

Takashi Kurogi

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Born: October 2nd, 1987. Nobeoka, Miyazaki, Japan Nationality: Japanese

Education

Ph.D. March 2015

Tokyo Institute of Technology, Tokyo, Japan – Ph.D. in Chemistry

Advisor Prof. Hiroyuki Kawaguchi

Thesis Title: “Synthesis and Reactivity Studies of Early Transition Metal Hydride and Low-Valent Complexes Supported by Aryloxide Ligands.”

(Dissertation Committee: H. Kawaguchi, O. Ishitani, T. Komatsu, K. Maeda, T. Takao)

M.S. March 2012

Tokyo Institute of Technology, Tokyo, Japan – M.S. in Chemistry

Advisor Prof. Hiroyuki Kawaguchi

Thesis Title: “Group 5 Metal Hydrides: Synthesis and Reactivity of Aryloxide Complexes”

(Dissertation Committee: H. Kawaguchi, O. Ishitani, N. Iwasawa, T. Okada, T. Ozeki)

B.S. March 2010

Tokyo Institute of Technology, Tokyo, Japan – B.S. in Chemistry

Advisor Prof. Hiroyuki Kawaguchi

Thesis Title: “Reductive Coupling of Carbon Monoxide by a Tantalum Hydride Complex”

Research Experience

July 1, 2021-present Program-Specific Associate Professor (CREST), Department of Chemistry, Graduate School of Science, Kyoto University, Japan.
Organic Chemistry Lab. (Prof. Hideki Yorimitsu)

April 1, 2019-June 30, 2021 Designated Assistant Professor (KAKENHI), Division of Applied Chemistry, Graduate School of Natural Science and Technology, Okayama University, Japan.
Organometallic Chemistry Lab. (Prof. Kazuhiko Takai)

April 1, 2017 - March 31, 2019 JSPS Overseas Research Fellowship, Japan Society for the Promotion of Science, Japan.
University of Pennsylvania, Philadelphia, PA, USA.
JSPS Research Fellow under the direction of Prof. Daniel J. Mindiola

May 15, 2015-March 31, 2017 Visiting Scholar of Chemistry, University of Pennsylvania, Philadelphia, PA, USA.
Postdoctoral Research Fellow under the direction of Prof. Daniel J. Mindiola.

April 1, 2014-March 31, 2016 JSPS Research Fellow, Japan Society for the Promotion of Science, Japan.
DC2 (2014-2015), PD (2015-2016)

Publication List

44. Carbon–Atom Transfer by Halocarbyne can Carbide Reagents. Takashi Kurogi, *J. Synth. Org.* **2024**, 82, 709–718.

43. Sodium-Mediated Reductive *anti*-Dimagnesiation of Diarylacetylenes with Magnesium Bromide. Haruka Yamaguchi, Fumiya Takahashi, Takashi Kurogi, Hideki Yorimitsu, *Synthesis* **2024**, 56, 3307–3313.
42. Reductive stereo- and regiocontrolled boryllithiation and borylsodiation of arylacetylenes using flow microreactors. Yiyuan Jiang, Takashi Kurogi, Hideki Yorimitsu, *Nat. Synth.* **2024**, 3, 192–201.
41. Reductive *anti*-Dizincation of Arylacetylenes. Haruka Yamaguchi, Fumiya Takahashi, Takashi Kurogi, Hideki Yorimitsu, *Chem. Asian J.* **2024**, 19, e202400384. “Front Cover”
40. Arylation of benzazoles at the 4 positions by activation of their 2-methylsulfinyl groups. Ryota Wakabayashi, Shuo Wang, Takashi Kurogi, Hideki Yorimitsu, *Chem. Commun.* **2024**, 60, 6166–6169.
39. Sodium-Mediated Reductive C–C Bond Cleavage Assisted by Boryl Groups. Mizuki Fukazawa, Takashi Kurogi, Hideki Yorimitsu, *Chem. Asian J.* **2024**, 19, e202400100.
38. Regioselectivity in the sulfonium-mediated arylation reactions of 2-substituted phenols with benzothienyl sulfoxide. Ryota Wakabayashi, Mizuki Fukazawa, Takashi Kurogi, Hideki Yorimitsu, *Bull. Chem. Soc. Jpn.* **2024**, 97, uoae002.
37. Aromatic metamorphosis of an indole into 2-quinolone, dihydrobenzazasilene, and dihydrobenzazagermine. Kazuki Nishihara, Takashi Kurogi, Hideki Yorimitsu, *Arkivoc* **2023**, (ii), 202312017.
36. Multiply *exo*-Methylated Corannulenes. Kazuhira Miwa, Shinobu Aoyagi, Toru Amaya, Takahiro Sasamori, Shogo Morisako, Takashi Kurogi, Hideki Yorimitsu, *Chem. Eur. J.* **2023**, 29, e202301557.
35. Preparation of Vinylic Lithium Reagents from Silyl Enolates of Alkyl Aryl Ketones Using Lithium Arenide. Ziwei Zhang, Fumiya Takahashi, Takashi Kurogi, Hideki Yorimitsu, *Asian J. Org. Chem.* **2023**, 12, e202300242.
34. Reductive *anti*-dimagnesiation and dialumination of alkynes: Synthesis and reactions of *trans*-1,2-dimetallalkenes. Fumiya Takahashi, Takashi Kurogi, Hideki Yorimitsu, *Nat. Synth.* **2023**, 2, 162–171.
33. A Transmetallation Pathway to a Dinuclear Chromium μ -Methylene Complex. Takashi Kurogi, Kenta Uchida, Kazusa Wakamatsu, Kazuhiko Takai, *Chem. Lett.* **2022**, 51, 525–528.
32. Reductive Ring Opening of Arylcyclopropanecarboxamides Accompanied by Borylation and Enolate Formation. Shuo Wang, Atsushi Kaga, Takashi Kurogi, Hideki Yorimitsu, *Org. Lett.* **2022**, 24, 1105–1109.
31. Chromium carbides and cyclopropenylienes. Takashi Kurogi, Keiichi Irifune, Kazuhiko Takai, *Chem. Sci.* **2021**, 12, 14281–14287.
30. Phosphorus-Atom Transfer from Phosphaethynolate to an Alkylidyne. Mehrafshan G. Jafari, Yerin Park, Bimal Pudasaini, Takashi Kurogi, Patrick J. Carroll, David M. Kaphan, Jeremy Kropf, Massimiliano Delferro, Mu-Hyun Baik, Daniel J. Mindiola, *Angew. Chem. Int. Ed.* **2021**, 60, 24411–24417; *Angew. Chem.* **2021**, 133, 24616–24622.
29. Birch Reduction of Arenes Using Sodium Dispersion and DMI under Mild Conditions. Sobi Asako, Ikko Takahashi, Takashi Kurogi, Yoshiaki Murakami, Laurean Illies, Kazuhiko Takai, *Chem. Lett.* **2021**, 51, 38–40.
28. A trinuclear chromium(III) chlorocarbene. Takashi Kurogi, Keiichi Irifune, Takahiro Enoki, Kazuhiko Takai, *Chem. Commun.* **2021**, 57, 5199–5202.
27. Structural elucidation of a methylenation reagent of esters: synthesis and reactivity of a dinuclear titanium(III) methylene complex. Takashi Kurogi, Kaito Kuroki, Shunsuke Moritani

- Kazuhiko Takai, *Chem. Sci.* **2021**, *12*, 3509–3515. Selected to “2021 Chemical Science HOT Article Collection”.
26. Methylidyne Transfer as a Plausible Deactivation Pathway for Ynene Metathesis. Takashi Kurogi, Daniel J. Mindiola, *Organometallics* **2020**, *39*, 4474–4478.
 25. Cyclization of 5-alkynones with chromium alkylidene equivalents generated *in situ* from *gem*-dichromiomethanes. Masato Murai, Ryuji Taniguchi, Takashi Kurogi, Shunsuke Moritani, Kazuhiko Takai, *Chem. Commun.* **2020**, *56*, 9711–9714.
 24. Selenenate Anions (PhSeO⁻) as Organocatalyst: Synthesis of *trans*-Stilbenes and a PPV Derivative. Zhipeng Zheng, Oleksandra S. Trofymchuk, Takashi Kurogi, Elena Varela, Daniel J. Mindiola, Patrick J. Walsh, *Adv. Synth. Catal.* **2020**, *362*, 659–666.
 23. Scrutinizing Metal-Ligand Covalency and Redox Non-Innocence Via Nitrogen K-edge X-ray Absorption Spectroscopy. James T. Lukens, Ida M. DiMucci, Takashi Kurogi, Daniel J. Mindiola, Kyle M. Lancaster, *Chem. Sci.* **2019**, *10*, 5044–5055.
 22. Neutral and Anionic Monomeric Zirconium Imides Prepared via Selective C=N Bond Cleavage of a Multidentate and Sterically Demanding β -Diketiminato Ligand. Takashi Kurogi, Jiayang Chu, Yaofeng Chen, Daniel J. Mindiola, *Chem. Asian J.* **2019**, *14*, 2629–2638.
 21. Well-Defined Titanium Complex for Free-Radical and Cationic Photopolymerization under Visible Light and Photoinduction of Ti-Based Nanoparticles. Louise Breloy, Vlasta Brezova, Jean-Pierre Malval, Agustin Rios de Anda, Julie Bourgon, Takashi Kurogi, Daniel J. Mindiola, Davy-Louis Versace, *Macromolecules* **2019**, *52*, 3716–3729.
 20. Methylidyne Transfer Reactions with Niobium. Takashi Kurogi, Balazs Pinter, Daniel J. Mindiola, *Organometallics* **2018**, *37*, 3385–3388.
 19. Room Temperature Olefination of Methane with a Titanium Alkylidene. Takashi Kurogi, Joonghee Won, Bohyun Park, Oleksandra S. Trofymchuk, Patrick J. Carroll, Mu-Hyun Baik, Daniel J. Mindiola, *Chem. Sci.* **2018**, *9*, 3376–3385.
 18. Divergent Pathways Involving 1,3-Dipolar Addition and N-N Bond Splitting of an Organic Azide Across a Zirconium Methylidene. Takashi Kurogi, Manoj V. Mane, Shuai Zheng, Patrick J. Carroll, Mu-Hyun Baik, Daniel J. Mindiola, *Angew. Chem. Int. Ed.* **2018**, *57*, 1978–1981; *Angew. Chem.* **2018**, *130*, 1996–1999.
 17. Selenolate Anion as an Organocatalyst: Reactions and Mechanistic Studies. Oleksandra S. Trofymchuk, Zhipeng Zheng, Takashi Kurogi, Daniel J. Mindiola, Patrick J. Walsh, *Adv. Synth. Catal.* **2018**, *360*, 1685–1692.
 16. 1,2-CH Bond Activation of Pyridine across a Transient Titanium Alkylidene Radical and Re-Formation of the Ti=CH^tBu Moiety. Takashi Kurogi, Matthias E. Mielhlik, Dominik Halter, Daniel J. Mindiola, *Organometallics* **2018**, *37*, 165–167.
 15. Room Temperature Ring-Opening of Quinoline, Isoquinoline and Pyridine with Low-Valent Titanium. Seung-yeol Baek, Takashi Kurogi, Dahye Kang, Masahiro Kamitani, Seungyeon Kwon, Douglas P. Solowey, Chun-Hsing Chen, Maren Pink, Patrick J. Carroll, Daniel J. Mindiola, Mu-Hyun Baik, *J. Am. Chem. Soc.* **2017**, *139*, 12804–12814.
 14. Polyhydrides of Sc, Zr and Hf and Their Proposed Formation. Takashi Kurogi, Masahiro Kamitani, Patrick J. Carroll, Daniel J. Mindiola, *Isr. J. Chem.* **2017**, *57*, 999–1009. (Special Issue for Robert Bergman's Wolf Prize).
 13. A New and Selective Cycle for Dehydrogenation of Linear and Cyclic Alkanes Under Mild Conditions Using a Base Metal. Douglas P. Solowey, Manoj, V. Mane, Takashi Kurogi, Patrick J. Carroll, Brian C. Manor, Mu-Hyun Baik, Daniel J. Mindiola, *Nat. Chem.* **2017**, *9*, 1126–1132.

12. A Radically Coupled Pathway to Stable and Terminally Bound Titanium Methylidenes. Takashi Kurogi, Patrick J. Carroll, Daniel J. Mindiola, *Chem. Commun.* **2017**, 53, 3412–3414. “Front Cover”
11. Molecular Titanium Nitrides. Nucleophiles Unleashed. Lauren N. Grant, Balazs Pinter, Takashi Kurogi, Maria E. Carroll, Gang Wu, Patrick J. Carroll, Daniel J. Mindiola, *Chem. Sci.* **2017**, 8, 1209–1224.
10. Trimethylsilyl imide complexes of tantalum: Can the silyl group be eliminated? Takashi Kurogi, Brian C. Manor, Patrick J. Carroll, Daniel J. Mindiola, *Polyhedron* **2017**, 125, 80–85. (Special Issue on Applications of Tridentate and Tetradentate Tripodal Ligands)
9. A Terminal Zirconium Methylidene. Methylenation, Group Transfer and C-H Bond Activation Reactions. Takashi Kurogi, Masahiro Kamitani, Patrick J. Carroll, Daniel J. Mindiola, *Organometallics* **2017**, 36, 74–79. (Special Issue on Hydrocarbon Chemistry: Activation and Beyond).
8. Metallo-Wittig Chemistry of an Alkylidene to Form a Terminal Titanium Oxo Complex. Douglas P. Solowey, Takashi Kurogi, Brian C. Manor, Patrick J. Carroll, Daniel J. Mindiola. (Special Issue on Reactions Facilitated by Ligand Design) *Dalton Trans.* **2016**, 45, 15894–15901.
7. A Terminally Bound Niobium Methylidyne. Takashi Kurogi, Patrick J. Carroll, Daniel J. Mindiola, *J. Am. Chem. Soc.* **2016**, 138, 4306–4309.
6. Formation and Redox Interconversion of Niobium Methylidene and Methylidyne Complexes. Keith Searles, Kyle T. Smith, Takashi Kurogi, Patrick J. Carroll, Daniel J. Mindiola, *Angew. Chem. Int. Ed.* **2016**, 55, 6642–6645.
5. Synthesis of Titanium and Zirconium Complexes Supported by a *p*-Terphenoxide Ligand and Their Reactions with N₂, CO₂ and CS₂. Takashi Kurogi, Yutaka Ishida, Hiroyuki Kawaguchi, *Chem. Commun.* **2013**, 49, 11766–11757. (Special Issue on Metal-Mediated Transformations of Small Molecules)
4. Reduction of Carbon Monoxide by a Tetrakis(aryloxy)diniobium Having Four Bridging Hydrides. Takashi Kurogi, Yutaka Ishida, Tsubasa Hatanaka, Hiroyuki Kawaguchi, *Dalton Trans.* **2013**, 42, 7510–7513. “Front Cover”
3. Multielectron Reduction of Diazoalkane and Azides via Reversible Cyclometalation in Ditantalum Complexes. Takashi Kurogi, Yutaka Ishida, Tsubasa Hatanaka, Hiroyuki Kawaguchi, *Chem. Commun.* **2012**, 48, 6809–6811.
2. Trimerization of Carbon Monoxides by a Tantalum Hydride Complex. Takashi Kurogi, *Bull. Jpn. Soc. Coord. Chem.* **2011**, 57, 22–24. (Special Issue on Presentation Award)
1. Insertion and Reduction Chemistry of Isocyanide with a Cyclometalated Ditantalum Hydride Complex. Takahito Watanabe, Takashi Kurogi, Yutaka Ishida, Hiroyuki Kawaguchi, *Dalton Trans.* **2011**, 40, 7701–7703. (Special Issue on d⁰ Organometallics in Catalysis)

Books

1. Nb Complexes in *Comprehensive Coordination Chemistry III, Vol. 4.*, Elsevier, **2021**, 299–374. Takashi Kurogi and Daniel J. Mindiola,

Patents

1. Synthesis Methods of Carboxylic Acids, JP 2021-120361 A.

Honors and Awards

2022 Fujifilm Research Award, The Society of Synthetic Organic Chemistry, Japan

- 2012 Student Poster Award, 60th Japan Society of Organometallic Chemistry Symposium, Division of Organometallic Chemistry, The Kinki Chemical Society, Japan
- 2010 Oral Presentation Award, 60th Japan Society of Coordination Chemistry Symposium, Japan Society of Coordination Chemistry, Japan

Teaching Experience

Program-Specific Associate Professor (Kyoto University)

- Spring 2023, Spring 2024
Organometallic Chemistry for graduate students.
- Fall 2022, Fall 2023
Frontier of Chemistry for undergraduate students.

Designated Assistant Professor (Okayama University)

- Winter 2019 Organic chemistry laboratory for second year undergraduate students. "Column Chromatography" and "Synthesis of Acetanilide".

Undergraduate and Graduate Student (Tokyo Institute of Technology)

- Spring 2012, Spring 2013, Spring 2014
Teaching assistant in crystallography class for first year graduate students. "How to solve a crystal structure by the SHELX package."
- Winter 2013 Teaching assistant in inorganic chemistry laboratory for third year undergraduate students. "Synthesis of [Co(salen)]₂, Magnetic Moment, O₂ Absorption."
- Spring 2012, Spring 2013
Teaching assistant in general chemistry laboratory for first year undergraduate students. "Chemistry of Chromium Ions: Cr²⁺, Cr³⁺, Cr⁶⁺."
- Winter 2011 Teaching assistant in inorganic chemistry laboratory for third year undergraduate students. "Synthesis of Ferrocene, Cyclic Voltammetry, UV-Vis."
- Spring 2010, Spring 2011
Teaching assistant in inorganic chemistry laboratory for second year undergraduate students. "Separation of Chromium Ions by Column Chromatography."
- Winter 2009, Winter 2010, Winter 2011, Winter 2012
Teaching assistant in inorganic chemistry laboratory for third year undergraduate students. "Synthesis of [Co(en)₃]³⁺ salts, Separation of Enantiomers, Optical Rotation, UV-Vis."