



Kazuhiko Semba
Department of Material Chemistry
Graduate School of Engineering
Kyoto University
Kyoto 615-8510, Japan

TEL:+81-75-383-2516, FAX:+81-75-383-2514, E-mail: semba.kazuhiko.5n@kyoto-u.ac.jp

CURRICULUM VITAE

Name Kazuhiko Semba
Nationality Japanese
Date of Birth January 16, 1986



ORCID: 0000-0001-7903-4091

Web of Science ResearcherID: AGK-9889-2022

Career

2023.9 – Senior Lecturer
Department of Energy and Hydrocarbon Chemistry, Graduate School of Engineering, Kyoto University

2013.4 – 2023.8 Assistant Professor
Department of Material Chemistry, Graduate School of Engineering, Kyoto University

2010.4 – 2013.3 Ph.D. (Thesis Advisor: Prof. Yasushi Tsuji)
Department of Energy and Hydrocarbon Chemistry, Graduate School of Engineering
Kyoto University

2008.4 – 2010.3 M.S. (Thesis Advisor: Prof. Yasushi Tsuji)
Department of Chemistry, Graduate School of Engineering, Kyoto University

2004.4 – 2008.3 B.S. (Thesis Advisor: Prof. Yasushi Tsuji)
Department of Chemistry, Faculty of Engineering, Kyoto University

Experience

2011.4 – 2013.3 JSPS Research Fellow for Young Scientist

2012.6 – 2012.8 Visiting Student (Research Advisor: Prof. Cathleen M. Crudden)
Department of Chemistry, Queen's University

List of Publications

[Original Papers]

- [1]. Synthesis and Reactivity of Al–Ni Bimetallic Complexes
Kazuhiko Semba, Kotaro Nagase, Hayato Asano, Naofumi Hara, Yoshiaki Nakao*
Polyhedron **2024**, 251, 116823. (part of Special Issue regarding Metal–Metal bonds involving main group metals)
- [2]. Magnesiation of Alkyl Fluorides Catalyzed by Rhodium–Aluminum Bimetallic Complexes
Ikuya Fujii, Ryota Higo, Kazuhiko Semba, Yoshiaki Nakao*
Synlett **2024**, 35, 455. (part of cluster regarding 11th Singapore International Chemistry Conference (SICC-11))
- [3]. Conjugate Addition of Organoboron Compounds to α, β -Unsaturated Ketones Catalyzed by Nickelacycles
Kazuhiko Semba,* Kotaro Nagase, Yoshiaki Nakao*
Synlett **2023**, 34, 2227–2231. (Special Issue for Modern Boron Chemistry: 60 Years of the Matteson Reaction)
- [4]. “The Kumada-Tamao-Corriu Coupling Reaction Catalyzed by Rhodium-Aluminum Bimetallic Complexes”
Ikuya Fujii, Kazuhiko Semba, Yoshiaki Nakao*
Org. Lett. **2022**, 24, 3075–3079.
- [5]. “Synthesis and Reactivity of Heterobimetallic Co-PAIP Pincer Complexes”
Kazuhiko Semba, Fumiya Shimoura, Yoshiaki Nakao*
Chem. Lett. **2022**, 51, 455–457.
- [6]. “1,2-Arylboration of Aliphatic Alkenes by Cooperative Palladium/Copper Catalysis”
Kazuhiko Semba,* Yasuhiro Ohtagaki, Yoshiaki Nakao*
Tetrahedron Lett. **2021**, 72, 153059 (Special Issue Paper: In honor of Professor Stephen Martin).
- [7]. “Merging Pd⁰/Pd^{II} Redox and Pd^{II}/Pd^{II} Non-redox Catalytic Cycles for the Allylarylation of Electron-deficient Alkenes”
Kazuhiko Semba,* Naoki Ohta, Fritz Paulus, Masaki Ohata, Yoshiaki Nakao*
Chem. Eur. J. **2021**, 27, 5035–5040. (VIP)
- [8]. “Magnesiation of Aryl Fluorides Catalyzed by a Rhodium–Aluminum Complex”
Ikuya Fujii, † Kazuhiko Semba, † Qiao-Zhi Li, Shigeyoshi Sakaki,* Yoshiaki Nakao*
J. Am. Chem. Soc. **2020**, 142, 11647–11652.
† These authors contributed equally on this work.
Highlighted in SYNFACTS **2020**, 16, 1062.

- [9]. "Nickel-Catalyzed Anti-Markovnikov Hydroarylation of Unactivated Alkenes with Unactivated Arenes Facilitated by non-Covalent Interactions"
Noam I. Saper, Akito Ohgi, David W. Small, Kazuhiko Semba, Yoshiaki Nakao,* John F. Hartwig*
Nat. Chem. **2020**, *12*, 276–283.
- [10]. "A PAIP Pincer Ligand Bearing a 2-Diphenylphosphinophenoxy Backbone"
Kazuhiko Semba, Ikuya Fujii, Yoshiaki Nakao*
Inorganics **2019**, *7*, 140–149.
- [11]. "Pd/NHC-Catalyzed Cross-Coupling Reactions of Nitroarenes"
Myuto Kashiara, Rong-Ling Zhong, Kazuhiko Semba, Shigeyoshi Sakaki,* Yoshiaki Nakao*
Chem. Commun. **2019**, *55*, 9291–9294.
- [12]. "Carboallylation of Electron-Deficient Alkenes with Organoboron Compounds and Allylic Carbonates by Cooperative Palladium/Copper Catalysis"
Kazuhiko Semba,* Naoki Ohta, Yoshiaki Nakao*
Org. Lett. **2019**, *21*, 4407–4410.
- [13]. "Synthesis of N-Heterocyclic Carbene Ligands for Site-Selective C–H Alkylation by Cooperative Nickel/Aluminum Catalysis"
Shogo Okumura, Tomohiro Ebara, Kazuhiko Semba, Yoshiaki Nakao*
Heterocycles **2019**, *99*, 1128–1144.
- [14]. "Carboallylation of Electron-Deficient Alkenes by Palladium/Copper Catalysis"
Kazuhiko Semba,* Naoki Ohta, Yuko Yano, Yoshiaki Nakao*
Chem. Commun. **2018**, *54*, 11463–11466.
- [15]. "Rhodium Complexes Bearing PAIP Pincer Ligands"
Naofumi Hara, Teruhiko Saito, Kazuhiko Semba, Nishamol Kuriakose, Hong Zheng, Shigeyoshi Sakaki,* Yoshiaki Nakao*
J. Am. Chem. Soc. **2018**, *140*, 7070–7073.
- [16]. "Hydrogenative Cross-Coupling of Internal Alkynes and Aryl Iodides by Palladium/Copper Cooperative Catalysis"
Kazuhiko Semba,* Ryohei Kameyama, Yoshiaki Nakao*
Chem. Lett. **2018**, *47*, 213–216.
- [17]. "Site-selective Linear Alkylation of Anilides by Cooperative Nickel/Aluminium Catalysis"
Shogo Okumura, Takuya Komine, Erika Shigeki, Kazuhiko Semba, Yoshiaki Nakao*
Angew. Chem. Int. Ed. **2018**, *57*, 929–932.

- [18]. “Arylboration of Internal Alkynes by Cooperative Palladium/Copper Catalysis”
Kazuhiko Semba,* Megumi Yoshizawa, Yasuhiro Ohtagaki, Yoshiaki Nakao*
Bull. Chem. Soc. Jpn. **2017**, 90, 1340–1343. Selected as a selected paper.
- [19]. “How to Control Inversion vs. Retention Transmetallation between PdII-Phenyl and CuI-Alkyl Complexes: Theoretical Insight”
Hong Zheng, Kazuhiko Semba, Yoshiaki Nakao, Shigeyoshi Sakaki*
J. Am. Chem. Soc. **2017**, 139, 14065–14076.
- [20]. “C3-Selective Alkenylation of N-Acylindoles with Unactivated Alkynes by Cooperative Nickel/Aluminium Catalysis”
Fumiyoshi Inoue, Teruhiko Saito, Kazuhiko Semba, Yoshiaki Nakao*
Chem. Commun. **2017**, 53, 4497–4500.
- [21]. “*para*-Selective C–H Borylation of (Hetero)Arenes by Cooperative Iridium/Aluminum Catalysis”
Lichen Yang, Kazuhiko Semba, Yoshiaki Nakao*
Angew. Chem., Int. Ed. **2017**, 56, 4853–4857.
Highlighted in SYNFACTS 2017, 13, 632.
- [22]. “*para*-Selective Alkylation of Benzamides and Aromatic Ketones by Cooperative Nickel/Aluminum Catalysis”
Shogo Okumura, Shuwei Tang, Teruhiko Saito, Kazuhiko Semba, Shigeyoshi Sakaki,* Yoshiaki Nakao*
J. Am. Chem. Soc. **2016**, 138, 14699–14704.
- [23]. “Arylboration of 1-Arylalkenes by Cooperative Nickel/Copper Catalysis”
Kazuhiko Semba,* Yasuhiro Ohtagaki, Yoshiaki Nakao*
Org. Lett. **2016**, 18, 3956–3959.
Highlighted in SYNFACTS 2016, 12, 1188.
- [24]. “Silicon-based Cross-coupling of Aryl Tosylates by Cooperative Palladium/Copper Catalysis”
Akito Ohgi, Kazuhiko Semba, Tamejiro Hiyama, Yoshiaki Nakao*
Chem. Lett. **2016**, 45, 973–975.
- [25]. “Reductive Cross-Coupling of Conjugated Arylalkenes and Aryl Bromides with Hydrosilanes by Cooperative Pd/Cu Catalysis”
Kazuhiko Semba,* Kenta Ariyama, Hong Zheng, Ryohei Kameyama, Shigeyoshi Sakaki,* Yoshiaki Nakao*
Angew. Chem. Int. Ed. **2016**, 55, 6275–6279.

- [26]. "Anti-Markovnikov Hydroheteroarylation of Unactivated Alkenes with Indoles, Pyrroles, Benzofurans, and Furans Catalyzed by a Nickel-*N*-Heterocyclic Carbene System"
York Schramm, Makoto Takeuchi, Kazuhiko Semba, Yoshiaki Nakao,* John F. Hartwig*
J. Am. Chem. Soc. **2015**, *137*, 12215–12218.
- [27]. "Copper-Catalyzed Semihydrogenation of Alkynes to (*Z*)-Alkenes"
Kazuhiko Semba,* Ryohei Kameyama, Yoshiaki Nakao*
Synlett **2015**, *26*, 318–322.
- [28]. "Copper-Catalyzed Borylative Allyl-Allyl Coupling Reaction"
Kazuhiko Semba, Naoto Bessho, Tetsuaki Fujihara, Jun Terao, Yasushi Tsuji*
Angew. Chem. Int. Ed. **2014**, *53*, 9007–9011.
- [29]. "Arylboration of Alkenes by Cooperative Palladium/Copper Catalysis"
Kazuhiko Semba,* Yoshiaki Nakao*
J. Am. Chem. Soc. **2014**, *136*, 7567–7570.
Highlighted in ACS SELECT (Legacy of Richard Heck)
- [30]. "Intramolecular Aminocyanation of Alkenes by Cooperative Palladium/Boron Catalysis"
Miyazaki Yosuke, Naoki Ohta, Kazuhiko Semba, Yoshiaki Nakao*
J. Am. Chem. Soc. **2014**, *136*, 3732–3735.
- [31]. "Copper-Catalyzed Borylation of α -Alkoxyallenes with Bis(pinacolato)diboron: Efficient Synthesis of 2-Boryl 1,3-Butadienes"
Kazuhiko Semba, Tetsuaki Fujihara, Jun Terao, Yasushi Tsuji*
Angew. Chem. Int. Ed. **2013**, *52*, 12400–12403.
Highlighted in SYNFACTS **2014**, *10*, 196.
- [32]. "Copper-Catalyzed Highly Selective Hydroboration of Allenes and 1,3-Dienes"
Kazuhiko Semba, Masataka Shinoiya, Tetsuaki Fujihara, Jun Terao, Yasushi Tsuji*
Chem. Eur. J. **2013**, *19*, 7125–7132.
- [33]. "Copper-Catalyzed Silacarboxylation of Internal Alkynes by Employing Carbon Dioxide and Silylboranes"
Tetsuaki Fujihara, Yosuke Tani, Kazuhiko Semba, Jun Terao, Yasushi Tsuji*
Angew. Chem. Int. Ed. **2012**, *51*, 11487–11490.
- [34]. "Copper-Catalyzed Highly Selective Semihydrogenation of Non-Polar Carbon–Carbon Multiple Bonds using a Silane and an Alcohol"
Kazuhiko Semba, Tetsuaki Fujihara, Tinghua Xu, Jun Terao, Yasushi Tsuji*
Adv. Synth. Catal. **2012**, *354*, 1542–1550.

- [35]. “Copper-Catalyzed Highly Regio- and Stereoselective Directed Hydroboration of Unsymmetrical Internal Alkynes: Controlling Regioselectivity by Choice of Catalytic Species”
Kazuhiko Semba, Tetsuaki Fujihara, Jun Terao, Yasushi Tsuji*
Chem. Eur. J. **2012**, *18*, 4179–4184.
- [36]. “Copper-Catalyzed Hydrocarboxylation of Alkynes Using Carbon Dioxide and Hydrosilanes”
Tetsuaki Fujihara, Tinghua Xu, Kazuhiko Semba, Jun Terao, Yasushi Tsuji*
Angew. Chem. Int. Ed. **2011**, *50*, 523–527.
Highlighted in Angew. Chem. Int. Ed. **2011**, *50*, 6210–6212.
- [37]. “Copper-Catalyzed Hydrosilylation with a Bowl-Shaped Phosphane Ligand: Preferential Reduction of a Bulky Ketone in the Presence of an Aldehyde”
Tetsuaki Fujihara, Kazuhiko Semba, Jun Terao, Yasushi Tsuji*
Angew. Chem. Int. Ed. **2010**, *49*, 1472–1476.

[Reviews and Perspectives]

- [1]. “Rh Complex with Unique Rh–Al Direct Bond: Theoretical Insight into its Characteristic Features and Application to Catalytic Reaction via σ -Bond Activation”
Qiao-Zhi Li, Naofumi Hara, Kazuhiko Semba, Yoshiaki Nakao, Shigeyoshi Sakaki*
Top. Catal. **2022**, *65*, 392–417.
- [2]. “X-Type Aluminyl Ligands for Transition-Metal Catalysis”
Naofumi Hara, Kazuhiko Semba, Yoshiaki Nakao*
ACS catal. **2022**, *12*, 1626–1638.
- [3]. “Cross-Coupling Reactions by Cooperative Pd/Cu or Ni/Cu Catalysis Based on the Catalytic Generation of Organocopper Nucleophiles”
Kazuhiko Semba,* Yoshiaki Nakao*
Tetrahedron **2019**, *75*, 709–719.
- [4]. “Cross-Coupling Reactions by Cooperative Metal Catalysis”
Kazuhiko Semba,* Yoshiaki Nakao*
J. Synth. Org. Chem. Jpn. **2017**, *75*, 1133–1140.
- [5]. “Copper-Catalyzed Borylative Transformations of Non-polar Carbon–Carbon Unsaturated Compounds Employing Borylcopper as an Active Catalyst Species”
Kazuhiko Semba, Tetsuaki Fujihara, Jun Terao, Yasushi Tsuji*
Tetrahedron, **2015**, *71*, 2183–2197.

- [6]. “Regioselective Transformation of Alkynes Catalyzed by a Copper Hydride or Boryl Copper Species”
Tetsuaki Fujihara, Kazuhiko Semba, Jun Terao, Yasushi Tsuji*
Catal. Sci. Technol. **2014**, 4, 1699–1709.