

MOLCAT

Welcome to the Molecular Catalysis Research Team
WEB Site

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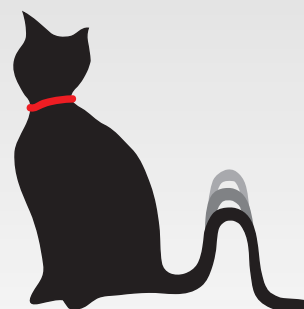


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The Laboratory



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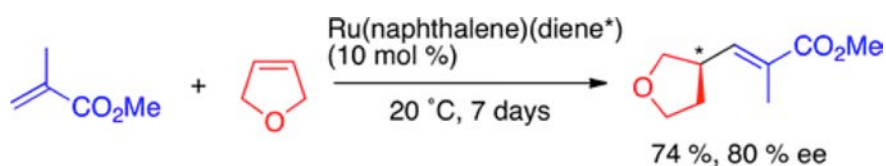


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TAT Tokyo Univ of A & T

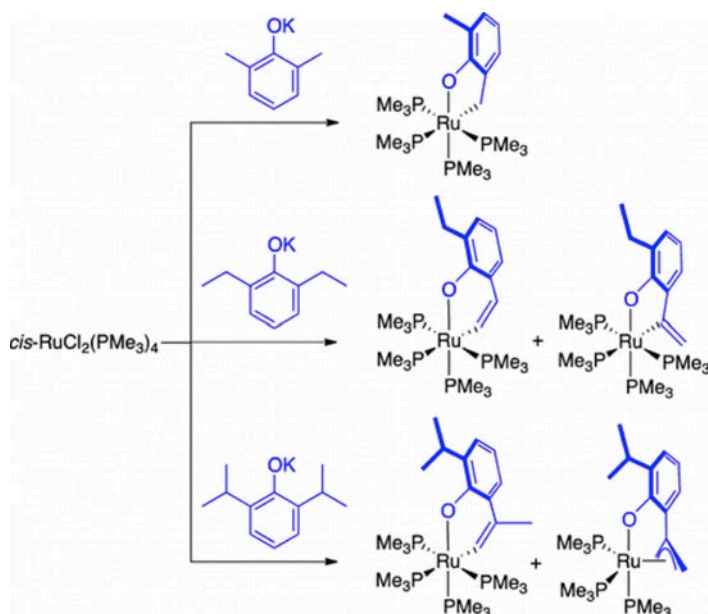


Research Interests:

1. Cross-Dimerization of Alkenes: One of the major focuses in our lab is the selective cross-dimerization of substituted alkenes by zero-valent ruthenium complex. We have developed the first enantioselective cross-dimerization between substituted alkenes, that goes through an oxidative coupling mechanism. (*Org. Lett.*, **2013**, 15, 2486)



2. Bond Activation by Internal Electrophilic Substitution Mechanism: Internal Electrophilic Substitution (IES) mechanism, which is also named as Concerted Metallation Deprotonation (CMD) or Ambiphilic Metal-Ligand Activation (AMLA), is one of the current topics in bond activation processes. However, the understanding in the molecular level and the application is still limited. We have shown multiple C-H bond activation processes of alkyl group in the *ortho* position of the aryloxo group. (*Organometallics*, **2014**, 33, 1235)

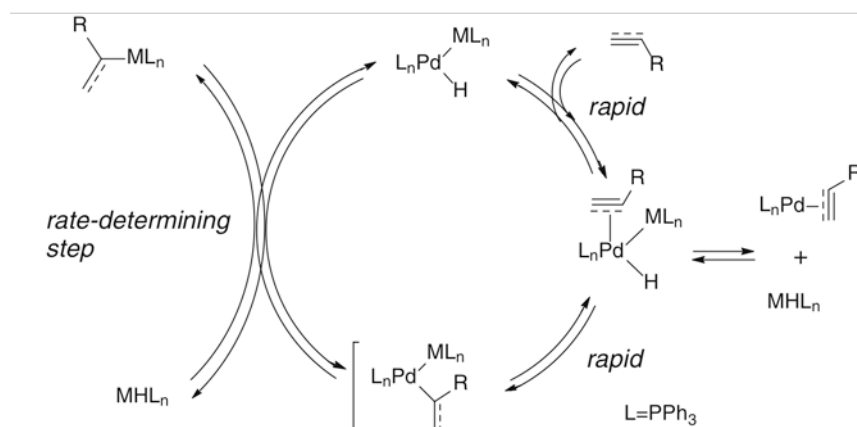


Research Interests:

3. Successive C-O/C-H Bond Activation of Esters: The C-H bond activation by the Internal Electrophilic Substitution (IES) mechanism normally starts from the oxidative addition of organic halide to the low valent metal compound followed by the anion exchange between the resulting halido and carboxylato (or carbonato) to give (carboxylate)(organo)metal species. If we can make this species directly from esters by the C-O bond activation, this process must be very attractive from the atom and step economy point of view. We have succeeded direct formation of fluorene by the C-O/C-H bond activation process by a Pd catalyst. (*Organometallics*, **2014**, 33, 1921)



4. Highly Active Catalyst for Hydrometallation: We recently found the mono-phosphine Pd(0) compounds to be a highly active hydrometallation catalyst under mild conditions. Hydrometallations, particularly those using main group elements, are highly attractive for the synthetic point of view.



Research Interests:

The MOLCAT

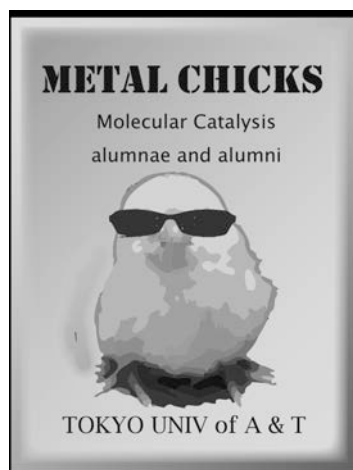
The molcat is a research team headed by Masafumi Hirano at Tokyo University of A & T. The molcat is interested in Molecular Catalysis and Organometallic and Coordination Chemistries.

Interested in becoming a MOLCAT?
Don't hesitate to contact MH.



METAL CHICKS

The Metal chicks is an alumnae and alumni organization of molcats.



The Keyaki Party

The united alumni organization involving those of Prof. Emer. S. Komiya and Prof. A. Fukuoka (Hokkaido U) is named Keyaki Party (Zelkova).



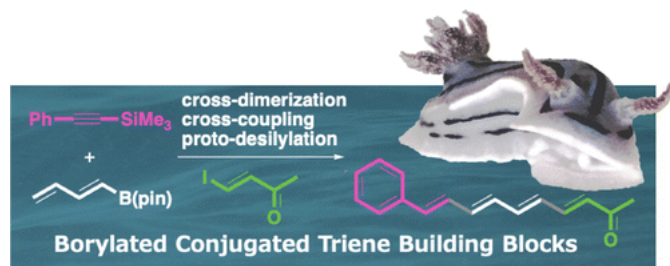
Publication List



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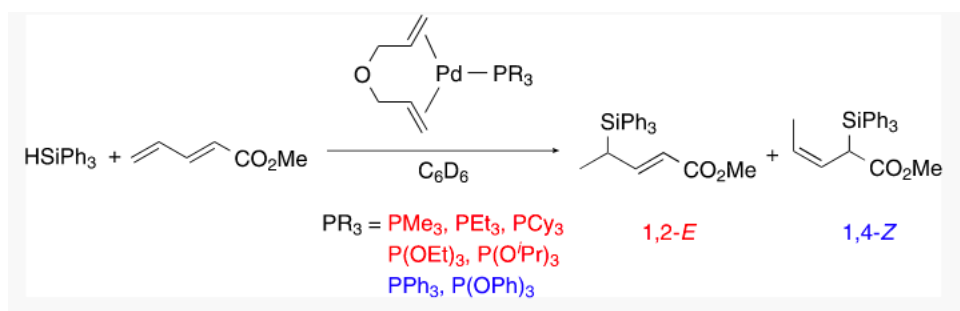
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- Ayumi Kuramochi, Nobuyuki Komine, Sayori Kiyota, Masafumi Hirano,* **Synthesis of Borylated-Conjugated Triene Building Blocks by Cross-Dimerization and Their Use in Cross-Coupling Reactions**, *Bull. Chem. Soc. Jpn* in press

DOI: [10.1246/bcsj.20210163](https://doi.org/10.1246/bcsj.20210163)



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- Nobuyuki Komine,* Tatsuo Mitsui, Shu Kikuchi, Masafumi Hirano, **Ligand-Controlled Rgiodivergent Hydrosilylation of Conjugated Dienes Catalyzed by Mono(phosphine)palladium(0) Complexes**, *Organometallics*, **2020**, 39, 4510-4524.

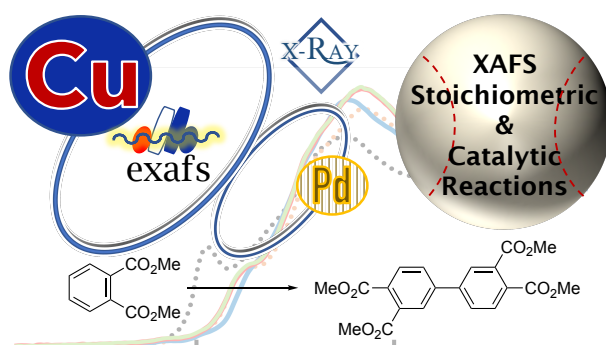
DOI: [10.1021/acs.organomet.0c00597](https://doi.org/10.1021/acs.organomet.0c00597)



● Yuki Kanazawa, Takato Mitsudome,* Hikaru Takaya,* and Masafumi Hirano,* **Pd/Cu-Catalyzed Dehydrogenative Coupling of Dimethyl Phthalate: Synchrotron Radiation Sheds Light on the Cu Cycle Mechanism**, *ACS Catalysis*, **10**, 5909-5919 (2020).

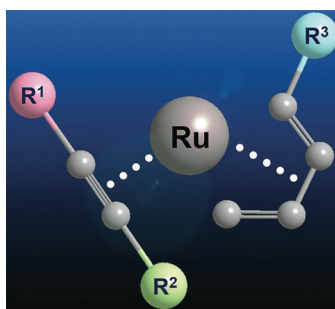
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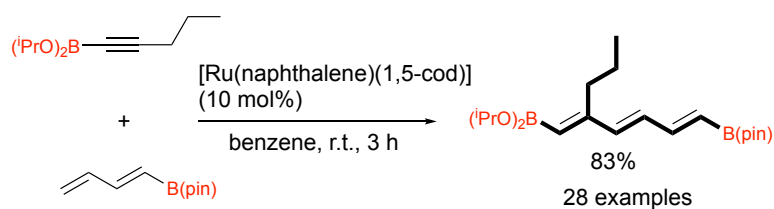
● Sayori Kiyota, Masafumi Hirano,* **An Insight into Regioselectivity in the Transformation through Ruthenacycle**, *New Journal of Chemistry*, **44**, 2129-2145 (2020).

DOI: [10.1039/c9nj04880d](https://doi.org/10.1039/c9nj04880d)



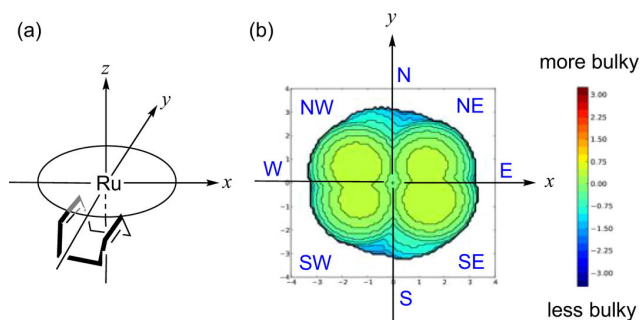
● Masafumi Hirano,* Ayumi Kuramochi, Keita Shimada, Nobuyuki Komine, Sayori Kiyota, Stephen A. Westcott, **Catalytic Cross-Dimerisation Giving Reactive Borylated Polyenes toward Cross-Coupling**, *Chemical Communications*, **55**, 10527-10530 (2019).

DOI: [10.1039/c9cc05930j](https://doi.org/10.1039/c9cc05930j)



● Masafumi Hirano,* Nobuyuki Komine, Eri Arata, Tatiana Gridneva, Atsuya Hatori, Naoki Kaizawa, Kohei Kamakura, Ayumi Kuramochi, Shinnosuke Kurita, Shuhei Machida, Harumi Okada, Asami Sawasaki, Takumi Uchino, **Recent Advances of Achiral and Chiral Diene Ligands in Transition-Metal Catalyses**, *Tetrahedron Letters*, Digest, in press (2019).

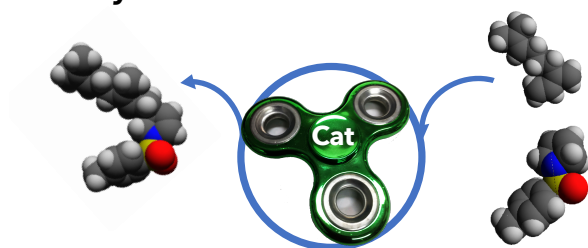
DOI: [10.1016/j.tetlet.2019.07.015](https://doi.org/10.1016/j.tetlet.2019.07.015)



● Masafumi Hirano,* **Recent Advances in the Catalytic Linear Cross-Dimerizations**, *ACS Catalysis*, **9**, 1408-1430 (2019).

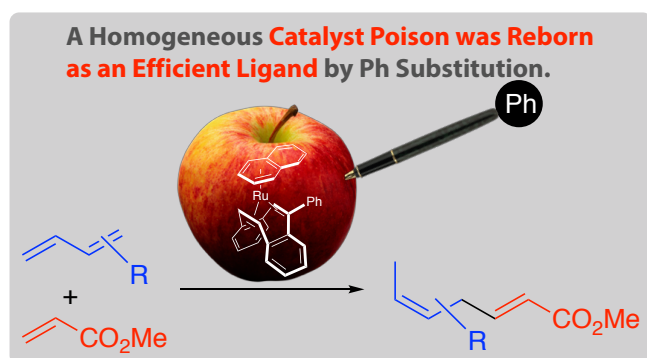
DOI: [10.1021/acscatal.8b04676](https://doi.org/10.1021/acscatal.8b04676)

Catalytic Linear Cross-Dimerization



● Masafumi Hirano,* Yukino Tanaka, Nobuyuki Komine, **Synthesis of and Catalytic Linear Cross-Dimerizations by an Electron-Deficient Cyclic Diene Complex of Ruthenium(0)**, *Organometallics*, **37**, 4173-4176 (2018).

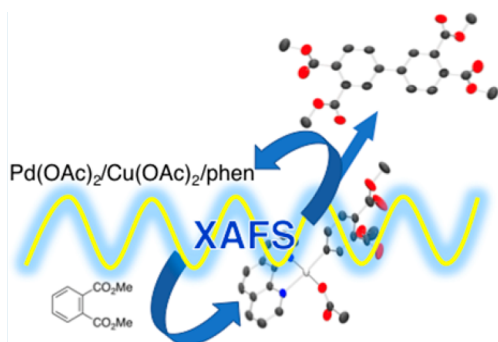
DOI: [10.1021/acs.organomet.8b00645](https://doi.org/10.1021/acs.organomet.8b00645)



● Masafumi Hirano,* Kosuke Sano, Yuki Kanazawa, Nobuyuki Komine, Zen Maeno, Takato Mitsudome,* Hikaru Takaya,* **Mechanistic Insights on Pd/Cu-Catalyzed Dehydrogenative Coupling of Dimethyl Phthalate**,

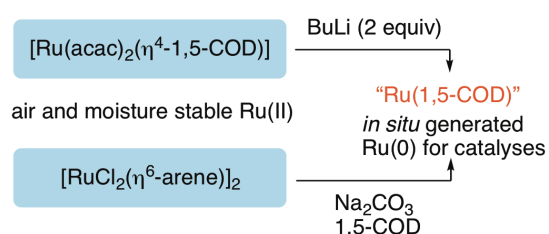
ACS Catalysis, **8**, 5827-5841 (2018).

DOI: [10.1021/acscatal.8b001095](https://doi.org/10.1021/acscatal.8b001095)



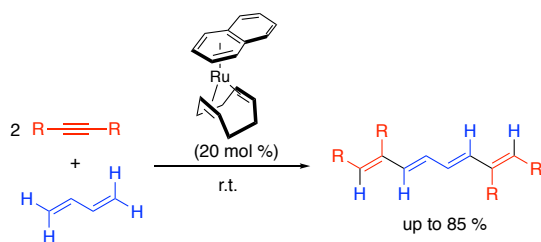
● Masafumi Hirano,* Hideyuki Kobayashi, Takao Ueda, Yuki Hiroi, Ryota Abe, Nobuyuki Koine, Annie L. Colebatch, Martin A. Bennett,* **In site Routes to Catalytically Active Ru(0) Species by Reduction of Readily Available, Air-stable Precursors**, *Organometallics*, **37**, 1092-1102 (2018).

DOI: [10.1021/acs.organomet.7b00882](https://doi.org/10.1021/acs.organomet.7b00882)



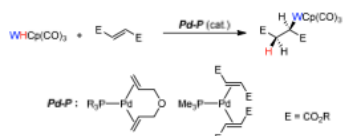
● Sayori Kiyota, Masafumi Hirano,* **Ru(0)-Catalyzed Straightforward Synthesis of Conjugated Tetraenes: An Approach using Two Internal Alkynes with 1,3-Butadiene**, *Organometallics*, **37**, 227-234 (2018).

DOI: [10.1021/acs.organomet.7b00801](https://doi.org/10.1021/acs.organomet.7b00801)



● Nobuyuki Komine,* Ryo Ito, Hiromi Suda, Masafumi Hirano, Sanshiro Komiya, **Selective Alkene Insertion into Inert Hydrogen-Metal Bond Catalyzed by Mono(phosphorus ligand)palladium(0) Complexes**, *Organometallics*, **36**, 36, 4160-4168 (2017).

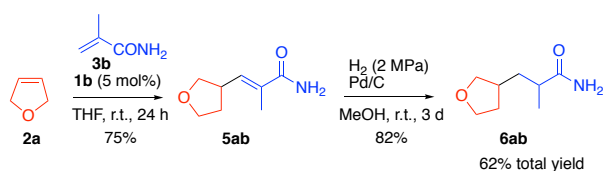
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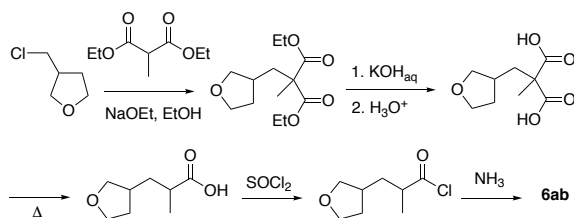
● Masafumi Hirano, Masahiro Moritake, Tasuku Murakami, Nobuyuki Komine, **Ru(0)-Catalyzed C3-Selective Coupling Reactions of Unsaturated 5-Membered Heterocycles with Methyl Methacrylate and Methacryl Amide**, *Chemistry Letters*, **46**, 1522-1524 (2017). (Editor's Choice)

DOI: [10.1246/cl.170683](https://doi.org/10.1246/cl.170683)

Present method



Conventional method



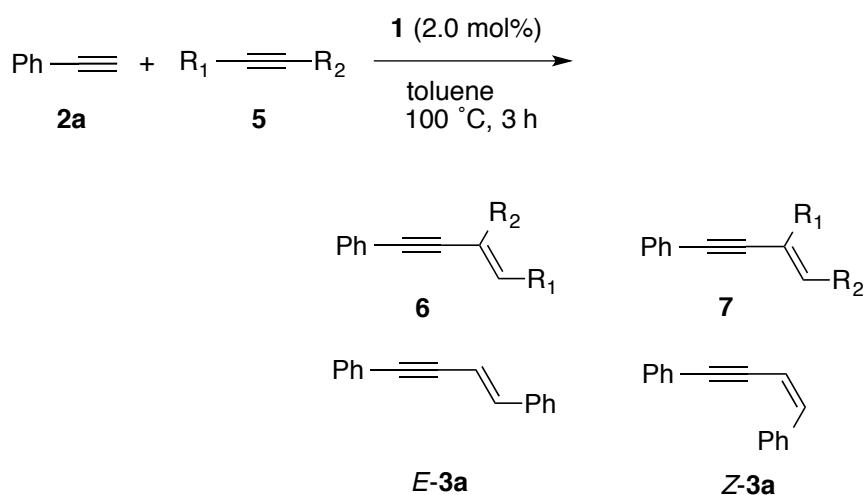
● Sayori Kiyota, Seonyoung In, Nobuyuki Komine, and Masafumi Hirano*

Regioselectivity Control by Added MeCN in Ru(0)-Catalyzed Cross-Dimerization of Internal Alkynes with Methyl Methacrylate, *Chemistry Letters*, **46, 1040-1043 (2017).**

DOI: [10.1246/cl.170224](https://doi.org/10.1246/cl.170224)

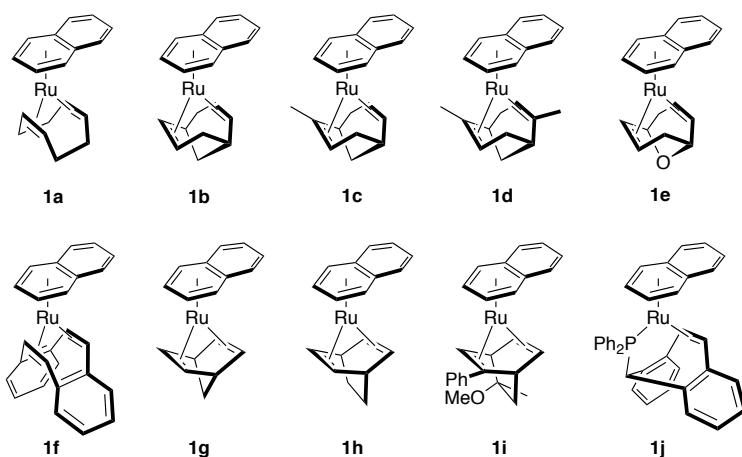
● Sayori Kiyota, Hirofumi Soeta, Nobuyuki Komine, Sanshiro Komiya, Masafumi Hirano,* ***E*-Selective Dimerization of Phenylacetylene Catalyzed by Cationic Tris(μ -hydroxo)diruthenium(II) Complex and the Mechanistic Insight: The Role of Two Ruthenium Centers in Catalysis, *J. Mol. Catal. A.* (Editor's choice paper), **426**, 419-428 (2017).**

DOI: [10.1016/j.molcata.2016.08.027](https://doi.org/10.1016/j.molcata.2016.08.027)



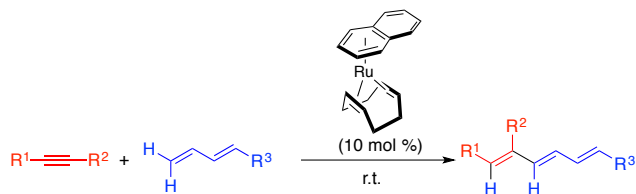
● Masafumi Hirano* and Sanshiro Komiya, **Oxidative Coupling Reactions at Ruthenium(0) and Their Applications to Catalytic Homo- and Cross-Dimerizations, *Coord. Chem. Rev.* **314**, 182-200 (2016).**

DOI: [10.1016/j.ccr.2015.07.008](https://doi.org/10.1016/j.ccr.2015.07.008)



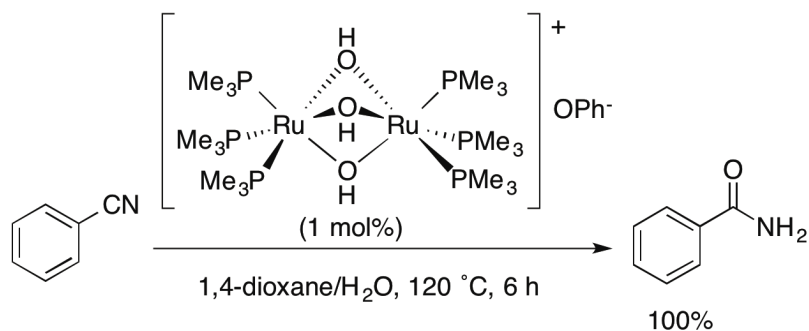
● Sayori Kiyota, Seonyoung In, Ryo Saito, Nobuyuki Komine, and Masafumi Hirano,* **Ru(0)-Catalyzed Direct Coupling of Internal Alkynes with Conjugated Dienes: An Efficient Access to Conjugated Trienes**, *Organometallics*, **35**, 4033-4043 (2016).

DOI: [10.102/acs.organomet.6b00668](https://doi.org/10.102/acs.organomet.6b00668)



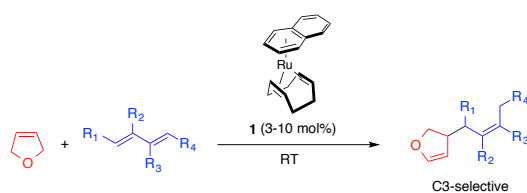
● Sayori Kiyota, Takako Kobori, Hirofumi Soeta, You-ichi Ichikawa, Nobuyuki Komine, Sanshiro Komiya, Masafumi Hirano,* **Synthesis of and Catalytic Nitrile Hydration by a Cationic Tris(μ -hydroxo)diruthenium(II) Complex Having PMe.Ligands**, *Polyhedron*, **120**, 3-10 (2016).

DOI: [10.1016/j.poly.2016.04.006](https://doi.org/10.1016/j.poly.2016.04.006)



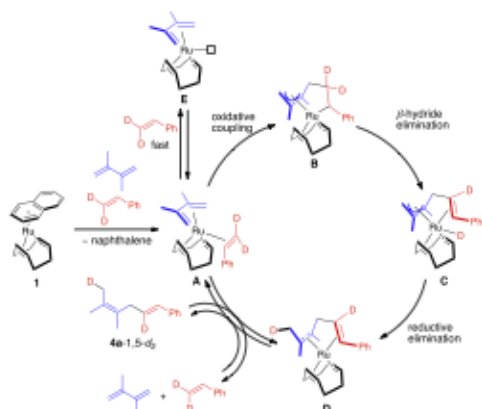
● Masafumi Hirano,* Yuki Hiroi, Tasuku Murakami, Hirofumi Ogawa, Sayori Kiyota, Nobuyuki Komine, and Sanshiro Komiya, **Ru(0)-Catalyzed C3-Selective Cross-Dimerization of 2,5-Dihydrofuran with Conjugated Dienes**, *Organometallics*, **35**, 1343-1346 (2016).

DOI: [10.1021/acs.organomet.5b00987](https://doi.org/10.1021/acs.organomet.5b00987)



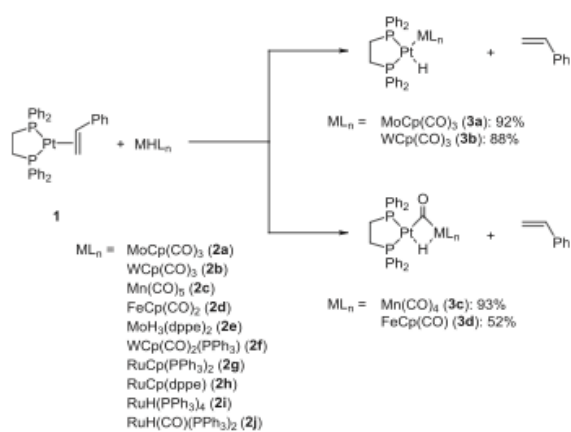
● Masafumi Hirano,* Takao Ueda, Nobuyuki Komine, Sanshiro Komiya, Saki Nakamura, Hikaru Deguchi, and Susumu Kawauchi,* **Mechanistic Insights into Catalytic Linear Cross-Dimerization between Conjugated Dienes and Styrenes by a Ruthenium(0) Complex**, *Journal of Organometallic Chemistry*, **797**, 174-184 (2015).

DOI: [10.1016/j.jorganchem.2015.08.022](https://doi.org/10.1016/j.jorganchem.2015.08.022)



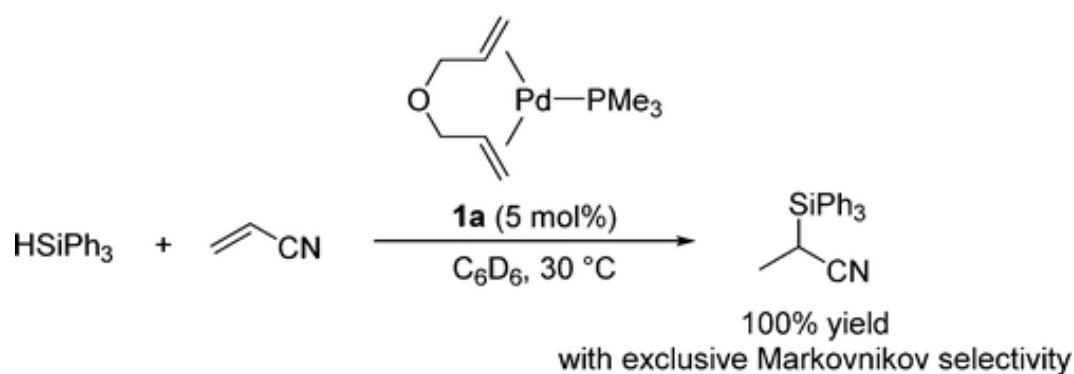
● Nobuyuki Komine,* Ayako Kuramoto, Toshiyuki Yasuda, Tatsuya Kawabata, Masafumi Hirano, and Sanshiro Komiya*, **Synthesis of Heterodinuclear Hydride Complexes by Oxidative Addition of a Transition-Metal Hydride to Pt(0) and Pd(0) Complexes**, *Journal of Organometallic Chemistry*, **792**, 194-205 (2015).

DOI: [10.1016/j.jorganchem.2015.04.048](https://doi.org/10.1016/j.jorganchem.2015.04.048)



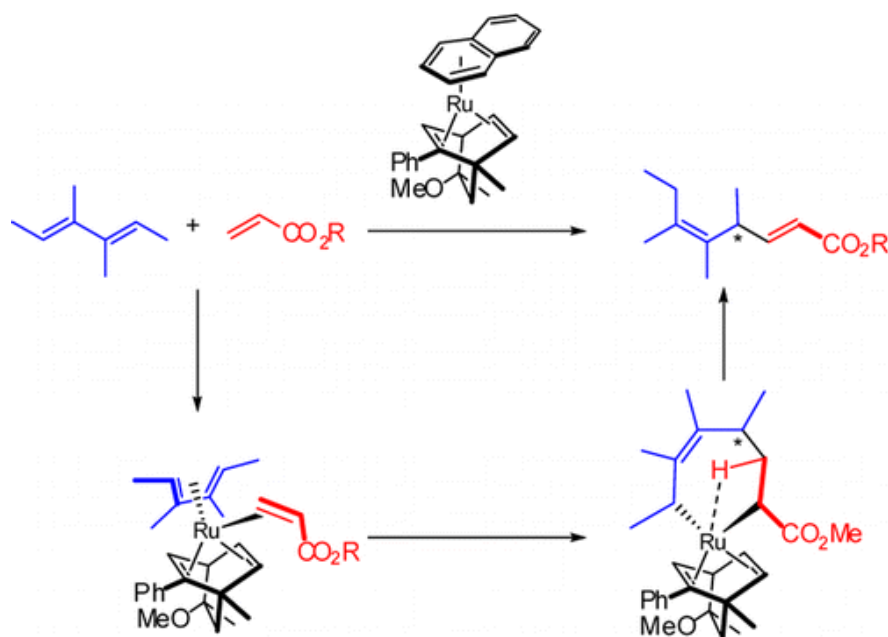
● Nobuyuki Komine,* Makoto Abe, Ryoko Suda, Masafumi Hirano, **Markovnikov-Selective Hydrosilylation of Electron-Deficient Alkenes with Arylsilanes Catalyzed by Mono(phosphine)palladium(0)**, *Organometallics*, **34**, 432-437 (2015).

DOI: [10.1021/om500927z](https://doi.org/10.1021/om500927z)



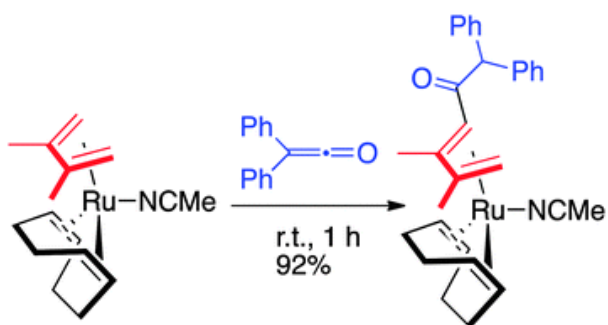
● Yuki Hiroi, Nobuyuki Komine, Sanshiro Komiya, Masafumi Hirano,* , **Regio- and Enantioselective Linear Cross-Dimerization between Conjugated Dienes and Acrylates Catalyzed by New Ru(0) Complexes**, *Organometallics*, **33**, 6604-6613 (2014).

DOI: [10.1021/ om500927z](https://doi.org/10.1021/om500927z)



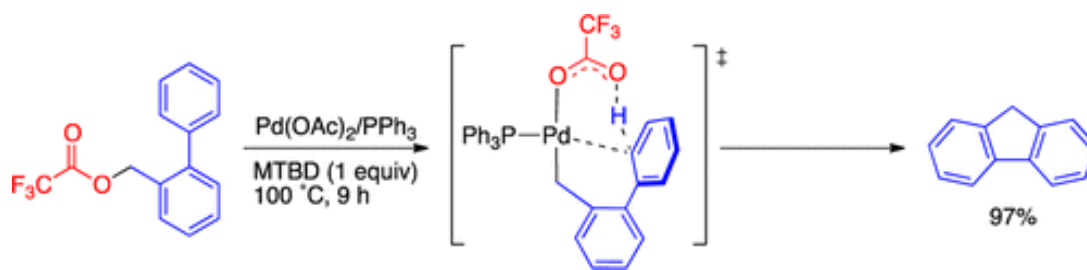
● Masafumi Hirano,* Takuya Okamoto, Nobuyuki Komine, Sanshiro Komiya, **Stoichiometric Formation of Conjugated Dienyl Ketones from 1,3-Dienes and Ketenes at a Ruthenium(0) Centre**, *New J. Chem.*, **38**, 5052-5057 (2014).

DOI: [10.1039/C4NJ01001A](https://doi.org/10.1039/C4NJ01001A)



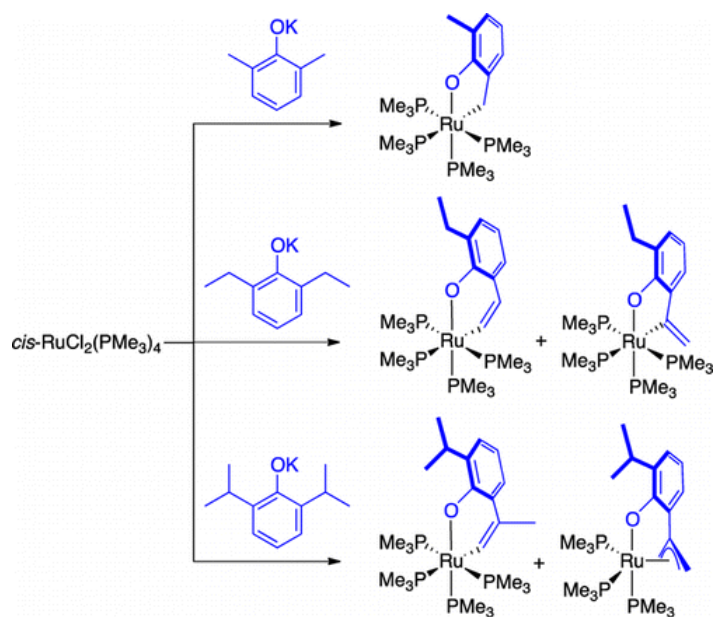
● Masafumi Hirano,* Sosuke Kawazu, Nobuyuki Komine, **Direct Access to Fluorene by Successive C-O/C-H Bond Activations of 2-Phenylbenzyl Ester**, *Organometallics*, 1921-1924 (2014).

DOI: [10.1021/om500341v](https://doi.org/10.1021/om500341v)

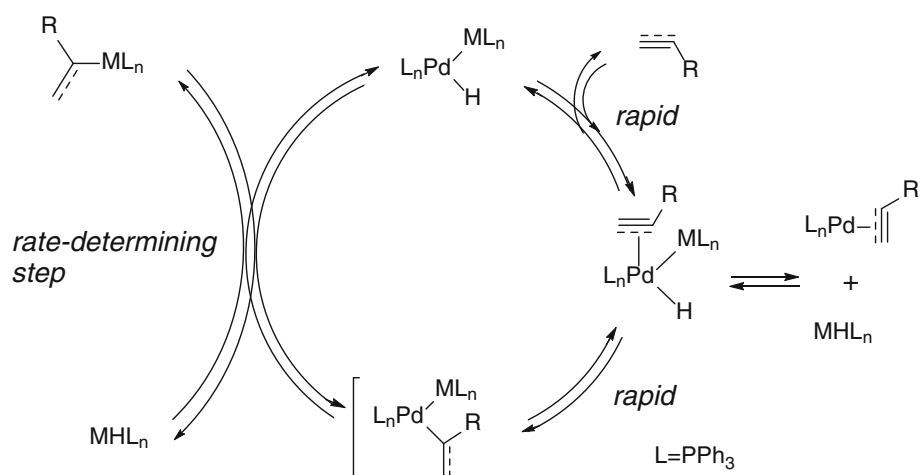


● Masafumi Hirano,* Yasuto Yanagisawa, Endin Mulyadi, Nobuyuki Komine, Sanshiro Komiya, **Multiple C-H Bond Cleavage of Alkyl Group in (2,6-Dialkylphenoxy)ruthenium(II) Complex**, *Organometallics*, **33**, 1235-1244 (2014).

DOI: [10.1021/om5000248](https://doi.org/10.1021/om5000248)

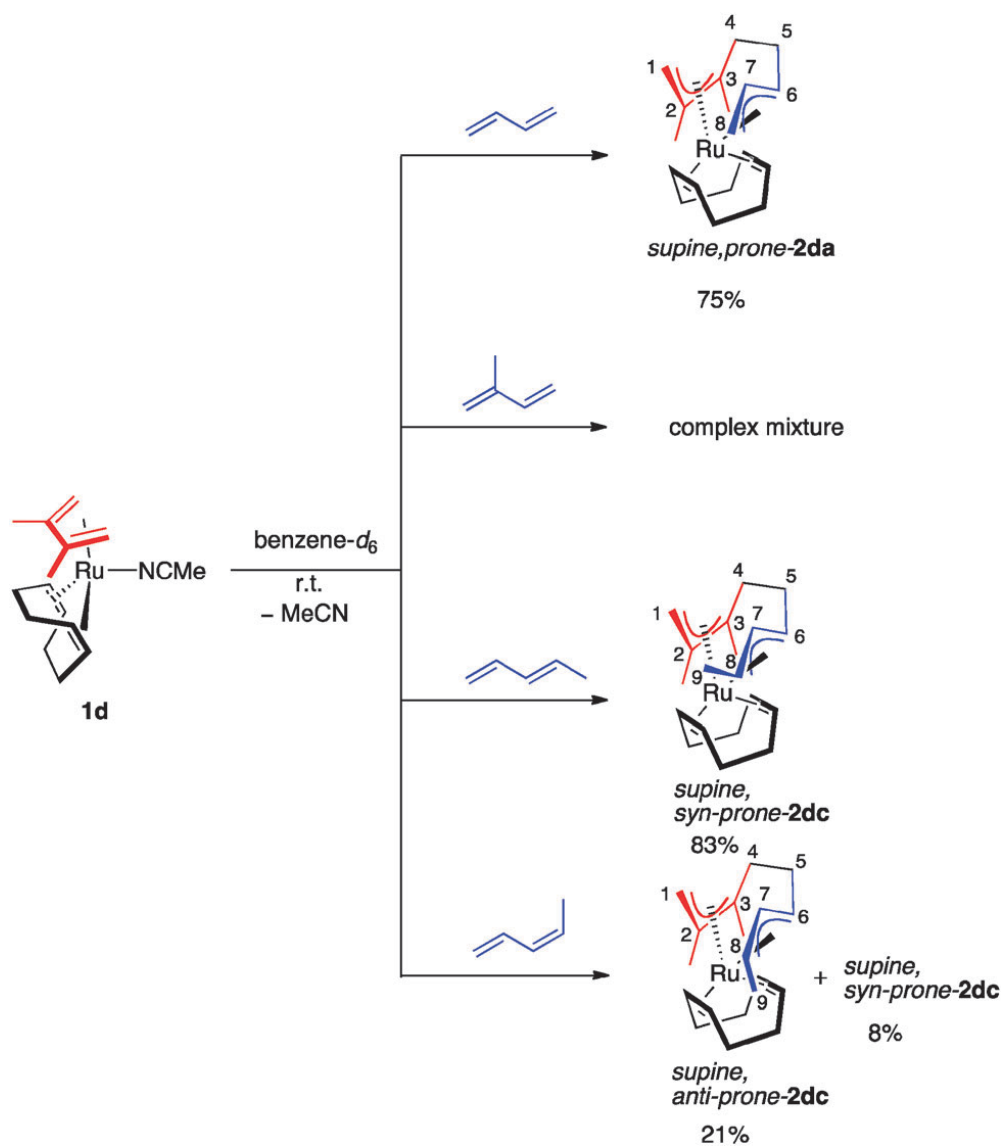


● Nobuyuki Komine, Ayako Kuramoto, Kouhei Nakanishi, Masafumi Hirano, Sanshiro Komiya,*
Alkene and Alkyne Insertion into Hydrogen-Transition Metal Bonds Catalyzed by Palladium(0) Complex, *Topics in Catalysis*, **57**, 960-966 (2014).
 DOI: [10.1007/s11244-014-0258-8](https://doi.org/10.1007/s11244-014-0258-8)



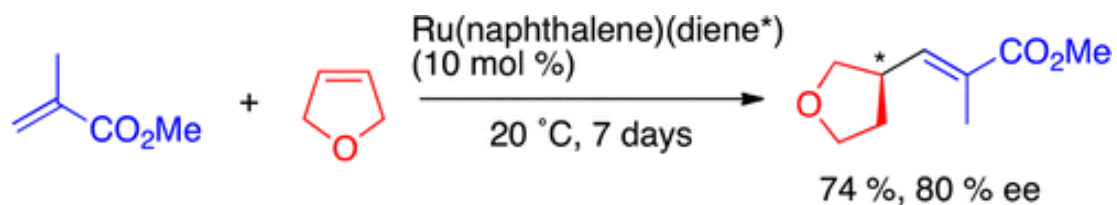
● Masafumi Hirano,* Haruka Inoue, Takuya Okamoto, Takao Ueda, Nobuyuki Komine, Sanshiro Komiya, Xian-qi Wang, and Martin A. Bennett,* **Cross-dimerization between Different *cisoid*- and *transoid*-1,3-Dienes at a Ruthenium(0) Center**, *New J. Chem.* **37**, 3433-3439 (2013).

DOI: 10.1039/c3nj00429e



● Yuki Hiroi, Nobuyuki Komine, Sanshiro Komiya, and Masafumi Hirano,* **Asymmetric Cross-dimerization between Methyl Methacrylate and Substituted Alkenes by Ru(0)-Bicyclononadiene Complex**, *Org. Lett.* **15**, 2486-2489 (2013).

DOI: 10.1021/ol400963d

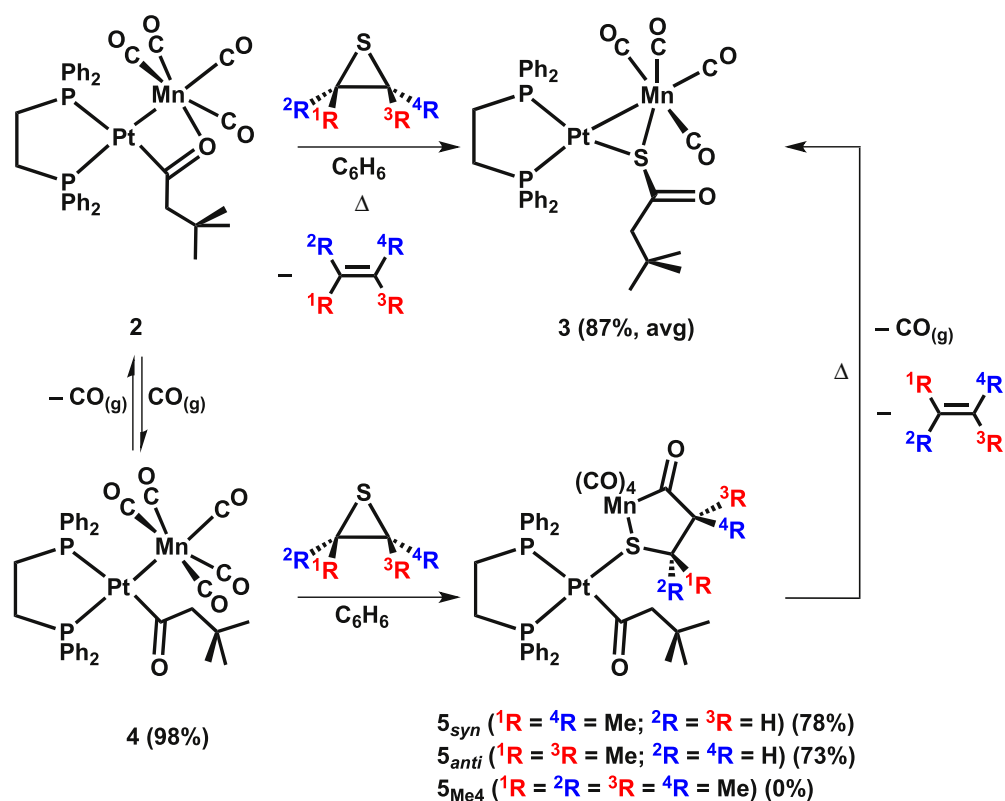


● Matthew T. Zamora, Kenta Oda, Nobuyuki Komine, Masafumi Hirano, and Sanshiro Komiya,*

Stereoselective Thiirane Desulfurization Controlled by a Bridging or Terminal Acyl Ligand:

Concerted vs S₂ Pathways, *J. Organomet. Chem.*, 739, 6-10 (2013).

[DOI:10.1016/j.jorganchem.2013.04.003](https://doi.org/10.1016/j.jorganchem.2013.04.003)



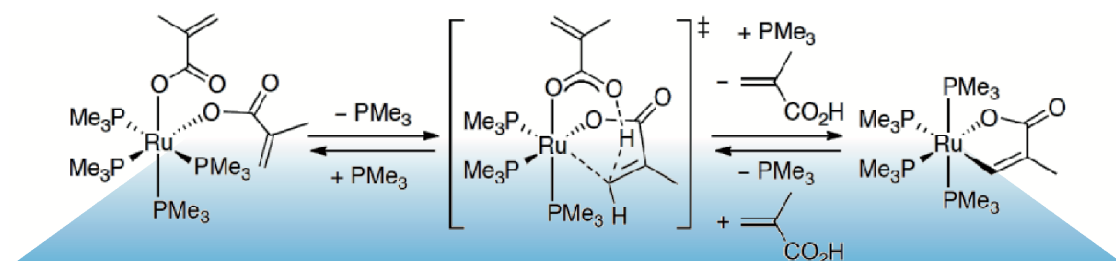
● Masafumi Hirano,* Ryo Fujimoto, Kohei Hatagami, Nobuyuki Komine, and Sanshiro Komiya,*

Stoichiometric Carbon-Hydrogen Bond Cleavage Reaction in a Bis(carboxylato)ruthenium(II)

Complex and Its Application to Catalytic H/D Exchange Reaction of Carboxylic Acids,

ChemCatChem, **5**, 1101-1115 (2013).

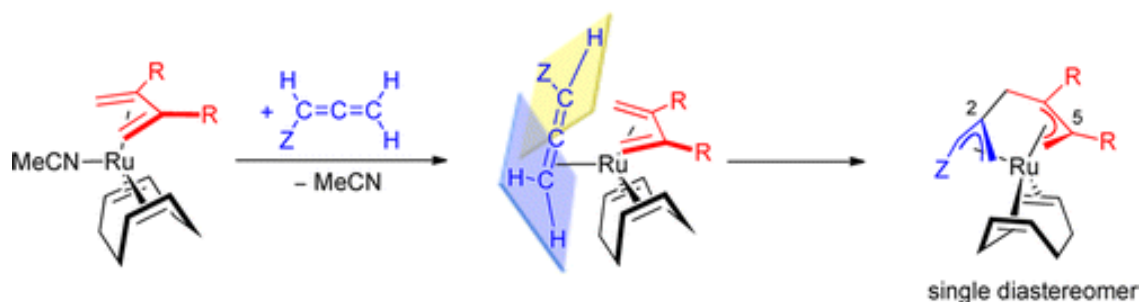
DOI: [10.1002/cctc.201200686](https://doi.org/10.1002/cctc.201200686)



● Masafumi Hirano,* Takuya Okamoto, Nobuyuki Komine, and Sanshiro Komiya

Stoichiometric Carbon-Carbon Bond Forming Reaction of 1,3-Diene with 1,2-Diene in a Ruthenium(0) Complex, *Organometallics* **31**, 4639-4642 (2012).

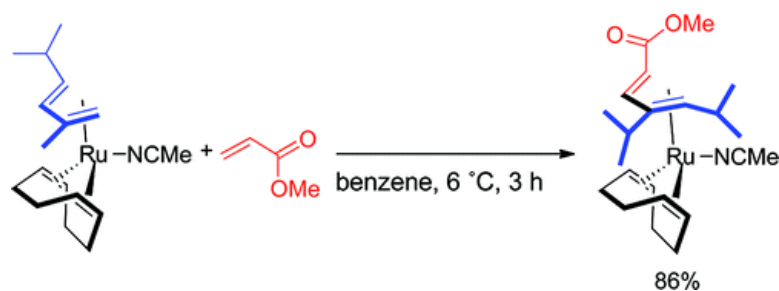
DOI: [10.1021/om300326q](https://doi.org/10.1021/om300326q)



● Masafumi Hirano,* Yasutomo Arai, Yuka Hamamura, Nobuyuki Komine, and Sanshiro Komiya

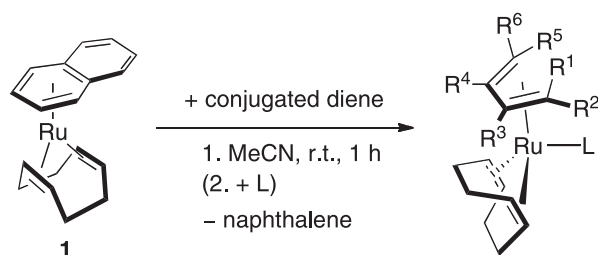
Stoichiometric and Catalytic Cross Dimerization between Conjugated Dienes and Conjugated Carbonyls by a Ruthenium(0) Complex. Straightforward Access to Unsaturated Carbonyl Compounds by an Oxidative Coupling Mechanism, *Organometallics*, **31**, 4006-4019 (2012).

DOI: [10.1021/om300234d](https://doi.org/10.1021/om300234d)



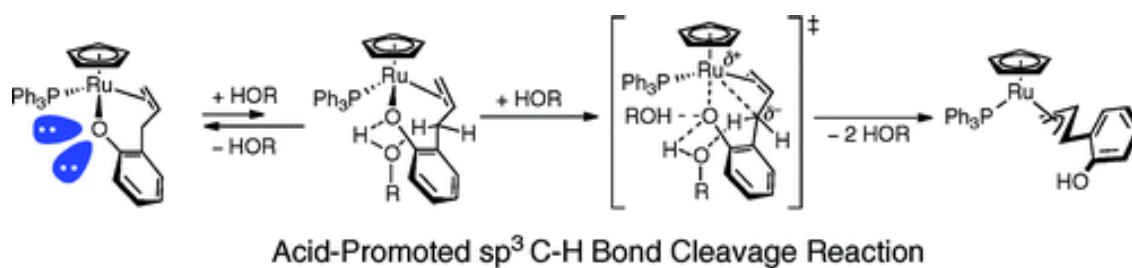
● Masafumi Hirano,* Yumiko Sakate, Haruka Inoue, Yasutomo Arai, Nobuyuki Komine, Sanshiro Komiya, Xian-qi Wang, Martin A. Bennett,* **Synthesis of Conjugated Diene Complexes of Ruthenium(0) Derived from Ru(η -naphthalene)(η -1,5-COD): Z to E Isomerisation of Coordinated 1,3-Pentadiene**, *J. Organomet. Chem.* **708-709**, 46-57 (2012).

DOI:10.1016/j.jorganchem.2012.02.018



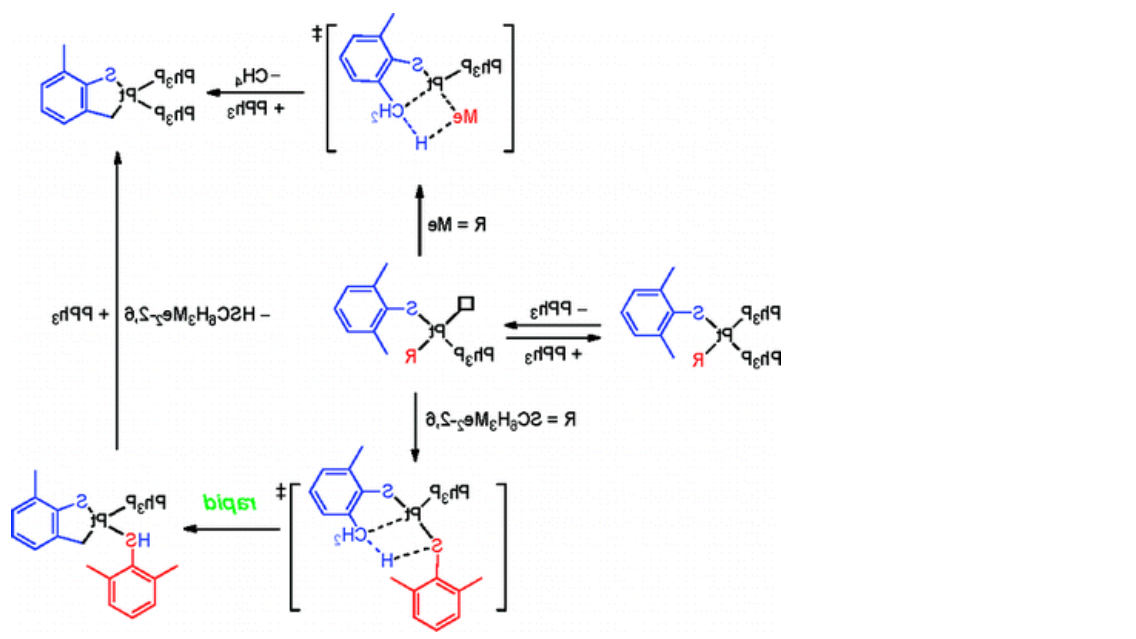
● Masafumi Hirano,* Masahiro Murakami, Toshinori Kuga, Nobuyuki Komine, and Sanshiro Komiya,* **Acid-Promoted sp^3 C-H Bond Cleavage in a Series of (2-Allylphenoxy)ruthenium(II) Complexes. Mechanistic Insight into the Aryloxo-Acid Interaction and Bond Cleavage Reaction**, *Organometallics*, **31**, 381-393 (2012).

DOI: 10.1021/om200974c



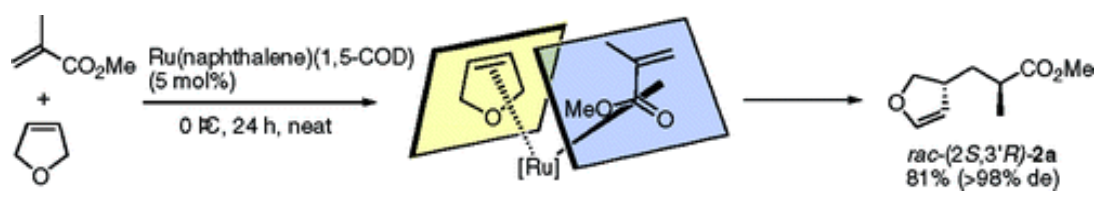
● Masafumi Hirano,* Shin-ya Tatesawa, Minoru Yabukami, Yoko Ishihara, Yusuke Hara, Nobuyuki Komine, and Sanshiro Komiya,* **Carbon-Hydrogen Bond Cleavage Reaction in Four-Coordinate (2,6-Dimethylbenzenethiolato)platinum(II) Complexes. Dramatic Acceleration by Thiolato Hydrogen Acceptor**, *Organometallics*, **30**, 5110-5122 (2011).

DOI: 10.1021/om200345h



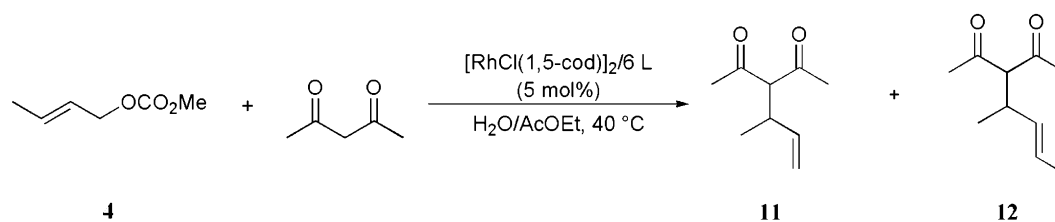
● Yuki Hiroi, Nobuyuki Komine, Masafumi Hirano*, and Sanshiro Komiya, **Prostereogenic Face and Orientational Control of Coordinated Olefins at Ru(0) in Oxidative Coupling Reaction between Methyl Methacrylate and 2,5-Dihydrofuran**, *Organometallics*, **30**, 1307-1310 (2011).

DOI: [10.1021/om200091n](https://doi.org/10.1021/om200091n)



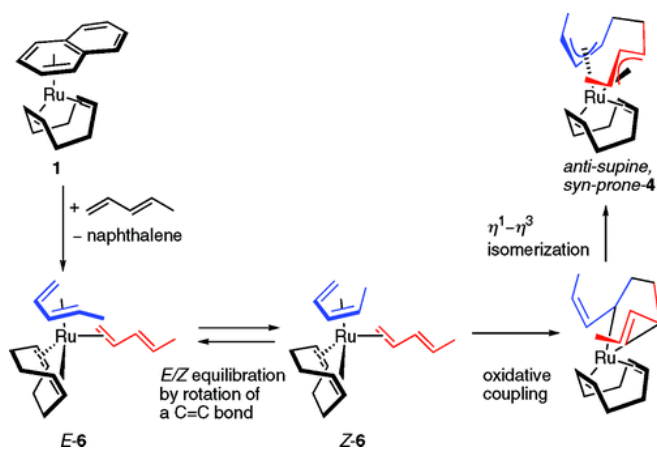
● Nobuyuki Komine, Kohtarō Ishiguro, Sachiyo Kanai, Masafumi Hirano, and Sanshiro Komiya,* **Branch Selective Allylation of Acetylacetonone Catalyzed by Water-soluble Rhodium Complex Catalyst**, *J. Organomet. Chem.* **696**, 1927-1930 (2011).

DOI: [10.1016/j.jorganchem.2010.10.037](https://doi.org/10.1016/j.jorganchem.2010.10.037)



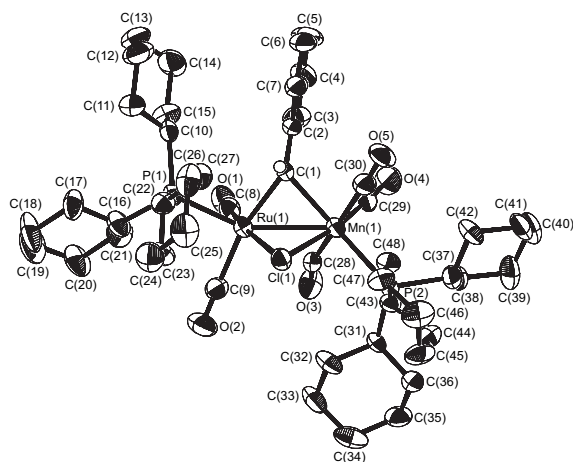
● Masafumi Hirano, Yumiko Sakate, Nobuyuki Komine, Sanshiro Komiya, Xian-qi Wang, Martin A. Bennett, **Stoichiometric Regio- and Stereoselective Oxidative Coupling Reaction of Conjugated Dienes with Ruthenium(0)**. A Mechanistic Insight into the Origin of Selectivity. *Organometallics*, **30**, 768-777 (2011).

DOI: [10.1021/om100956f](https://doi.org/10.1021/om100956f)



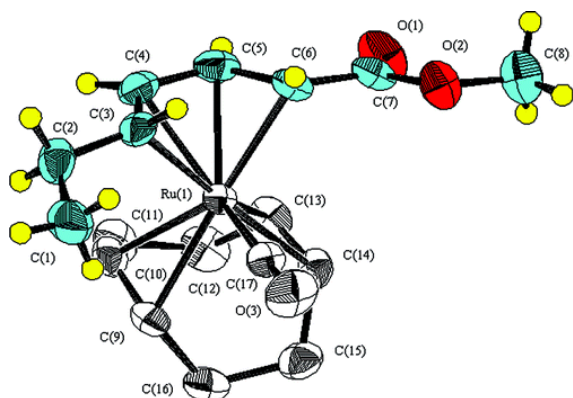
● Shin-ichi Tanaka, Nobuyuki Komine, Masafumi Hirano, and Sanshiro Komiya, **Synthesis of Heterodinuclear Ruthenium-manganese Complex Having μ -Benzylidene Ligand**, *J. Organomet. Chem.* **696**, 632-635 (2011).

DOI: [10.1016/j.jorganchem.2010.09.020](https://doi.org/10.1016/j.jorganchem.2010.09.020)



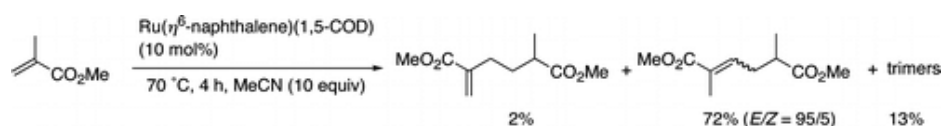
● Masafumi Hirano, Yasutomo Arai, Nobuyuki Komine, and Sanshiro Komiya, **Stoichiometric and Catalytic Oxidative Coupling Reactions between Butadiene and Methyl Acrylate Promoted by Ruthenium(0) Complex**, *Organometallics*, **29**, 5741-5743 (2010).

DOI: [10.1021/om100822n](https://doi.org/10.1021/om100822n)



● Masafumi Hirano, Yuki Hiroi, Nobuyuki Komine, and Sanshiro Komiya, **Catalytic Tail-to-tail Selective Dimerization of Methyl Methacrylate Promoted by Ruthenium(0) Complex**, *Organometallics*, **29**, 3690-3693 (2010).

DOI: [10.1021/om100646q](https://doi.org/10.1021/om100646q)



● Masafumi Hirano, Sayaka Togashi, Muneaki Ito, Yuko Sakaguchi, Nobuyuki Komine, and Sanshiro Komiya, **Carbon-Hydrogen Bond Cleavage Reaction in 5-Coordinate Bis(2,6-dimethylbenzenethiolato)ruthenium(II) Complexes**, *Organometallics*, **29**, 3146-3159 (2010).

DOI: [10.1021/om100249s](https://doi.org/10.1021/om100249s)



■ Papers before 2009

- Shin-ichi Tanaka, Nobuyuki Komine, Masafumi Hirano and Sanshiro Komiya, **Synthesis of Heterodinuclear (Carbene)platinum (or palladium) Complex which Gives μ -Alkenyl Type Complex by Deprotonation**, *Organometallics*, **28**, 5368-5381 (2009).
- Masafumi Hirano, Yumiko Sakate, Nobuyuki Komine, Sanshiro Komiya, and Martin A. Bennett, **Isolation of *trans*-2,5-Bis(methoxycarbonyl)ruthenacyclopentane by Oxidative Coupling of Methyl Acrylate on Ruthenium(0) as an Active Intermediate for Tail-to-tail Selective Catalytic Dimerization**, *Organometallics*, **28**, 4902-4905 (2009).
- Sanshiro Komiya, Sei Ezumi, Nobuyuki Komine and Masafumi Hirano, **Visible Light Enhanced Selective Reductive Elimination of Methylmanganese Complex from Heterodinuclear Dimethylphenyl(4,4'-di-*tert*-butyl-2,2'-bipyridine)platinum-pentacarbonylmanganese Complex**, *Organometallics*, **28**, 3608-3610 (2009).
- Masafumi Hirano, Izirwan Bin Izhah, Naoki Kurata, Kaori Koizumi, Nobuyuki Komine and Sanshiro Komiya, **Reaction of an Oxaruthenacycle with DMAD. Stoichiometric Transformations of 2,6-Xylenol to Allylic Phenols and Benzopyrans via sp^3 C-H Bond Cleavage Reaction**, *Dalton Transactions*, 3270-3279 (2009)
- Masafumi Hirano, Toshinori Kuga, Mariko Kitamura, Susumu Kanaya, Nobuyuki Komine and Sanshiro Komiya, **Acid Promoted Hydrogen Migration in 2-Allylphenoxoruthenium(II) to Form an η^3 -Allyl Complex**, *Organometallics*, **27**, 3635-3638 (2008).
- Sanshiro Komiya, Akari Sako, Hirofumi Kosuge, Masafumi Hirano, and Nobuyuki Komine, **Mechanical Stirring in Water/Hexane Biphasic Catalyst Controls Regioselectivity of Pd-Catalyzed Allylation Reaction**, *Chem. Lett.*, **37**, 640-641 (2008).
- Nobuyuki Komine, Tomoko Ishiwata, Jun-ya Kasahara, Erino Matsumoto, Masafumi Hirano, and Sanshiro Komiya, **Synthesis and Organic Group Transfer of Organodiplatinum Complex Having a 1,2-Bis(diphenylphosphino)ethane Ligand**, *Can. J. Chem.*, **2009**, *87*, 176-182.

- Nobuyuki Komine, Takuma, Hirota, Masafumi Hirano, and Sanshiro Komiya, ***E*-Selective Allyl Transfer Reaction in μ - η^1 : η^2 -crotylplatinum-cobalt Complex**, *Organometallics*, **27**(9), 2145-2148 (2008).

- Nobuyuki Komine, Susumu Tsutsuminai, Masafumi Hirano, and Sanshiro Komiya, **Synthesis and Reactions of Heterodinuclear Organopalladium Complex Having an Unsymmetrical PN Ligand**, *J. Organomet. Chem.*, **692**(21), 4486-4494 (2007).

- Masafumi Hirano, Hiromi Sato, Naoki Kurata, Nobuyuki Komine, and Sanshiro Komiya, **Carbon-Oxygen and Carbon-Hydrogen Bond Cleavage Reaction of *ortho*-Substituted Phenols by Ruthenium(II) Complex**, *Organometallics*, **26**(8), 2005-2016 (2007).

- Takao, Shibasaki, Nobuyuki Komine, Masafumi Hirano, and Sanshiro Komiya, **Synthesis of Di-, Tri-, Tetra- and Pentacyclic Arene Complexes of Ruthenium(II): $[\text{Ru}(\eta^6\text{-polycyclic arene})(1\text{-}5\text{-}\eta^5\text{-cyclooctadienyl)]\text{PF}_6$ and Their Reactions with NaBH_4** , *J. Organomet. Chem.*, **692**(12), 2385-2394 (2007).

- Shin-ichi Tanaka, Hideko Hoh, Yoshifumi Akahane, Susumu Tsutsuminai, Nobuyuki Komine, Masafumi Hirano and Sanshiro Komiya, **Synthesis and Reactions of Heterodinuclear Organopalladium-cobalt Complexes Acting as Copolymerization Catalyst for Aziridine and Carbon Monoxide**, *J. Organomet. Chem.* (2007) **692**, 26-35.

- Nobuyuki Komine, Susumu Tsutsuminai, Hideko Hoh, Toshiyuki Yasuda, Masafumi Hirano and Sanshiro Komiya, **Synthesis and Structures of Heterodinuclear Organoplatinum(or -palladium)-molybdenum(or -tungsten) Complexes: Unexpected Structural Deformation of Heterodinuclear Propionylplatinum-tungsten Complex Having 1,2-Bis(diphenylphosphino)ethane Ligand**, *Inorg. Chim. Acta*, (2006), 359, 2699-3708.

- Ayako Kuramoto, Kouhei Nakanishi, Tatsuya Kawabata, Nobuyuki Komine, Masafumi Hirano, and Sanshiro Komiya, **Palladium-assisted Regioselective Olefin Insertion into and β -Hydrogen Elimination of Hydrogen-molybdenum and β -Tungsten Bonds. Synthesis and Reactions of**

Heterodinuclear Hydrido Complexes of Palladium and Platinum with Molybdenum and Tungsten, *Organometallics* (2006), 25(2), 311-314.

● Takao Shibasaki, Nobuyuki Komine, Masafumi Hirano, and Sanshiro Komiya, **Synthesis of Momo-, Di and Trinuclear Ruthenium(0) Complexes Having a Triphenylene Ligand,** *Organometallics* (2006), 25(2), 523-527.

● Nobuyuki Komine, Kaoru Ichikawa, Anna Mori, Masafumi Hirano, and Sanshiro Komiya, **Enhanced Reductive Elimination of Dialkylgold(III) Complexes in Water,** *Chemistry Letters*, 34, (2005) 1704-1705.

● Masafumi Hirano, Yuko Sakaguchi, Toshiaki Yajima, Naoki Kurata, Nobuyuki Komine, and Sanshiro Komiya. **Stoichiometric and Catalytic sp^3 C-H/D₂ Exchange Reactions of *ortho*-Substituted Benzenethiol and Phenols by a Ruthenium(II) Complex. Effect of a Chalcogen Anchor on the Bond Cleavage Reaction,** *Organometallics* (2005) 24(20), 4799-4809.

● Kiyota, Sayori; Tamuki, Jun-ichi; Komine, Nobuyuki; Hirano, Masahumi; Komiya, Sanshiro. **Synthesis, Structure, and Fluxional Behavior of κ^1 -O-Enolatoiron(II) Complexes Derived from 1,3-Dicarbonyl Compounds,** *Chemistry Letters* (2005), 34(4), 498-499.

● Komine, Nobuyuki; Sako, Akar; Hirahara, Shin-ya; Hirano, Masafumi; Komiya, Sanshiro. **Selective allylation of arenethiols using water-soluble palladium complex catalyst in recyclable water/hexane biphasic media.** *Chemistry Letters* (2005), 34(2), 246-247.

● Kanaya, Susumu; Imai, Yuya; Komine, Nobuyuki; Hirano, Masafumi; Komiya, Sanshiro. **Dehydrogenative Formation of a (η^4 -Enone)ruthenium(0) Complex as a Key Intermediate in the Catalytic Isomerization of Allylic Alcohol to Ketone.** *Organometallics* (2005), 24(6), 1059-1061.

● Komine, Nobuyuki; Tanaka, Shin-ichi; Tsutsuminai, Susumu; Akahane, Yoshifumi; Hirano, Masafumi; Komiya, Sanshiro. **Copolymerization of aziridines and carbon monoxide catalyzed by a heterodinuclear organo palladium-cobalt complex.** *Chemistry Letters* (2004), 33(7), 858-859.

- Tsutsuminai, Susumu; Komine, Nobuyuki; Hirano, Masafumi; Komiya, Sanshiro. **Enhanced C-C Bond Formation of Heterodinuclear Methylplatinum-Molybdenum Complexes Having a Hemilabile Ligand with Dialkyl Acetylenedicarboxylate.** *Organometallics* (2004), 23(1), 44-53.
- Tsutsuminai, Susumu; Komine, Nobuyuki; Hirano, Masafumi; Komiya, Sanshiro. **Synthesis and Reactions of Heterodinuclear Organoplatinum Complexes Having an Unsymmetrical PN Ligand.** *Organometallics* (2003), 22(21), 4238-4247.
- Hirano, Masafumi; Onuki, Koji; Kimura, Yuichi; Komiya, Sanshiro. **Regioselective C-H or N-H bond cleavage reactions of heterocyclic compounds by [Ru(1,5-COD)(1,3,5-COT)]/monodentate phosphine.** *Inorganica Chimica Acta* (2003), 352 160-170.
- Furuya, Masaki; Tsutsuminai, Susumu; Nagasawa, Hiroto; Komine, Nobuyuki; Hirano, Masafumi; Komiya, Sanshiro. **Catalytic synthesis of thiobutylolactones via CO insertion into the C-S bond of thietanes in the presence of a heterodinuclear organoplatinum-cobalt complex.** *Chemical Communications (Cambridge, United Kingdom)* (2003), (16), 2046-2047.
- Hirano, Masafumi; Asakawa, Rie; Nagata, Chifumi; Miyasaka, Takashi; Komine, Nobuyuki; Komiya, Sanshiro. **Ligand Displacement Reaction of Ru(η^4 -1,5-COD)(η^6 -1,3,5-COT) with Lewis Bases.** *Organometallics* (2003), 22(12), 2378-2386.
- Komiya, Sanshiro; Hirano, Masafumi. **Bond activation by low valent ruthenium complexes.** *Dalton Transactions* (2003), (8), 1439-1453.
- Komiya, Sanshiro; Ikuine, Miho; Komine, Nobuyuki; Hirano, Masafumi. **Synthesis and β -hydrogen elimination of water-soluble dialkylplatinum(II) complexes in water.** *Bulletin of the Chemical Society of Japan* (2003), 76(1), 183-188.
- Hirano, Masafumi; Shibasaki, Takao; Komiya, Sanshiro; Bennett, Martin A. **Synthesis of and Stereospecific Hydride Migration in Cationic (Tricyclic arene)(cyclooctadiene)ruthenium(II) Complexes.** *Organometallics* (2002), 21(26), 5738-5745.

- Komiva, Sanshiro; Ikuine, Miho; Komme, Nobuyuki; Hirano, Masafumi. **Synthesis and reactions of water-soluble diorganoplatinum(II) complexes.** *Chemistry Letters* (2002), (1), 72-73.
- Hirano, Masafumi; Osakada, Kohtaro; Nohira, Hiroyuki; Miyashita, Akira. **Crystal and solution structures of photochromic spirobenzothiopyran. First full characterization of the meta-stable colored species.** *Journal of Organic Chemistry* (2002), 67(2), 533-540.
- Kanaya, Susumu; Komine, Nobuyuki; Hirano, Masafumi; Komiya, Sanshiro. **Preferential bond activation of sp³ C-H over sp² C-H in α,β -unsaturated carboxylic acids by ruthenium complex.** *Chemistry Letters* (2001), (12), 1284-1285.
- Komiya, S.; Kuwahara, M.; Awazu, N.; Hirano, M.; Fukatani, J. **Preparation of highly dispersed nano-scale platinum composite polymer using reactive organoplatinum complexes.** *Journal of Materials Science Letters* (2001), 20(8), 743-744.
- Fukuoka, Atsushi; Fukagawa, Sumiko; Hirano, Masafumi; Koga, Nobuaki; Komiya, Sanshiro. **Enhancement of CO Insertion into a Pd-C Bond in a Pd-Co Heterodinuclear Complex.** *Organometallics* (2001), 20(10), 2065-2075.
- Komiya, S.; Yasuda, T.; Fukuoka, A.; Hirano, M.. **Synthesis of hydridoplatinum-molybdenum (or tungsten) heterodinuclear complexes by β -hydrogen elimination of (dppe)EtPt-MCp(CO)₃. Selective hydride transfer from Pt to Mo (or W).** *Journal of Molecular Catalysis A: Chemical* (2000), 159(1), 63-70.
- Usui, Yoko; Noma, Junko; Hirano, Masafumi; Komiya, Sanshiro. **C-Si bond cleavage of trihalomethyltrimethylsilane by alkoxo- and aryloxogold or -copper complexes.** *Inorganica Chimica Acta* (2000), 309(1-2), 151-154.
- Komine, Nobuyuki; Hoh, Hideko; Hirano, Masafumi; Komiya, Sanshiro. **Oxidative Addition of Organocobalt(I) and -molybdenum(II) Complexes to Palladium(0) Complexes To Give Heterodinuclear Organometallic Complexes.** *Organometallics* (2000), 19(25), 5251-5253.

- Hirano, Masafumi; Kurata, Naoki; Komiya, Sanshiro. **Successive O-H and sp³ C-H bond activation of ortho-substituted phenols by a ruthenium(0) complex.** Journal of Organometallic Chemistry (2000), 607(1-2), 18-26.
- Komiya, Sanshiro; Planas, Jose Giner; Onuki, Koji; Lu, Zhaobin; Hirano, Masafumi. **Versatile Coordination Modes and Transformations of the Cyclooctatriene Ligand in Ru(C₈H₁₀)L₃ (L = Tertiary Phosphine).** Organometallics (2000), 19(20), 4051-4059.
- Hirano, Masafumi; Kiyota, Sayori; Imoto, Masataka; Komiya, Sanshiro. **Michael addition of N-bonded enolato ligands to acrylonitrile in iron and ruthenium complexes.** Chemical Communications (Cambridge) (2000), (17), 1679-1680.
- Planas, Jose Giner; Marumo, Tsuyoshi; Ichikawa, Yoichi; Hirano, Masafumi; Komiya, Sanshiro. **Carbon-oxygen and carbon-sulfur bond activation of vinyl esters, ethers and sulfides by low valent ruthenium complexes.** Dalton (2000), (15), 2613-2625.
- Komiya, Sanshiro; Muroi, Shin-ya; Furuya, Masaki; Hirano, Masafumi. **Regio- and Stereoselective Insertion Reactions of Thiiranes into Pt-Mn (or Re) Bond in Organoplatinum-Manganese or -Rhenium Heterodinuclear Complexes as Intermediates toward Desulfurization Reaction.** Journal of the American Chemical Society (2000), 122(1), 170-171.
- Planas, J. G.; Marumo, T.; Ichikawa, Y.; Hirano, M.; Komiya, S. **C-O and C-S bond activation of allyl esters, ethers, and sulfides by low valent ruthenium complexes.** Journal of Molecular Catalysis A: Chemical (1999), 147(1-2), 137-154.
- Usui, Yoko; Noma, Junko; Hirano, Masafumi; Komiya, Sanshiro. **Ring opening reactions of thiiranes by alkoxo- and aryloxo-gold(I) complexes.** Journal of the Chemical Society, Dalton Transactions: Inorganic Chemistry (1999), (24), 4397-4406.
- Fukuoka, A.; Sato, A.; Kodama, K.-y.; Hirano, M.; Komiya, S. **Synthesis of organo(siloxo)platinum and -palladium complexes and preparation of supported nanoclusters by facile ligand reduction.** Inorganica Chimica Acta (1999), 294(2), 266-274.

- Morikita, Takashi; Hirano, Masafumi; Sasaki, Akito; Komiya, Sanshiro. **C-S, C-H, and N-H bond cleavage of heterocycles by a zero-valent iron complex, Fe(N₂)(depe)₂ [depe = 1,2-bis(diethylphosphino)ethane].** *Inorganica Chimica Acta* (1999), 291(1-2), 341-354.
- Planas, Jose Giner; Hirano, Masafumi; Komiya, Sanshiro. **Synthesis and ligand exchange control of Ru(η^2 -C₂H₃YPh)(cod)(depe) (Y = O, S).** *Chemistry Letters* (1999), (9), 953-954.
- Planas, Jose Giner; Hirano, Masafumi; Komiya, Sanshiro. **Regioselective 1,2-insertion of Ru into the C-S bond in 3-substituted thiophenes.** *Chemical Communications (Cambridge)* (1999), (18), 1793-1794.
- Hirano, Masafumi; Takenaka, Atsushi; Mizuho, Yuji; Hiraoka, Makiko; Komiya, Sanshiro. **Synthesis of N-bonded enolatoruthenium(II) by oxidative addition of alkyl cyanocarboxylate to a ruthenium(0) complex.** *Journal of the Chemical Society, Dalton Transactions: Inorganic Chemistry* (1999), (18), 3209-3216.
- Doumeki, Reiko; Hatano, Masaharu; Kinoshita, Hiroo; Yamashita, Emi; Hirano, Masafumi; Fukuoka, Atsushi; Komiya, Sanshiro. **Effect of Pt precursors on N₂/N₂O selectivity for selective reduction of NO by hydrocarbon on supported Pt catalysts.** *Chemistry Letters* (1999), (6), 515-516.
- Sato, Takehiro; Komine, Nobuyuki; Hirano, Masafumi; Komiya, Sanshiro. **Selective isomerization of 2-allylphenol to (Z)-2-propenylphenol catalyzed by Ru(COD)(COT)/PEt₃.** *Chemistry Letters* (1999), (5), 441-442.
- Komiya, Sanshiro; Chigira, Tomoko; Suzuki, Toru; Hirano, Masafumi. **Polymerization of alkyl methacrylate catalyzed by hydridorhenium complexes.** *Chemistry Letters* (1999), (4), 347-348.
- Fukuoka, Atsushi; Kosugi, Wataru; Morishita, Fumiaki; Hirano, Masafumi; Komiya, Sanshiro; McCaffrey, Louise; Henderson, William. **Water-soluble iridium and rhodium complexes with tris(hydroxymethyl)phosphine and their catalysis in biphasic hydrogenation and hydroformylation.** *Chemical Communications (Cambridge)* (1999), (6), 489-490.

- Nakahara, Naofumi; Hirano, Masafumi; Fukuoka, Atsushi; Komiya, Sanshiro. **Synthesis and structure of thiolato bridged Pt-Ti heterobimetallic complexes with methyl group.** Journal of Organometallic Chemistry (1999), 572(1), 81-85.
- Hirano, Masafumi; Hirai, Miwa; Ito, Yuji; Tsurumaki, Tsutomu; Baba, Atsushi; Fukuoka, Atsushi; Komiya, Sanshiro. **N-bonded enolatorhenium(I) complexes having dimethylphenylphosphine ligands as active key intermediates in catalytic Knoevenagel and Michael reactions.** Journal of Organometallic Chemistry (1998), 569(1-2), 3-14.
- Alvarez, Salvador G.; Hasegawa, Sachi; Hirano, Masafumi; Komiya, Sanshiro. **Michael reactions promoted by η^1 -O-enolatoruthenium(II) complexes derived from Ru(cod)(cot), diphosphine, and dimethyl malonate.** Tetrahedron Letters (1998), 39(29), 5209-5212.
- Fukuoka, Atsushi; Nagano, Takeyuki; Furuta, Shuichi; Yoshizawa, Michito; Hirano, Masafumi; Komiya, Sanshiro. **Tail-to-tail dimerization of acrylonitrile catalyzed by low-valent ruthenium complexes.** Bulletin of the Chemical Society of Japan (1998), 71(6), 1409-1415.
- Kubo, Hiroaki; Hirano, Masafumi; Komiya, Sanshiro. **Synthesis, structure and reactivity of an (η -naphthalene)iron(0) complex having a 1,2-bis(dicyclohexylphosphino)ethane ligand.** Journal of Organometallic Chemistry (1998), 556(1-2), 89-95.
- Planas, Jose Giner; Hirano, Masafumi; Komiya, Sanshiro. **C-S bond cleavage of allyl thioethers by zerovalent Ru complexes.** Chemistry Letters (1998), (2), 123-124
- Hirano, Masafumi; Kurata, Naoki; Marumo, Tsuyoshi; Komiya, Sanshiro. **Successive O-C/O-H and sp³ C-H Bond Activation of ortho Substituents in Allyl Phenyl Ethers and Phenols by a Ruthenium(0) Complex.** Organometallics (1998), 17(4), 501-503.
- Yasuda, Toshiyuki; Fukuoka, Atsushi; Hirano, Masafumi; Komiya, Sanshiro. **Hydrogen transfer in Pt-Mo heterodinuclear hydride complexes promoted by alkynes.** Chemistry Letters (1998), (1), 29-30.

- Hirano, Masafumi; Akita, Masatoshi; Morikita, Takashi; Kubo, Hiroaki; Fukuoka, Atsushi; Komiya, Sanshiro. **Synthesis, structure and reactions of a dinitrogen complex of iron(0), [Fe(N)₂(depe)] (depe = EtPCH₂CH₂PEt).** Journal of the Chemical Society, Dalton Transactions: Inorganic Chemistry (1997), (19), 3453-3458.
- Usui, Yoko; Hirano, Masafumi; Fukuoka, Atsushi; Komiya, Sanshiro. **Hydrogen abstraction from transition metal hydrides by gold alkoxides giving gold-containing heterodinuclear complexes.** Chemistry Letters (1997), (10), 981-982.
- Hirano, Masafumi; Akita, Masatoshi; Tani, Kazuo; Kumagai, Kuninori; Kasuga, Noriko C.; Fukuoka, Atsushi; Komiya, Sanshiro. **Activation of Coordinated Carbon Dioxide in Fe(CO)₂(depe)₂ by Group 14 Electrophiles.** Organometallics (1997), 16(19), 4206-4213.
- Fukuoka, Atsushi; Fukagawa, Sumiko; Hirano, Masafumi; Komiya, Sanshiro. **Insertion of CO into a CH₃-Pd bond in a heterodinuclear complex (dppe)MePd-Co(CO)₄. Preferential insertion of coordinated CO on a cobalt moiety.** Chemistry Letters (1997), (4), 377-378.
- Fukuoka, Atsushi; Sugiura, Takeshi; Yasuda, Toshiyuki; Taguchi, Tomokazu; Hirano, Masafumi; Komiya, Sanshiro. **Enhancement of β-hydrogen elimination reaction on platinum-containing heterodinuclear complexes.** Chemistry Letters (1997), (4), 329-330.
- Hirano, Masafumi; Marumo, Tsuyoshi; Miyasaka, Takashi; Fukuoka, Atsushi; Komiya, Sanshiro. **Unexpected ligand displacement of Ru(cod) with trimethylphosphine to give fac-Ru(6-η¹:1-3-η³-C₈H₁₀)(PMe₃)₃.** Chemistry Letters (1997), (4), 297-298.
- Komiya, Sanshiro; Sone, Takuo; Usui, Yoko; Hirano, Masafumi; Fukuoka, Atsushi. **Condensation reactions of benzaldehyde catalyzed by gold alkoxides.** Gold Bulletin (London) (1996), 29(4), 131-136.
- Fukuoka, Atsushi; Minami, Yutaka; Nakajima, Nobumasa; Hirano, Masafumi; Komiya, Sanshiro. **Synthesis and reactivity of organoplatinum-rhenium heterobimetallic complexes having sulfur ligands.** Journal of Molecular Catalysis A: Chemical (1996), 107(1-3), 323-328.

● Murahashi, Shun-Ichi; Naota, Takeshi; Taki, Hiroshi; Mizuno, Masahiko; Takaya, Hikaru; Komiya, Sanshiro; Mizuho, Yuji; Oyasato, Naohiko; Hiraoka, Makiko; Hirano, Masafumi; Fukuoka, Atsushi.

Ruthenium-catalyzed aldol and Michael reactions of nitriles. Carbon-carbon bond formation by α -C-H activation of nitriles. Journal of the American Chemical Society (1995), 117(50), 12436-51.

● Fukuoka, Atsushi; Gotoh, Naotaka; Kobayashi, Norikazu; Hirano, Masafumi; Komiya, Sanshiro.

Homogeneous bimetallic catalysts for production of carboxylic acids from carbon dioxide, hydrogen, and organic iodides. Chemistry Letters (1995), (7), 567-8.

● Fukuoka, Atsushi; Sato, Akihiro; Mizuho, Yuji; Hirano, Masafumi; Komiya, Sanshiro. **Synthesis and structure of novel organo(siloxo)platinum complexes. Facile reduction by dihydrogen.**

Chemistry Letters (1994), (9), 1641-4.

● Komiya, Sanshiro; Kabasawa, Takashi; Yamashita, Koji; Hirano, Masafumi; Fukuoka, Atsushi. **C-O bond cleavage and oxidative addition of an allyl carboxylate to a ruthenium(0) complex. Isolation of (π -allyl)(trifluoroacetato)tris(triethylphosphine)ruthenium(II).** Journal of Organometallic Chemistry (1994), 471(1-2), C6-C7.

● Komiya, Sanshiro; Akita, Masatoshi; Kasuga, Noriko; Hirano, Masafumi; Fukuoka, Atsushi.

Synthesis, structure and reactions of a carbon dioxide complex of iron(0) containing 1,2-bis(diethylphosphino)ethane ligands. Journal of the Chemical Society, Chemical Communications (1994), (9), 1115-16.

● Hirano, Masafumi; Hirai, Miwa; Ito, Yuji; Fukuoka, Atsushi; Komiya, Sanshiro. **Novel catalytic metathesis of substituted olefins promoted by rhenium(I) enolate complexes.** Chemistry Letters (1994), (1), 165-6.

● Hirano, Masafumi; Ito, Yuji; Hirai, Miwa; Fukuoka, Atsushi; Komiya, Sanshiro. **Synthesis of novel rhenium(I) enolate complexes as active key intermediates in the catalytic aldol type reaction.**

Chemistry Letters (1993), (12), 2057-60.

