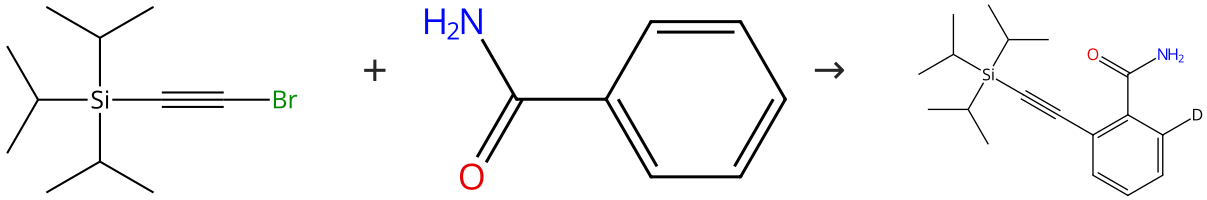
Stereo- and Chemoselective Cross-Coupling between Two Electron-Deficient Acrylates: An Efficient Route to (Z,E)-Muconate Derivatives

By: Hu, Xu-Hong; et al

Journal of the American Chemical Society (2015), 137(9), 3169-3172.

Scheme 79 (1 Reaction)

Steps: **1** Yield: **24%**



Suppliers (67)

Suppliers (115)

31-614-CAS-34763780

Steps: **1** Yield: **24%**

1.1 **Reagents:** Silver carbonate, Acetic acid-d_4
Catalysts: Sodium acetate, Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethane; 12 h, 110 °C

Experimental Protocols

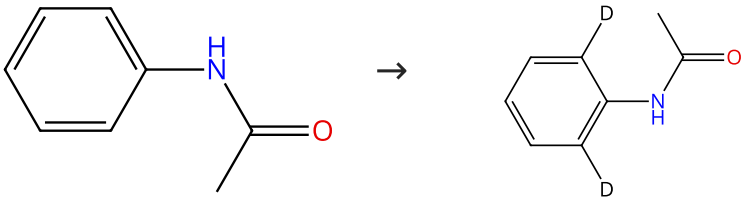
Ru(II)-catalyzed external auxiliary-free primary amide-directed inverse Sonogashira reaction on (hetero)arylamides

By: Baghel, Akanksha Singh; et al

Chemical Communications (Cambridge, United Kingdom) (2022), 58(80), 11304-11307.

Scheme 80 (1 Reaction)

Steps: **1** Yield: **15%**



Suppliers (108)

31-116-CAS-19862499

Steps: **1** Yield: **15%**

1.1 **Reagents:** Cupric acetate, Acetic acid-d_4
Catalysts: Ruthenium(1+), tris(acetonitrile)[(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]-, (*OC*-6-11)-hexafluoroantimonate(1-)
Solvents: 2-Methyl-2-butanol; 10 h, 90 °C

Rhodium(III)-Catalyzed ortho-Alkenylation of Anilides with Maleimides

By: Tamizmani, Masilamani; et al

ChemistrySelect (2019), 4(11), 2976-2981.

Scheme 81 (1 Reaction)

Steps: **1** Yield: **13%**

Suppliers (68)

Supplier (1)

31-116-CAS-20966837

Steps: **1** Yield: **13%**

1.1 **Reagents:** Methanol-d_4, Acetic acid-d_4
Catalysts: Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,1,1,3,3,3-Hexafluoro-2-propanol; 5 h, 120 °C

Experimental Protocols

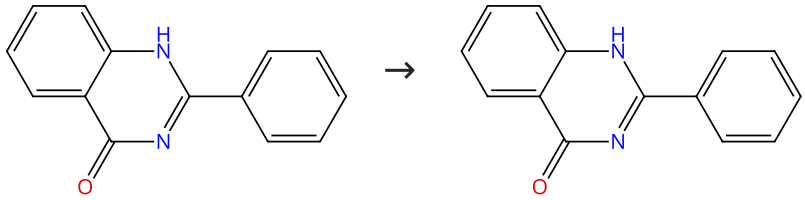
Ru(II)/Rh(III)-Catalyzed C(sp^3)-C(sp^3) Bond Formation through C(sp^3)-H Activation: Selective Linear Alkylation of 8-Methylquinolines and Ketoximes with Olefins

By: Kumar, Rohit; et al

Journal of Organic Chemistry (2020), 85(2), 1181-1192.

Scheme 82 (1 Reaction)

Steps: **1**



Suppliers (72)

31-614-CAS-27190133

Steps: **1**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethane; 10 min, 130 °C; 130 °C → rt

Experimental Protocols

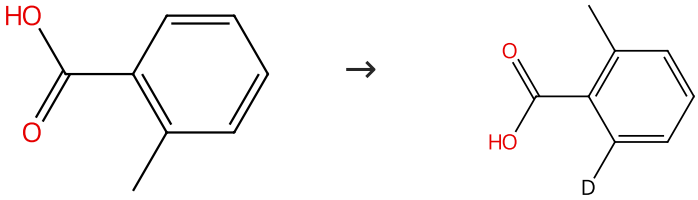
Exceedingly Fast, Direct Access to Dihydroisoquinolino[1,2-b]quinazolinones through a Ruthenium(II)-Catalyzed Redox-Neutral C-H Allylation/Hydroamination Cascade

By: Bairy, Gurupada; et al

Organic Letters (2018), 20(22), 7107-7112.

Scheme 83 (1 Reaction)

Steps: **1**



Suppliers (91)

Suppliers (3)

31-116-CAS-17765562

Steps: **1**

1.1 **Reagents:** Potassium carbonate, Acetic acid-*d*
Catalysts: Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 2-Methyl-2-butanol; 24 h, 80 °C

Experimental Protocols

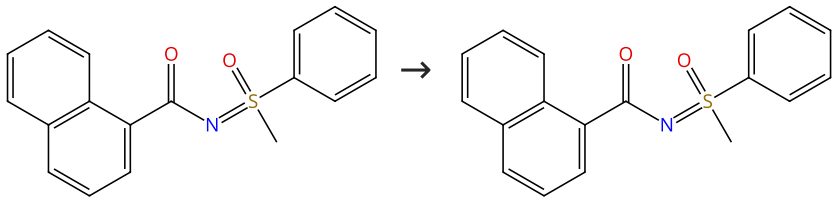
Ruthenium-Catalyzed Alkynylation of Benzoic Acids Mediated by a Weakly Coordination-Directing Auxiliary

By: Chen, Changpeng; et al

European Journal of Organic Chemistry (2017), 2017(32), 4749-4752.

Scheme 84 (1 Reaction)

Steps: **1**



Suppliers (2)

Supplier (1)

31-614-CAS-24916729

Steps: **1**

1.1 **Reagents:** Cupric acetate, Acetic acid-d_4, Silver hexafluoro antimonate
Catalysts: Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,4-Dioxane; 6 h, 120 °C

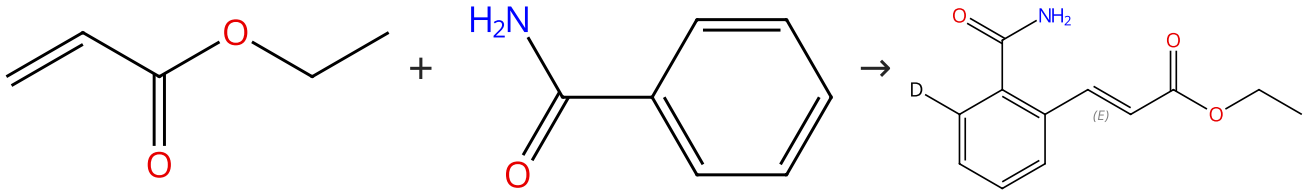
Experimental Protocols

Double annulation of ortho- and peri-C-H bonds of fused (hetero)arenes to unusual oxepino-pyridines

By: Shankar, Majji; et al

Chemical Science (2020), 11(39), 10770-10777.

Scheme 85 (1 Reaction) Steps: **1**



Suppliers (76) Suppliers (115)

Double bond geometry shown

31-116-CAS-23773461 Steps: **1**

1.1 **Reagents:** Acetic acid, Cupric acetate, Acetic acid-d_4, Silver tetrafluoroborate
Catalysts: Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethane; 8 h, 100 °C

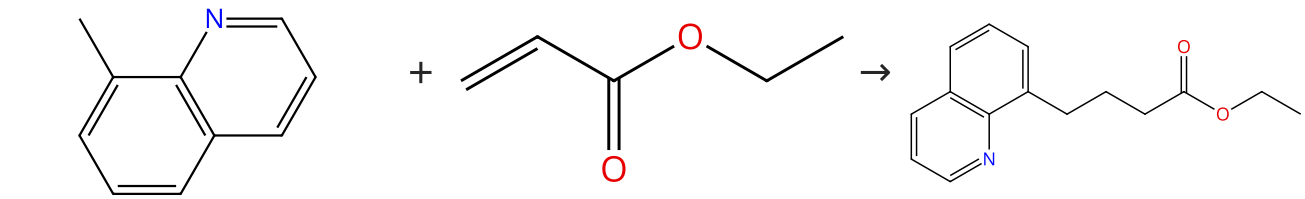
Experimental Protocols

Ru(II)-Catalyzed Controlled Cross-Dehydrogenative Coupling of Benzamides with Activated Olefins via Weakly Coordinating Primary Amides

By: Baghel, Akanksha Singh; et al

Journal of Organic Chemistry (2021), 86(14), 9744-9754.

Scheme 86 (1 Reaction) Steps: **1**



Suppliers (68) Suppliers (76)

31-614-CAS-25589872 Steps: **1**

1.1 **Reagents:** Methanol-d_4, Acetic acid-d_4
Catalysts: Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,1,1,3,3,3-Hexafluoro-2-propanol; 5 h, 120 °C

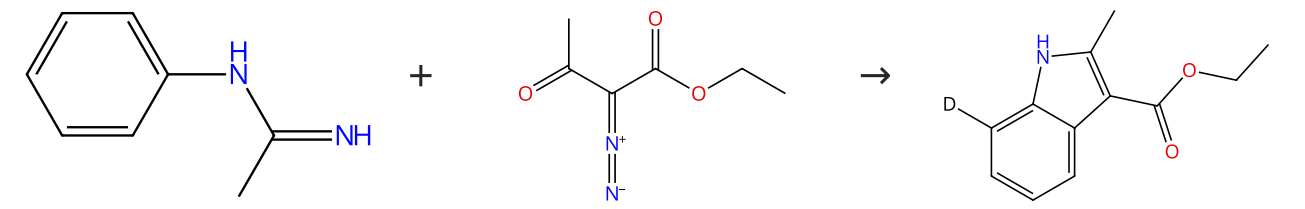
Experimental Protocols

Ru(II)/Rh(III)-Catalyzed C(sp^3)-C(sp^3) Bond Formation through C(sp^3)-H Activation: Selective Linear Alkylation of 8-Methylquinolines and Ketoximes with Olefins

By: Kumar, Rohit; et al

Journal of Organic Chemistry (2020), 85(2), 1181-1192.

Scheme 87 (1 Reaction) Steps: **1**



Suppliers (12) Suppliers (41)

31-116-CAS-16122782 Steps: **1**

1.1 **Reagents:** Acetic acid-*d*
Catalysts: Cesium acetate, Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethane; > 1 s, rt

1.2 12 h, 40 °C

Experimental Protocols

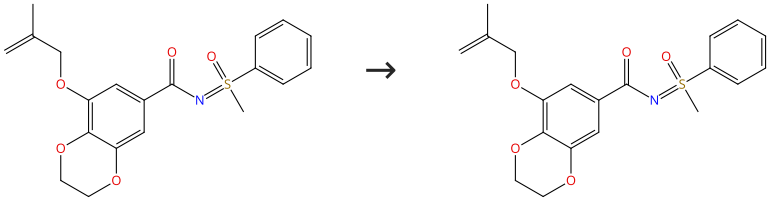
Ruthenium(II)-Catalyzed C-H Activation of Imidamides and Divergent Couplings with Diazo Compounds: Substrate-Controlled Synthesis of Indoles and 3 H-Indoles

By: Li, Yunyun; et al

Angewandte Chemie, International Edition (2016), 55(39), 11877-11881.

Scheme 88 (1 Reaction)

Steps: **1**



31-614-CAS-28578657

Steps: **1**

1.1 **Reagents:** Cupric acetate, Silver hexafluoroantimonate
Catalysts: Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: Methanol-d_4, Acetic acid-d_4; 6 h, rt

Ruthenium-Catalyzed Hydroarylation and One-Pot Twofold Unsymmetrical C-H Functionalization of Arenes

By: Ghosh, Koushik; et al

Angewandte Chemie, International Edition (2016), 55(27), 7821-7825.

Scheme 89 (1 Reaction)

Steps: **1**

Suppliers (58)

31-614-CAS-25166685

Steps: **1**

1.1 **Reagents:** Acetic acid-d_4, Copper diacetate monohydrate
Catalysts: Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethane; 6 h, 80 °C

Experimental Protocols

Electronic Nature of Ketone Directing Group as a Key To Control C-2 vs C-4 Alkenylation of Indoles

By: Lanke, Veeranjaneyulu; et al

Organic Letters (2016), 18(21), 5496-5499.

Scheme 90 (1 Reaction)

Steps: **1**

Suppliers (83)

31-116-CAS-24239608

Steps: **1**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 2,2,2-Trifluoroethanol; 20 h, 50 °C

Experimental Protocols

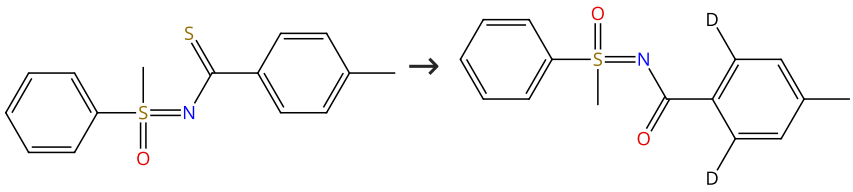
Ruthenium(II)-catalyzed regioselective direct C4- and C5-diamidation of indoles and mechanistic studies

By: Devkota, Shreedhar; et al

Chemical Science (2021), 12(34), 11427-11437.

Scheme 91 (1 Reaction)

Steps: **1**



31-614-CAS-24290831

Steps: **1**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Cupric acetate, Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,4-Dioxane; 1 h, 120 °C

Experimental Protocols

Sulfur and Nitrogen Modulated One-Pot Double Annulation of Arenes

By: Shankar, Majji; et al

Journal of Organic Chemistry (2021), 86(21), 14942-14955.

Scheme 92 (1 Reaction)

Steps: **1**

31-116-CAS-17032350

Steps: **1**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: Tetrahydrofuran; rt; 20 h, 140 °C

Experimental Protocols

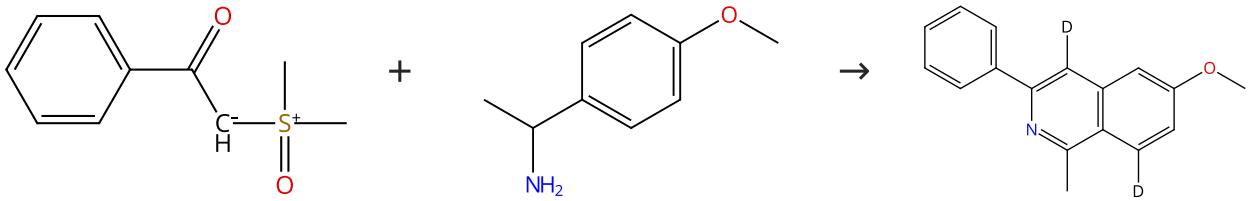
Highly chemoselective ruthenium(II)-catalyzed direct arylation of cyclic and N,N-dialkyl benzamides with aryl silanes

By: Nareddy, Pradeep; et al

Chemical Science (2017), 8(4), 3204-3210.

Scheme 93 (1 Reaction)

Steps: **1**



Suppliers (38)

Suppliers (70)

31-614-CAS-34077933

Steps: **1**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver triflate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: Dichloromethane; 12 h, 80 °C

Free Amine-Directed Ru(II)-Catalyzed Redox-Neutral [4 + 2] C-H Activation/Annulation of Benzylamines with Sulfoxonium Ylides

By: Aher, Yogesh N.; et al

Journal of Organic Chemistry (2022), 87(19), 12608-12621.

Scheme 94 (1 Reaction)

Steps: **1**

Suppliers (16)

31-614-CAS-33759623

Steps: **1**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethylene; 16 h, reflux

Experimental Protocols

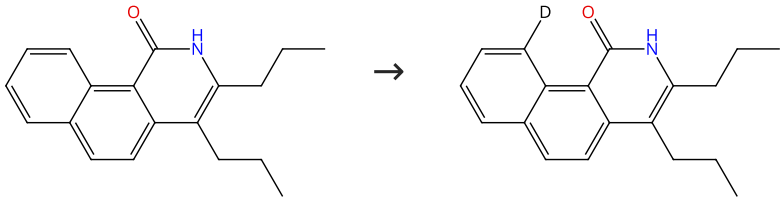
Transition metal-catalyzed regioselective functionalization of carbazoles and indolines with maleimides

By: Cho, Eun Hee; et al

Organic & Biomolecular Chemistry (2022), 20(34), 6776-6783.

Scheme 95 (1 Reaction)

Steps: **1**



31-116-CAS-22752710

Steps: **1**

1.1 **Reagents:** Cupric acetate, Acetic acid-d_4, Silver hexafluoro antimonate
Catalysts: Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,4-Dioxane; 6 h, 120 °C

Experimental Protocols

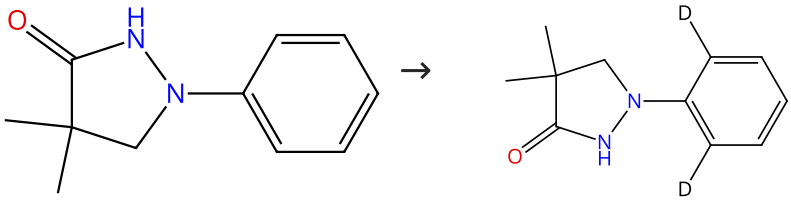
Double annulation of ortho- and peri-C-H bonds of fused (hetero)arenes to unusual oxepino-pyridines

By: Shankar, Majji; et al

Chemical Science (2020), 11(39), 10770-10777.

Scheme 96 (1 Reaction)

Steps: **1**



Suppliers (25)

31-116-CAS-22793701

Steps: **1**

1.1 **Reagents:** Sodium acetate, Acetic acid-*d*
Catalysts: Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: Methanol; 12 h, 100 °C

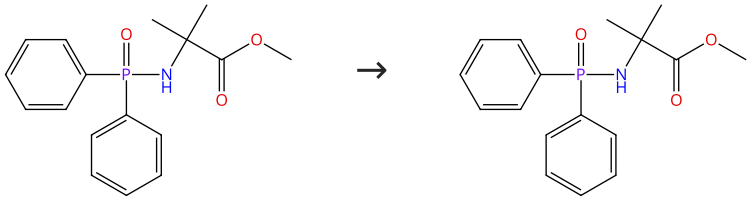
Ru(II)-Catalyzed tunable cascade reaction via C-H/C-C bond cleavage

By: Yang, Zi; et al

Journal of Organic Chemistry (2020), 85(20), 12960-12970.

Scheme 97 (1 Reaction)

Steps: **1**



31-614-CAS-31460471

Steps: **1**

1.1 **Reagents:** Silver acetate, Acetic acid-d_4, Oxygen
Catalysts: Silver hexafluoroantimonate, Dichloro[(1,2,3,4,5,6-η)-1-methyl-4-(1-methylethyl)benzene]ruthenium
Solvents: 1,2-Dichloroethane, Methanol-d_4; 30 min, 150 °C

Experimental Protocols

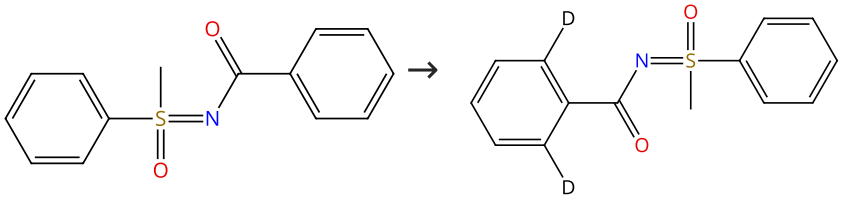
Microwave-Assisted Ruthenium- and Rhodium-Catalyzed Couplings of α-Amino Acid Ester-Derived Phosphinamides with Alkynes

By: Li, Xue-Hong; et al

Chemistry - An Asian Journal (2022), 17(2), e202101158.

Scheme 98 (2 Reactions)

Steps: **1**



Suppliers (4)

31-116-CAS-19145578

Steps: **1**

1.1 **Reagents:** Cupric acetate, Acetic acid-d_4
Catalysts: Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,4-Dioxane; 6 h, 120 °C

Experimental Protocols

One-Pot Unsymmetrical {[4 + 2] and [4 + 2] } Double Annulations of o/o'-C-H Bonds of Arenes: Access to Unusual Pyranoisoquinolines

By: Shankar, Majji; et al

Organic Letters (2018), 20(17), 5144-5148.

31-116-CAS-9496367

Steps: **1**

1.1 **Reagents:** Potassium acetate
Catalysts: Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: Acetic acid-d_4; 18 h, 120 °C

Experimental Protocols

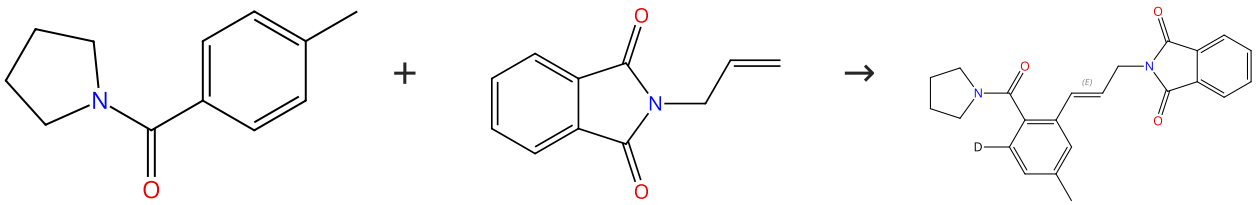
Sulfoximine Directed Intermolecular o-C-H Amidation of Arenes with Sulfonyl Azides

By: Yadav, M. Ramu; et al

Organic Letters (2013), 15(7), 1638-1641.

Scheme 99 (1 Reaction)

Steps: **1**



Suppliers (24)

Suppliers (72)

Double bond geometry shown

31-614-CAS-36428377 Steps: **1**

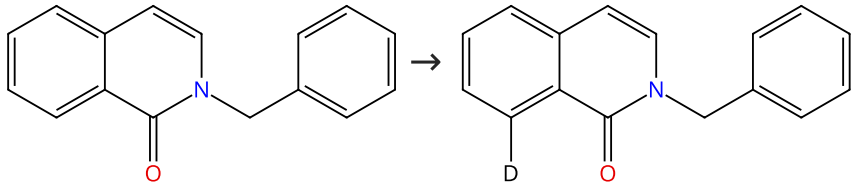
1.1 **Reagents:** Cupric acetate, Acetic acid-d_4, Disodium phosphate, Silver hexafluoroantimonate
Catalysts: Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,4-Dioxane; 10 min, rt; 8 h, 100 °C

Ru(II)-Catalyzed Oxidative Cross-Dehydrogenative Alkenyl ations of Aromatic Amides and Ketones with Unacti vated Olefins

By: Giri, Chandan Kumar; et al

Chemistry - An Asian Journal (2023), 18(10), e202300243.

Scheme 100 (1 Reaction) Steps: **1**



Suppliers (4)

31-614-CAS-38396090 Steps: **1**

1.1 **Reagents:** Acetic acid-*d*
Catalysts: Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethane; 3 h, rt

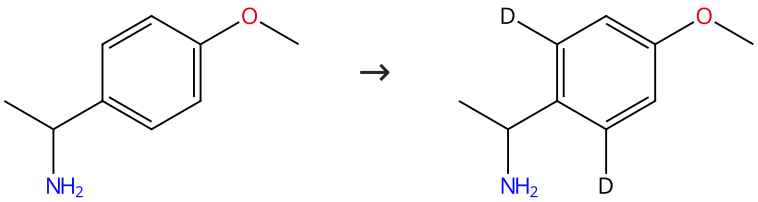
Experimental Protocols

Chemo selective C-H alkylation of isoquinolones with maleimides: A combined experimental and computational case study

By: Chandra, Devesh; et al

Molecular Catalysis (2023), 551, 113597.

Scheme 101 (1 Reaction) Steps: **1**



Suppliers (70)

31-614-CAS-34077934 Steps: **1**

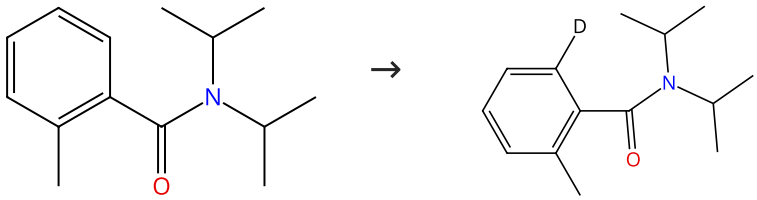
1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver triflate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: Dichloromethane; 12 h, 80 °C

Free Amine-Directed Ru(II)-Catalyzed Redox-Neutral [4 + 2] C-H Activation/Annulation of Benzylamines with Sulfoxonium Ylides

By: Aher, Yogesh N.; et al

Journal of Organic Chemistry (2022), 87(19), 12608-12621.

Scheme 102 (1 Reaction) Steps: **1**



Suppliers (22)

31-116-CAS-21962346 Steps: **1**

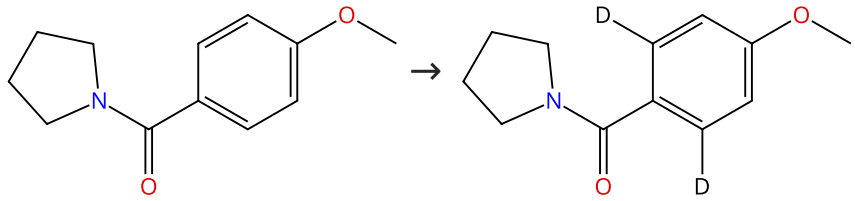
1.1 **Reagents:** Acetic acid-d_4
Catalysts: Cupric acetate, [1,1,1-Trifluoro-*N*-[(trifluoromethyl) sulfonyl-κ*O*]methanesulfonamidato-κ*O*]silver, [*N*-[(1*S*,2*S*)-2-(Amino-κ*N*)-1,2-diphenylethyl]-4-methylbenzenesulfo namidato-κ*N*]chloro[(1,2,3,4,5,6-η)-1-methyl-4-(1-methylethyl) benzene]ruthenium
Solvents: 1,2-Dichloroethane; 2 h, 80 °C

Rhodium-Catalyzed ortho-Olefination of Sterically Demanding Benzamides: Application to the Asymmetric Synthesis of Axially Chiral Benzamides

By: Yoshimura, Ryo; et al

Chemistry - A European Journal (2020), 26(22), 4969-4973.

Scheme 103 (1 Reaction) Steps: **1**



Suppliers (17)

31-116-CAS-17032349 Steps: **1**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: Tetrahydrofuran; rt; 20 h, 140 °C

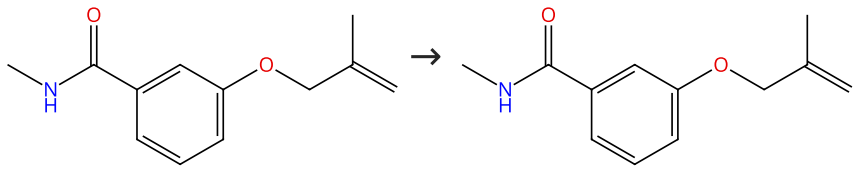
Experimental Protocols

Highly chemoselective ruthenium(II)-catalyzed direct arylation of cyclic and N,N-dialkyl benzamides with aryl silanes

By: Nareddy, Pradeep; et al

Chemical Science (2017), 8(4), 3204-3210.

Scheme 104 (1 Reaction) Steps: **1**



Suppliers (3)

31-614-CAS-26729792 Steps: **1**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Manganese diacetate, Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium); 6 h, 70 °C

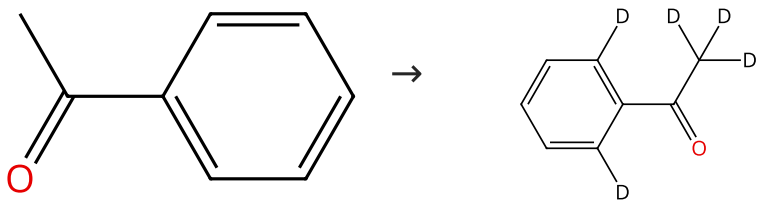
Experimental Protocols

Ruthenium-Catalyzed Intramolecular Hydroarylation of Arenes and Mechanistic Study: Synthesis of Dihydroben zofurans, Indolines, and Chromans

By: Rit, Raja K.; et al

Journal of Organic Chemistry (2016), 81(18), 8552-8560.

Scheme 105 (1 Reaction) Steps: **1**



Suppliers (109)

31-116-CAS-4242581 Steps: 1

1.1 **Reagents:** Silver acetate, Acetic acid-d_4
Catalysts: Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium); 24 h, 100 °C

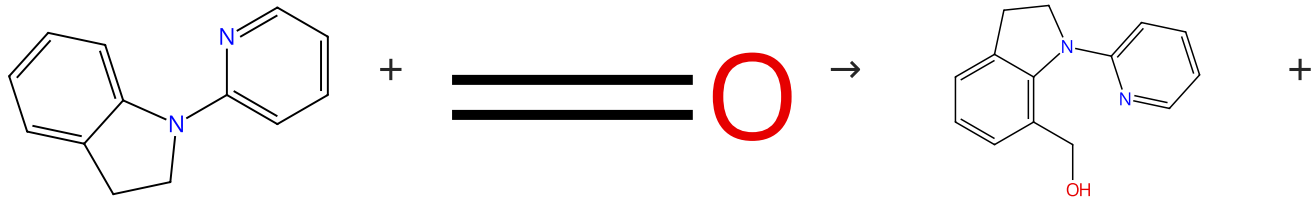
Experimental Protocols

Ru(II)-catalyzed intermolecular ortho-C-H amidation of aromatic ketones with sulfonyl azides

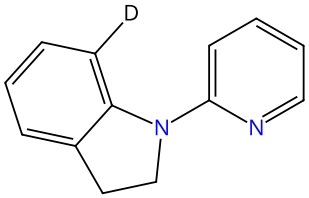
By: Bhanuchandra, M.; et al

Chemical Communications (Cambridge, United Kingdom) (2013), 49(45), 5225-5227.

Scheme 106 (1 Reaction) Steps: **1** Yield: **61%**



Suppliers (7) Suppliers (206) Suppliers (2)



31-116-CAS-19688329 Steps: 1 Yield: **61%**

1.1 **Reagents:** Oxygen
Catalysts: Zinc acetate, Tricyclohexylphosphine, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethane, Acetic acid-d_4; 12 h, 40 °C

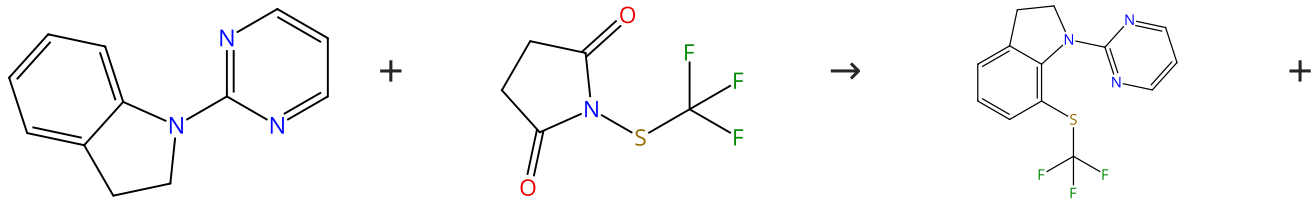
Experimental Protocols

Ruthenium(II)-Catalyzed Site-Selective Hydroxymethylation of Indolines with Paraformaldehyde

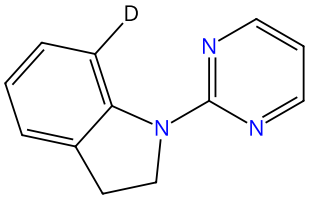
By: Lee, Suk Hun; et al

Journal of Organic Chemistry (2019), 84(4), 2307-2315.

Scheme 107 (1 Reaction) Steps: **1** Yield: **58%**



Suppliers (10) Suppliers (44)



31-614-CAS-42086605 Steps: 1 Yield: **58%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 2,2,2-Trifluoroethan-*1,1*-d_2-ol-*d*; 3 h, 100 °C

Experimental Protocols

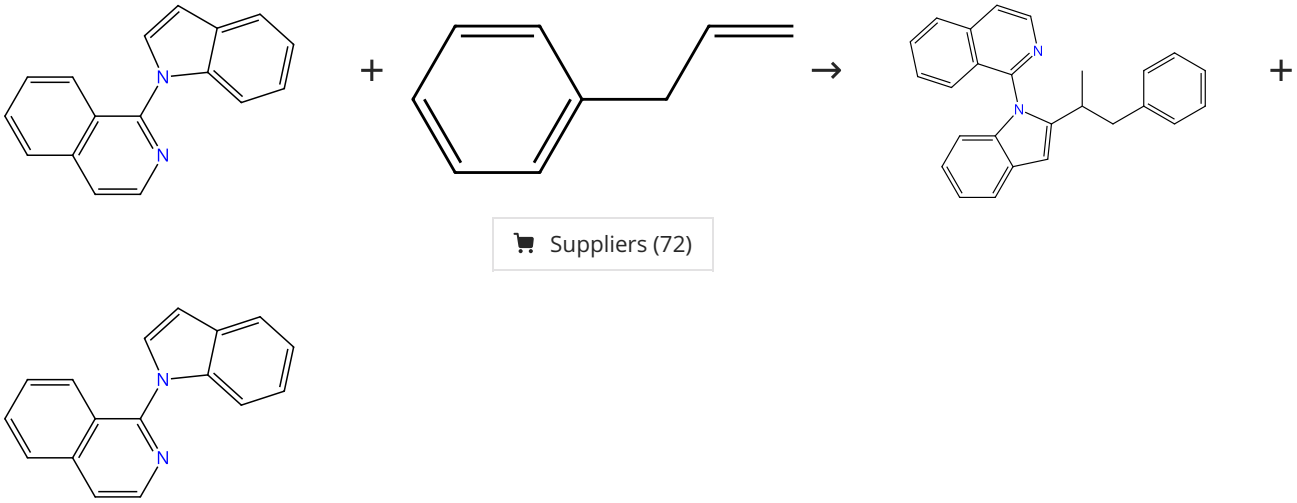
Ru(II)-catalyzed C7 trifluoromethylthiolation and thioarylation of indolines using bench-stable reagents

By: Sumit; et al

Journal of Organic Chemistry (2024), 89(21), 15893-15900.

Scheme 108 (1 Reaction)

Steps: **1** Yield: **56%**



Suppliers (72)

31-614-CAS-34692695

Steps: **1** Yield: **56%**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver hexafluorophosphate, Bis(dichloro(η^6-*p*-cymene)ruthenium), 2-Imidazolidinecarboxylic acid, 1,3-bis[(5-bromo-2-thienyl)carbonyl]-4,5-diphenyl-, (4*S*,5*S*)-
Solvents: Toluene; 24 h, rt

Experimental Protocols

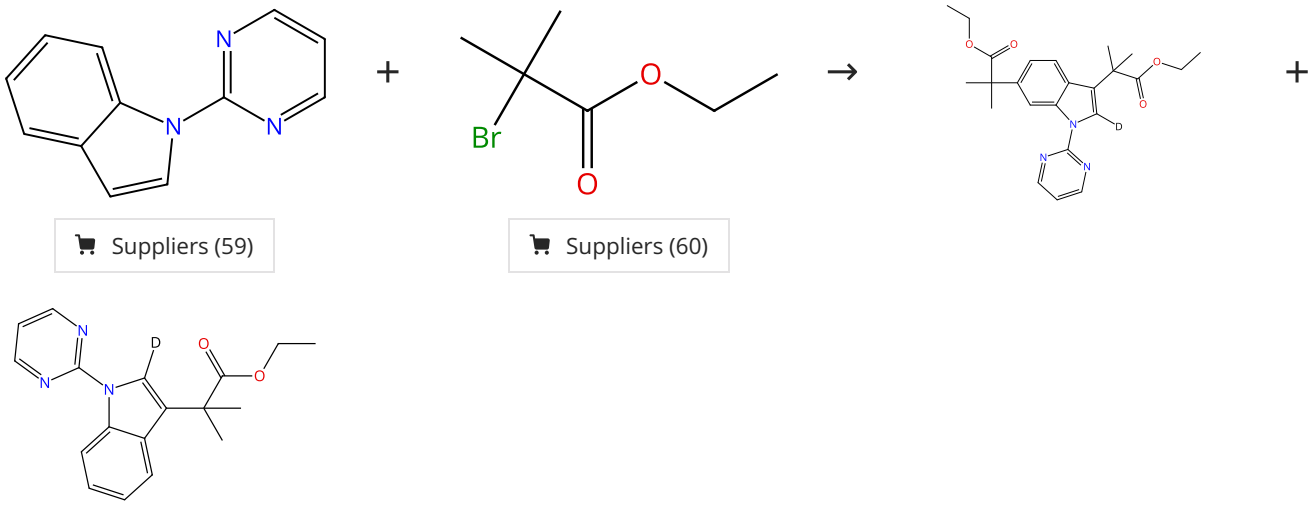
Ruthenium(II)/Imidazolidine Carboxylic Acid-Catalyzed C-H Alkylation for Central and Axial Double Enantio-Induction

By: Li, Yanjun; et al

Angewandte Chemie, International Edition (2022), 61(47), e202212595.

Scheme 109 (1 Reaction)

Steps: **1** Yield: **56%**



Suppliers (59)

Suppliers (60)

31-085-CAS-16939181

Steps: **1** Yield: **56%**

1.1 **Reagents:** Potassium acetate, Acetic acid-*d*
Catalysts: Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,4-Dioxane; rt → 120 °C; 16 h, 120 °C

Experimental Protocols

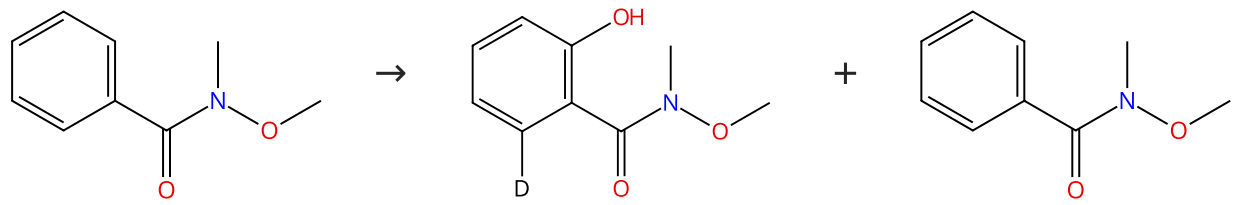
Remote C6-Selective Ruthenium-Catalyzed C-H Alkylation of Indole Derivatives via σ-Activation

By: Leitch, Jamie A.; et al

ACS Catalysis (2017), 7(4), 2616-2623.

Scheme 110 (1 Reaction)

Steps: **1** Yield: **48%**



Suppliers (81)

31-614-CAS-29803183

Steps: **1** Yield: **48%**

1.1 **Reagents:** Trifluoroacetic acid-*d*, Tetrabutylammonium hexafluorophosphate
Catalysts: Iodobenzene, (Acetato-κ*O*)(acetato-κ*O*,κ*O*')[(1,2,3,4,5,6-η)-1-methyl-4-(1-methylethyl)benzene]ruthenium
Solvents: Trifluoroacetic anhydride; 6 h, 50 °C

1.2 **Reagents:** Sodium bicarbonate
Solvents: Water

Experimental Protocols

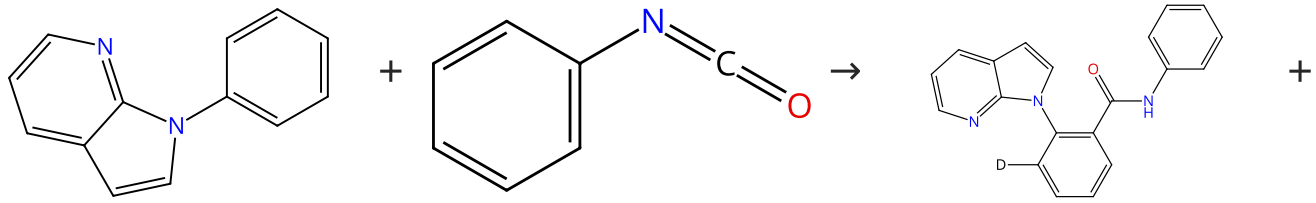
C-H Oxygenation Reactions Enabled by Dual Catalysis with Electrogenerated Hypervalent Iodine Species and Ruthenium Complexes

By: Massignan, Leonardo; et al

Angewandte Chemie, International Edition (2020), 59(8), 3184-3189.

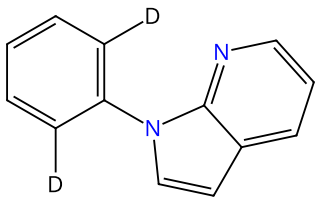
Scheme 111 (1 Reaction)

Steps: **1** Yield: **47%**



Suppliers (6)

Suppliers (25)



31-095-CAS-18701921

Steps: **1** Yield: **47%**

1.1 **Reagents:** Acetic acid-*d*
Catalysts: Sodium hexafluorophosphate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: Dichloromethane; 4 h, 60 °C

Experimental Protocols

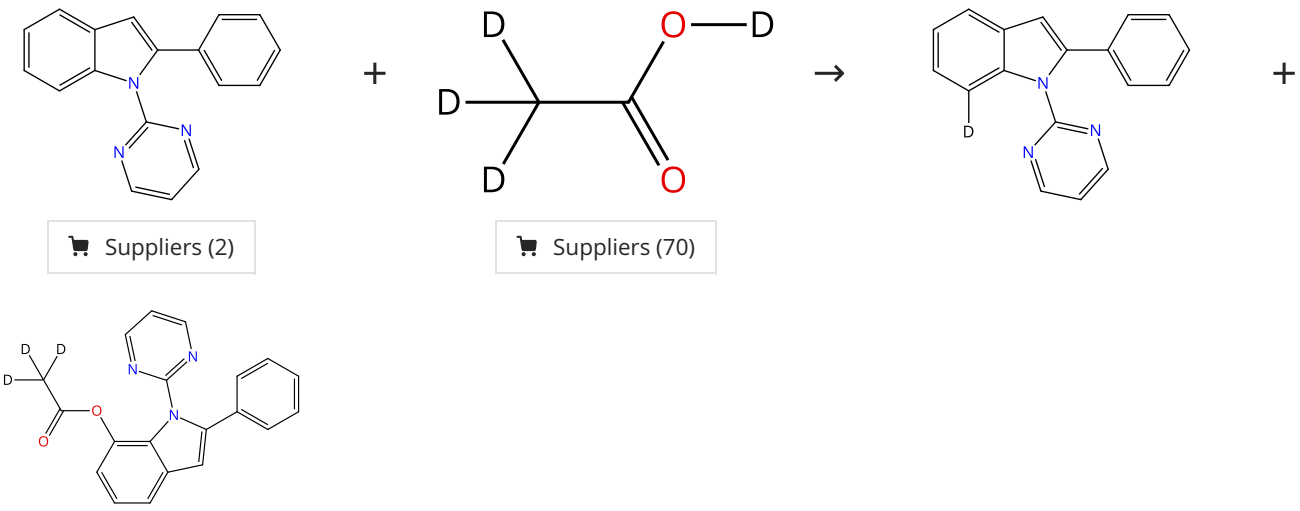
Ru(II)-Catalyzed C-H Aminocarbonylation of N-(Hetero)aryl-7-azaindoles with Isocyanates

By: Jeong, Taejoo; et al

Journal of Organic Chemistry (2018), 83(8), 4641-4649.

Scheme 112 (1 Reaction)

Steps: **1** Yield: **41%**



Suppliers (2)

Suppliers (70)

31-116-CAS-13051745

Steps: **1** Yield: **41%**

1.1 **Reagents:** Silver carbonate
Catalysts: Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: Chlorobenzene; 2 h, 140 °C

Experimental Protocols

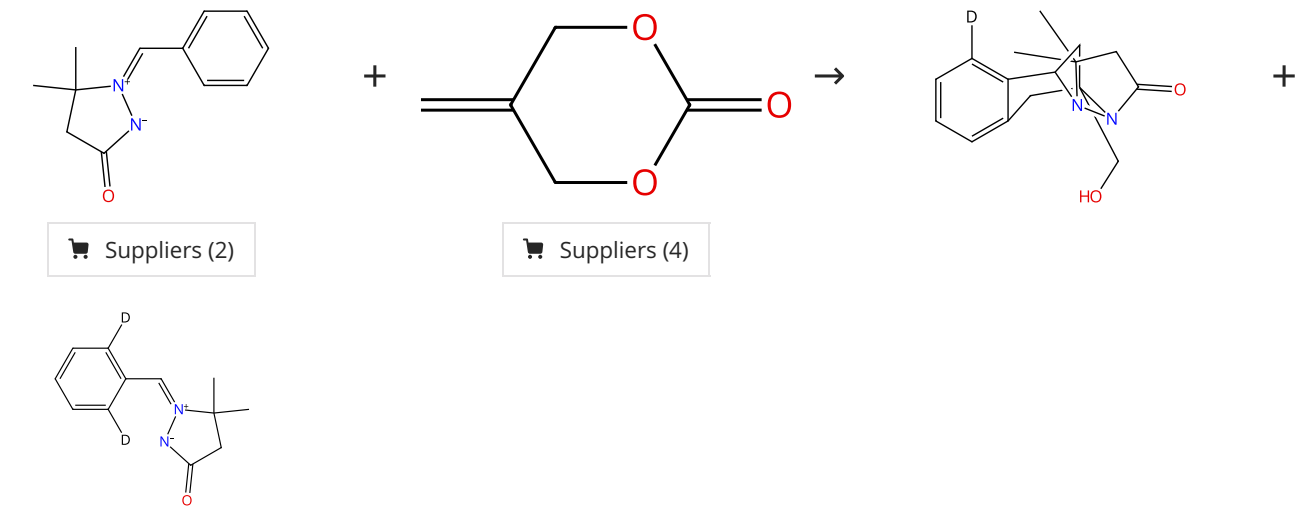
Ruthenium-Catalyzed Regioselective C-H Bond Acetoxylation on Carbazole and Indole Frameworks

By: Okada, Takeshi; et al

Organic Letters (2016), 18(5), 1150-1153.

Scheme 113 (1 Reaction)

Steps: **1** Yield: **35%**



Suppliers (2)

Suppliers (4)

31-614-CAS-34634935

Steps: **1** Yield: **35%**

1.1 **Reagents:** Lithium acetate, Acetic acid-d_4
Catalysts: Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethane; 8 h, 80 °C

Experimental Protocols

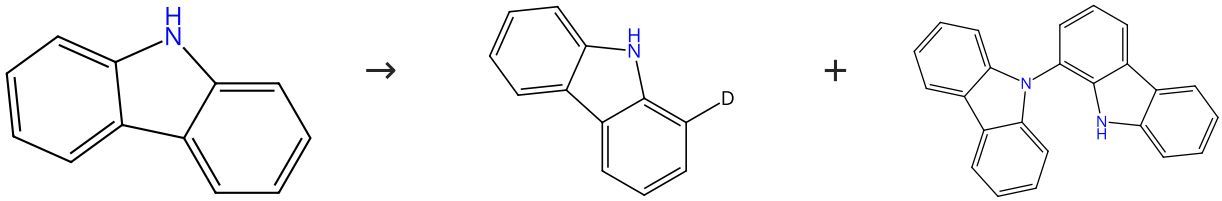
Ruthenium(II)-Catalyzed Tandem C-H Allylation and [3+2] Dipolar Cycloaddition to Construct Bridged Tetracycles

By: Moon, Junghyea; et al

Organic Letters (2022), 24(44), 8115-8119.

Scheme 114 (1 Reaction)

Steps: **1** Yield: **11%**



Suppliers (123)

Supplier (1)

Suppliers (26)

31-116-CAS-8552177 Steps: **1** Yield: **11%**

1.1 **Reagents:** Acetic acid-*d*
Catalysts: Cupric acetate, Bis(dichloro(η^6-*p*-cymene) ruthenium)
Solvents: Chlorobenzene, Tetrachloroethylene; 23 h, 140 °C

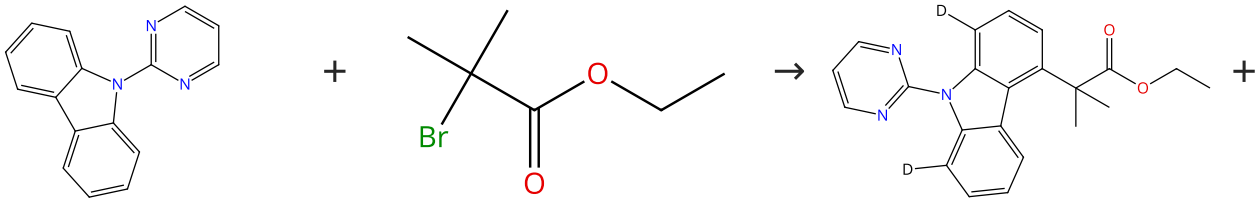
Experimental Protocols

Toward Polynuclear Ru-Cu Catalytic Dehydrogenative C-N Bond Formation, on the Reactivity of Carbazoles

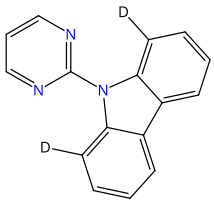
By: Louillat, Marie-Laure; et al

Organic Letters (2013), 15(1), 164-167.

Scheme 115 (1 Reaction) Steps: **1**



Suppliers (3) Suppliers (60)



31-085-CAS-17903393 Steps: **1**

1.1 **Reagents:** Acetic acid-*d*, Benzoic acid, 2,4,6-trimethyl-, potassium salt (1:1)
Catalysts: Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,4-Dioxane; 16 h, 120 °C

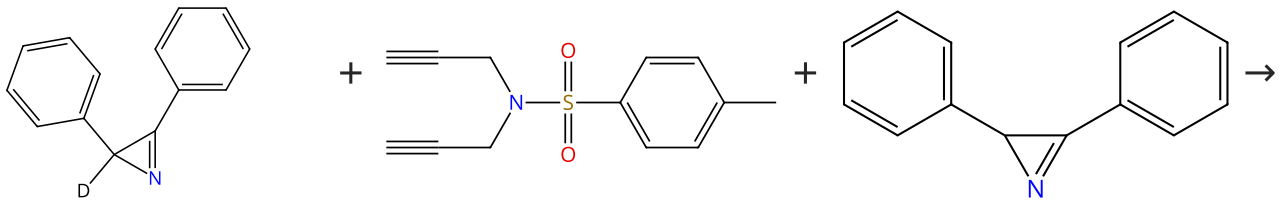
Experimental Protocols

Ruthenium catalyzed remote C4-selective C-H functiona lisation of carbazoles via σ-activation

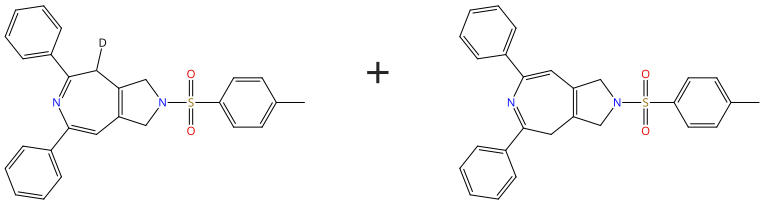
By: Leitch, Jamie A.; et al

Chemical Communications (Cambridge, United Kingdom) (2017), 53(97), 13039-13042.

Scheme 116 (1 Reaction) Steps: **1**



Suppliers (56) Suppliers (3)



31-116-CAS-6770070 Steps: **1**

1.1 **Catalysts:** Chloro[(1,2,5,6-η)-1,5-cyclooctadiene][(1,2,3,4,5-η)-1,2,3,4,5-pentamethyl-2,4-cyclopentadien-1-yl]ruthenium
Solvents: 1,2-Dichloroethane; 5 min, 25 °C

1.2 **Reagents:** Acetic acid-*d*; 5 min, 25 °C

Experimental Protocols

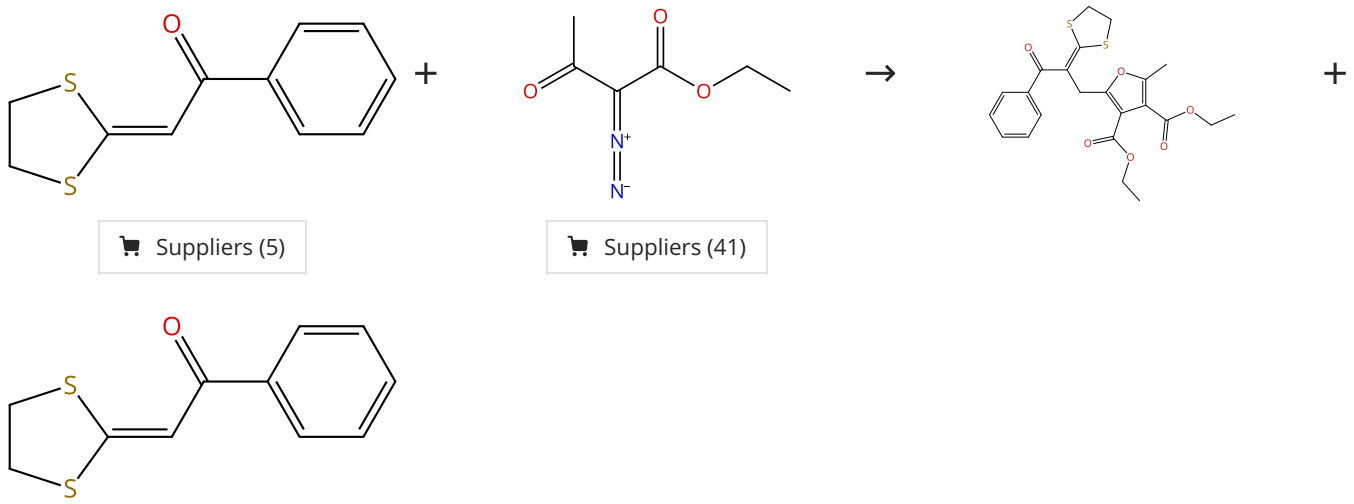
Ruthenium-Catalyzed C-C Bond Cleavage of 2 H-Azirines: A Formal [3+2+2] Cycloaddition to Fused Azepine Skeletons

By: Li, Tengfei; et al

Angewandte Chemie, International Edition (2016), 55(8), 2861-2865.

Scheme 117 (1 Reaction)

Steps: **1**



Suppliers (5)

Suppliers (41)

31-614-CAS-29402362

Steps: **1**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver tetrafluoroborate, Bis(dichloro(η^6-*p*-cymene) ruthenium)
Solvents: 1,2-Dichloroethane; 3 h, 90 °C

Experimental Protocols

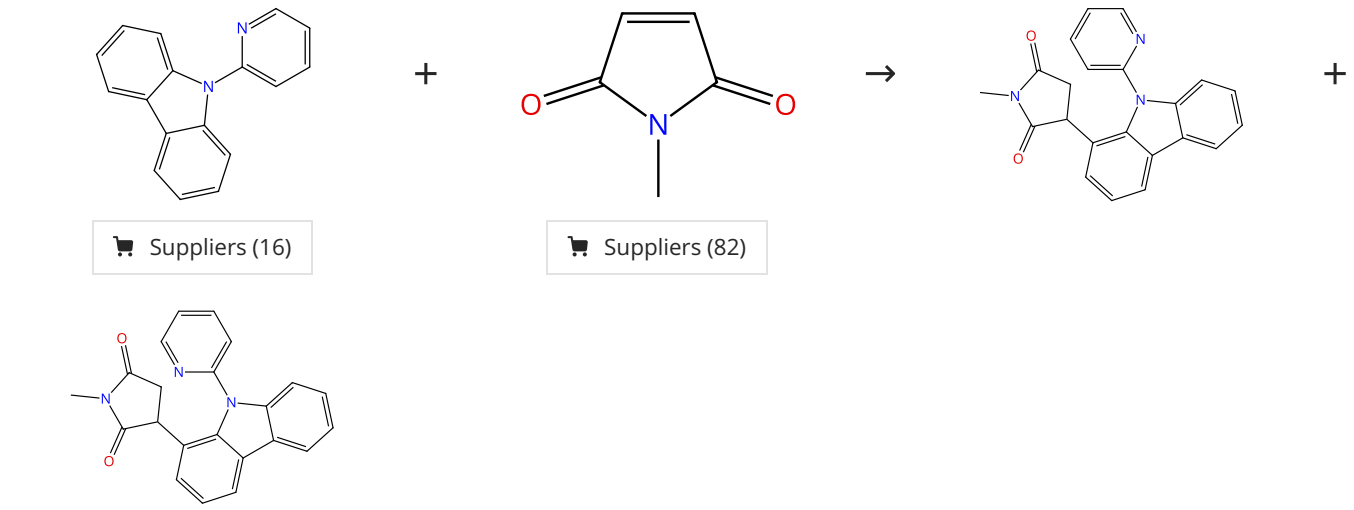
Ruthenium- and Rhodium-Catalyzed Chemodivergent Couplings of Ketene Dithioacetals and α-Diazo Ketones via C-H Activation/Functionalization

By: Wang, Manman; et al

Organic Letters (2018), 20(15), 4597-4600.

Scheme 118 (1 Reaction)

Steps: **1**



Suppliers (16)

Suppliers (82)

31-614-CAS-33759629

Steps: **1**

1.1 **Reagents:** Cupric acetate, Acetic acid-d_4
Catalysts: Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethylene; reflux

Experimental Protocols

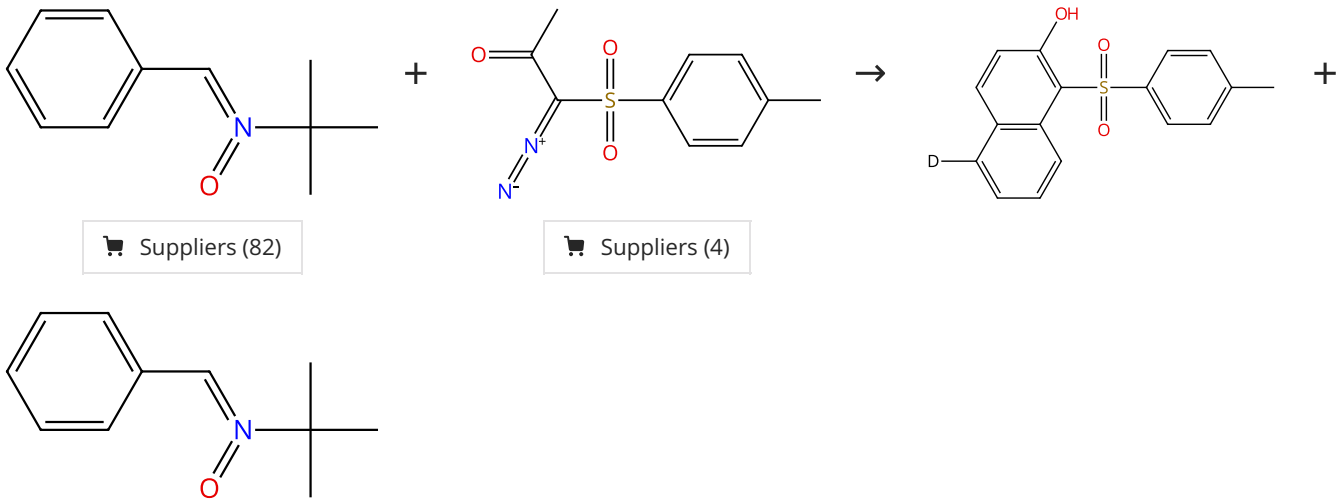
Transition metal-catalyzed regioselective functionalization of carbazoles and indolines with maleimides

By: Cho, Eun Hee; et al

Organic & Biomolecular Chemistry (2022), 20(34), 6776-6783.

Scheme 119 (1 Reaction)

Steps: **1**



Suppliers (82)

Suppliers (4)

31-614-CAS-29888489

Steps: **1**

1.1 **Reagents:** Acetic acid-d_4
Catalysts: Silver hexafluorophosphate, Bis(dichloro(η^6-*p*-cymene)ruthenium), [1,1,1-Trifluoro-*N*-[(trifluoromethyl) sulfonyl-κ*O*]methanesulfonamidato-κ*O*]silver
Solvents: 1,2-Dichloroethane; 24 h, 100 °C

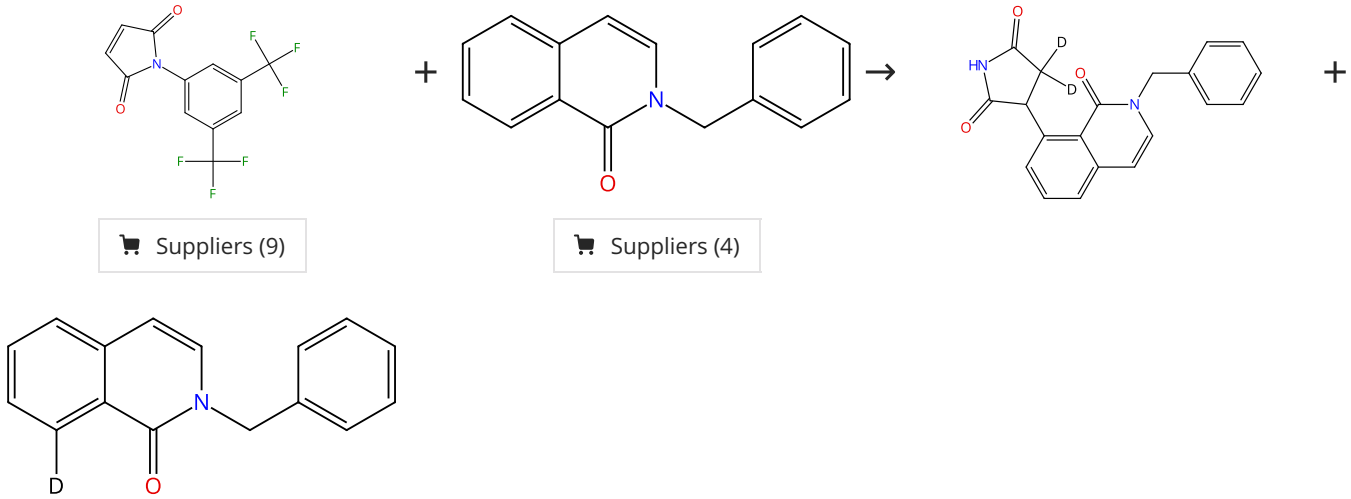
Access to 2-naphthols via Ru(II)-catalyzed C-H annulation of nitrones with α-diazo sulfonyl ketones

By: Kong, Lingheng; et al

Chemical Communications (Cambridge, United Kingdom) (2019), 55(51), 7339-7342.

Scheme 120 (1 Reaction)

Steps: **1**



Suppliers (9)

Suppliers (4)

31-614-CAS-38396091

Steps: **1**

1.1 **Reagents:** Acetic acid-*d*
Catalysts: Silver hexafluoroantimonate, Bis(dichloro(η^6-*p*-cymene)ruthenium)
Solvents: 1,2-Dichloroethane; 3 h, rt

Experimental Protocols

Chemo selective C-H alkylation of isoquinolones with maleimides: A combined experimental and computational case study

By: Chandra, Devesh; et al

Molecular Catalysis (2023), 551, 113597.