Curriculum Vitae with Publication List

update: December 25, 2024

Personal Data

Name: Tsuyoshi MITA（美多　剛）
Date of Birth: August 09, 1976
Place of Birth: Tokyo, Japan
Gender: Male
Citizenship: Japanese
Language: English and Japanese

Current Affiliation

Institute for Chemical Reaction Design and Discovery (WPI-ICReDD), Hokkaido University
Address: Kita 21, Nishi 10, Kita-ku, Sapporo 001-0021, Japan
Job title: Professor
URL: https://www.icredd.hokudai.ac.jp/
Tel: +81-(0)11-706-9653
Fax: +81-(0)11-706-9655
E-mail: tmita@icredd.hokudai.ac.jp
ORCID: 0000-0002-6655-3439
ResearcherID: D-7069-2012
Researchmap: https://researchmap.jp/bbb/?lang=english

Education and Working Experiences

1996.4-2000.3: Chemistry Department, Keio University, Supervisor: Prof. Tohru Yamada (BSc)
2000.4-2002.3: Graduate School of Science and Technology, Keio University
Supervisor: Prof. Tohru Yamada (MSc)
2002.4-2004.3: Ajinomoto Co., INC. (Process Research & Development, Pharmaceutical Research Laboratories in Pharmaceutical Company, Kawasaki, Japan)
2004.4-2007.3: Graduate School of Pharmaceutical Sciences, The University of Tokyo
Supervisor: Prof. Masakatsu Shibasaki (PhD)
2007.4-2009.3: Department of Chemistry & Chemical Biology, Harvard University
Supervisor: Prof. Eric N. Jacobsen (Postdoctoral Fellow (JSPS Fellowship_SPD))
2009.4-2019.3: Faculty of Pharmaceutical Sciences, Hokkaido University
(Assistant Professor in the Yoshihiro Sato's group)
2019.4-2023.3: Institute for Chemical Reaction Design and Discovery (WPI-ICReDD)
(Specially Appointed Associate Professor)
2019.10-present: JST, ERATO "MAEDA Artificial Intelligence in Chemical Reaction Design and Discovery Project" (Group leader in organic synthesis group)
2023.4-present: Institute for Chemical Reaction Design and Discovery (WPI-ICReDD)
(Professor)

2023.4-2024.3 Graduate School of Science, Kyoto University (Part-time Lecturer)
2023.10-2024.3: Graduate School of Medical and Pharmaceutical Sciences, Chiba University (Part-time Lecturer)
2024.4-present: School of Advanced Science and Engineering, Waseda University (Part-time Lecturer)

Membership

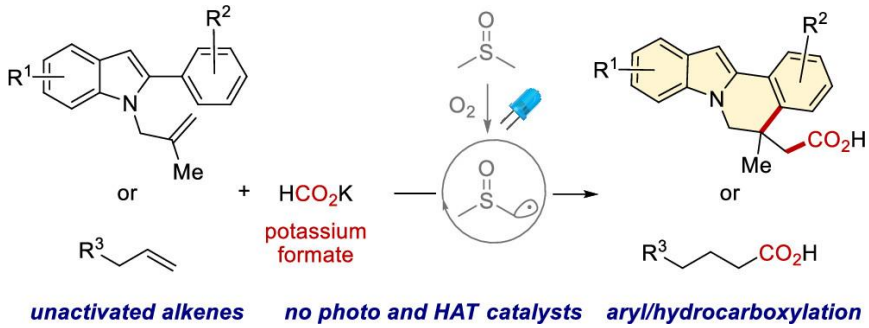
Pharmaceutical Society of Japan (PSJ), Chemical Society of Japan (CSJ), Society of Synthetic Organic Chemistry of Japan (SSOCJ), American Chemical Society (ACS), Kinka Chemical Society

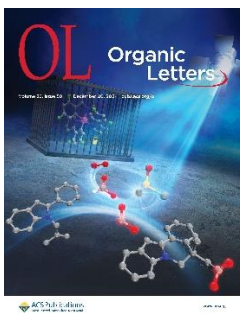
Awards

2007.3: The Representative of Graduating PhD Students, Faculty of Pharmaceutical Sciences The University of Tokyo
2007: JSPS Postdoctoral Fellowship (Superlative Postdoctoral Fellow (SPD))
2009: Tosoh Corporation Award in Synthetic Organic Chemistry, Japan
2014: Incentive Award in Synthetic Organic Chemistry, Japan
2014: Hokkaido University President's Award for Research Excellence, Japan
2016: Chemist Award BCA in the MSD Life Science Foundation, Japan
2018: Lecture Award of ICPAC Langkawi 2018, Institut Kimia Malaysia
2019: Young Researcher's Award in the Ube Industries Foundation, Japan
2020: Hokkaido Science and Technology Incentive Award, Japan
2024: Asian Core Program (ACP) Lectureship Award (Taiwan), Taiwan
2024: The Chemical Society of Japan Award for Creative Work for 2024, Japan

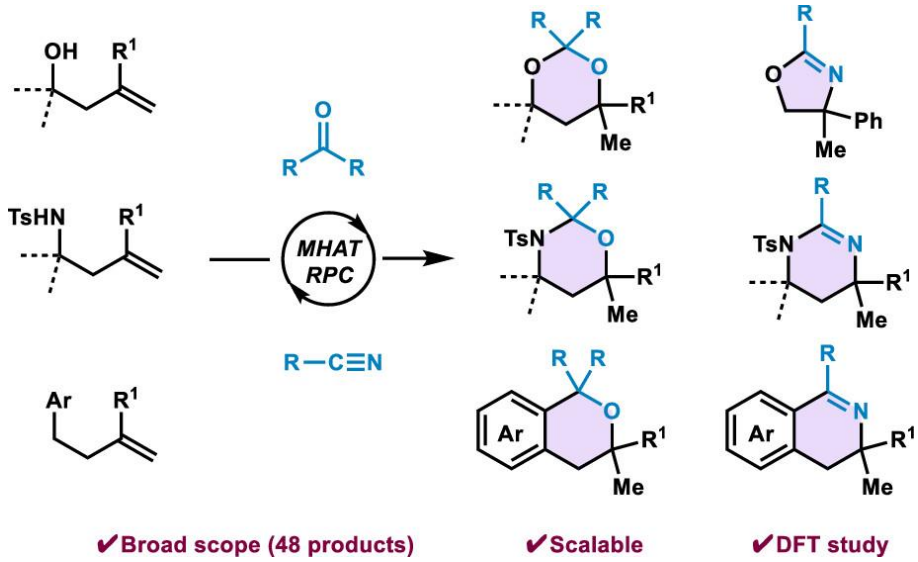
Publications

1) Debbarma, S.; Hayashi, H.; Ueno, Y.; Kanna, W.; Tanaka, K., III; Mita, T.* "Photoredox-Catalyst-Free Carboxylation of Unactivated Alkenes in DMSO: Synthesis of Polycyclic Indole Derivatives and Aliphatic Acids" *Org. Lett.* **2024**, *26* (50), 10897-10902.

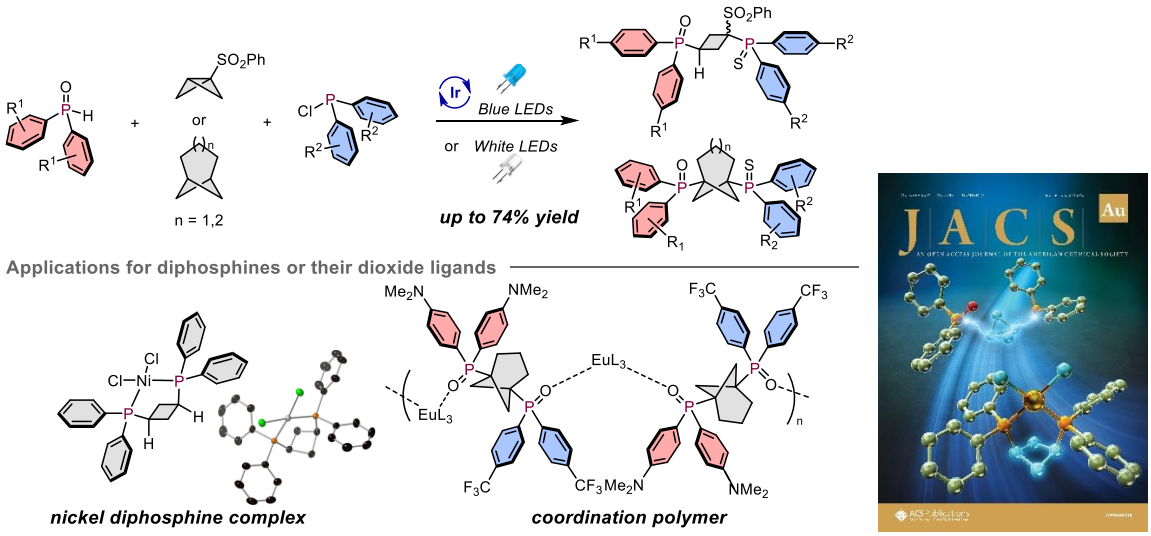




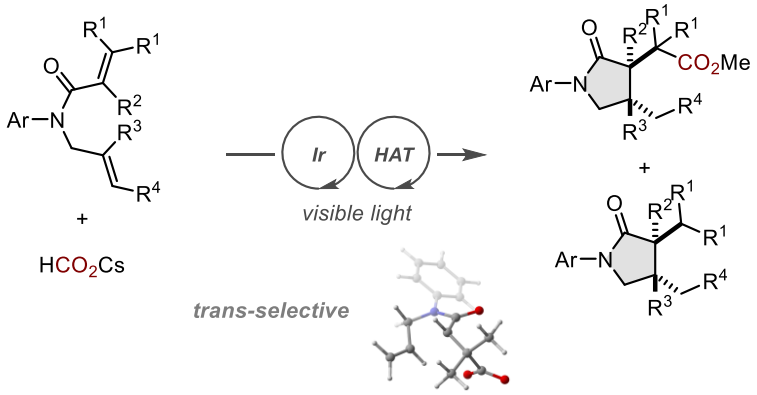
2) Sugimura, T.; Yamada, R.; Kanna, W.; Mita, T.; Maeda, S.; Szarłan, B.; Shigehisa, H.* "Annulation Producing Diverse Heterocycles Promoted by Cobalt Hydride" *ACS Catal.* **2024**, *14* (20), 15514-15520.



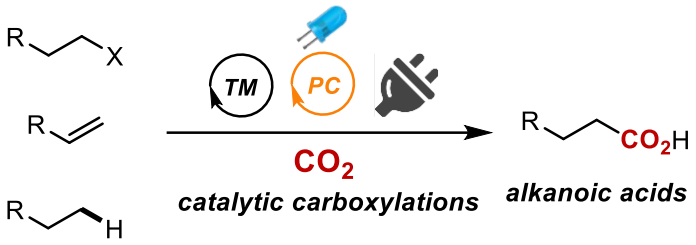
3) Krishnan, C. G.; Takano, H.; Katsuyama, H.; Kanna, W.; Hayashi, H.; Mita, T.* "Strain-Releasing Ring-Opening Diphosphinations for the Synthesis of Diphosphine Ligands with Cyclic Backbones" *JACS Au* **2024**, *4* (10), 3777-3787.



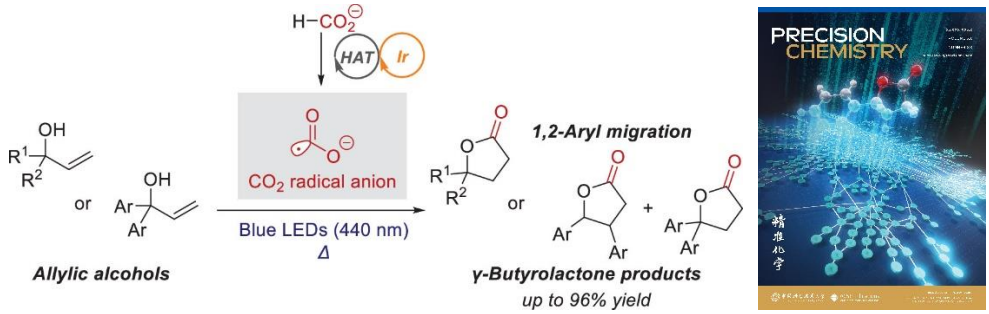
4) Song, Y.; Hayashi, H.*; Mangaonkar, S.; Mita, T.* "*Trans*-Selective Carboxylative Cyclization of 1,6-Dienes Using the CO_2 Radical Anion" *Chem. Lett.* **2024**, *53* (8), upae149.



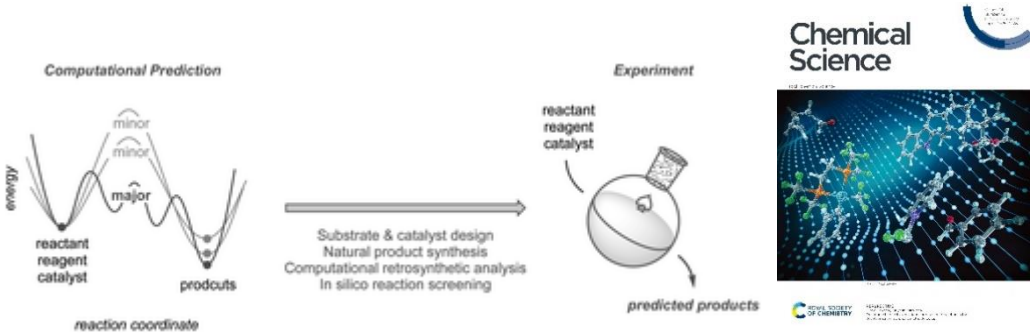
5) Rawat, V. K.; Mita, T.* "Synthesis of Alkanoic Acids Using Carbon Dioxide through Catalytic C-C Bond Forming Reactions" *Science of Synthesis* **2024**, (3), 291-314.



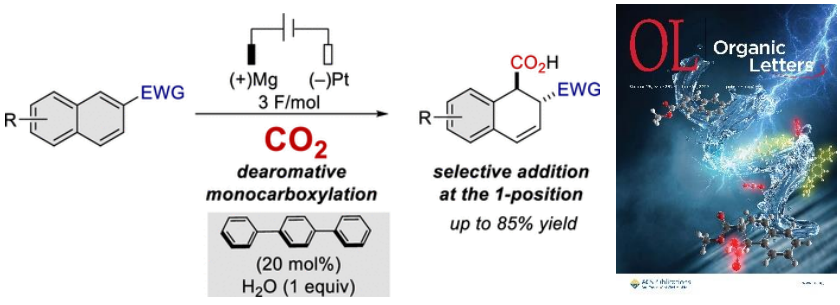
6) Mangaonkar, S. R.; Hayashi, H.; Kanna, W.; Debbarma, S.; Harabuchi, Y.; Maeda, S.*; Mita, T.* "γ-Butyrolactone Synthesis from Allylic Alcohols Using the CO_2 Radical Anion" *Precis. Chem.* **2024**, *2* (3), 88-95.



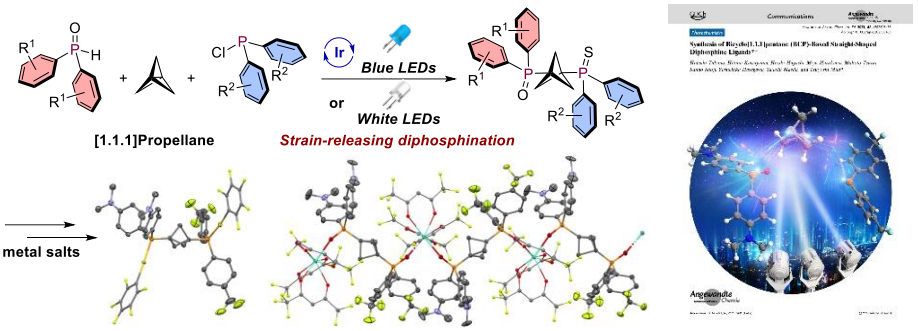
7) Hayashi, H.*; Maeda, S; Mita, T.* "Quantum Chemical Calculations for Reaction Prediction in the Development of Synthetic Methodologies" *Chem. Sci.* **2023**, *14* (42), 11601-11616.



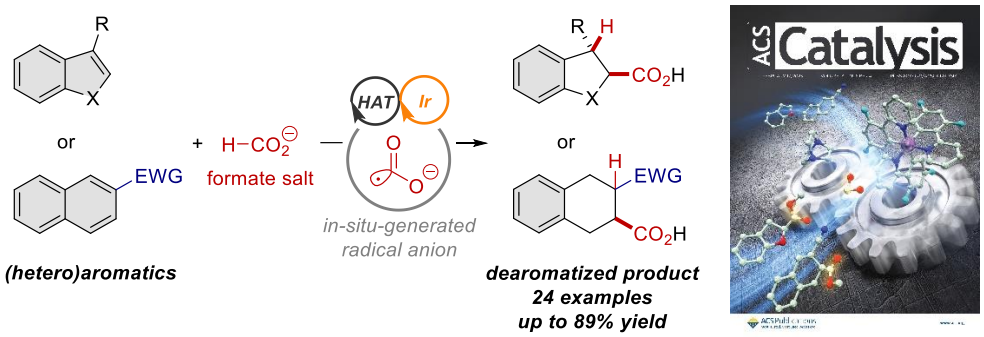
8) Rawat, V. K.; Hayashi, H.; Katsuyama, H.; Mangaonkar, S. R.; Mita, T.* "Revisiting the Electrochemical Carboxylation of Naphthalene with CO_2: Selective Monocarboxylation of 2-Substituted Naphthalenes" *Org. Lett.* **2023**, *25* (23), 4231-4235.



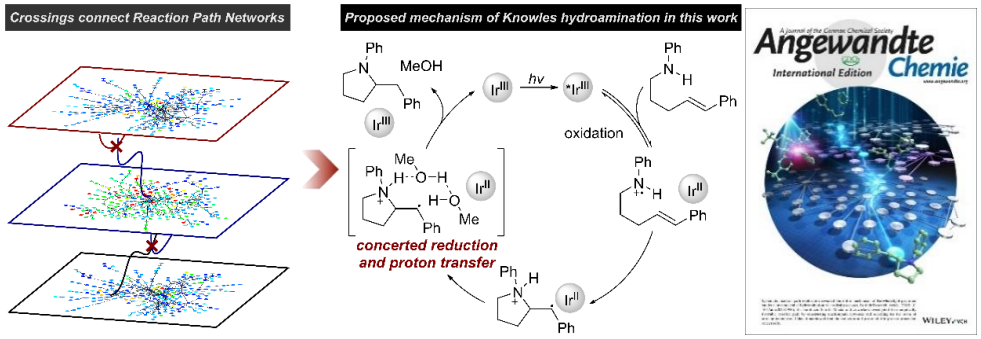
9) Takano, H.; Katsuyama, H.; Hayashi, H.; Harukawa, M.; Tsurui, M.; Shoji, S.; Hasegawa, Y.; Maeda, S.; Mita, T.* "Synthesis of Bicyclo[1.1.1]pentane (BCP)-Based Straight-Shaped Diphosphine Ligands" *Angew. Chem., Int. Ed.* **2023**, *62* (23), e202303435.



10) Mangaonkar, S. R.; Hayashi, H.; Takano, H.; Kanna, W.; Maeda, S.; Mita, T.* "Photoredox/HAT-Catalyzed Dearomative Nucleophilic Addition of the CO_2 Radical Anion to (Hetero)Aromatics" *ACS Catal.* **2023**, *13* (4), 2482-2488.

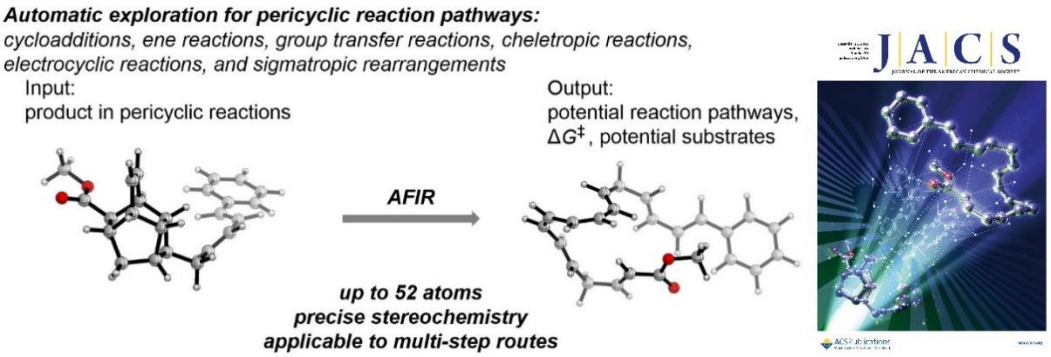


11) Harabuchi, Y.*; Hayashi, H.; Takano, H.; Mita, T.; Maeda, S.* "Oxidation and Reduction Pathways in the Knowles Hydroamination via a Photoredox-Catalyzed Radical Reaction" *Angew. Chem., Int. Ed.* **2023**, *62* (1), e202211936.

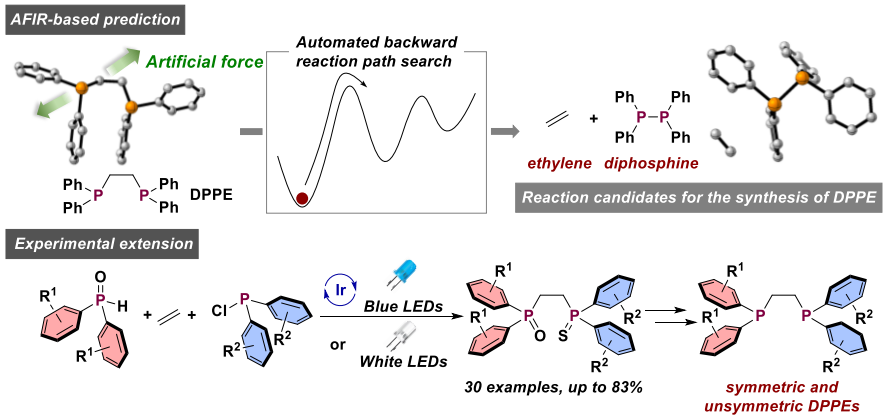


12) Maeda, S.*; Harabuchi, Y.; Hayashi, H.; Mita, T.* "Toward Ab Initio Reaction Discovery Using the Artificial Force Induced Reaction Method" *Annu. Rev. Phys. Chem.* **2023**, *74*, 287-311.

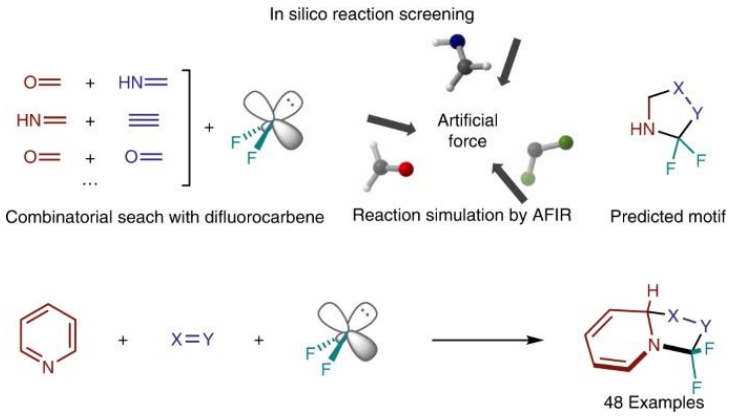
13) Mita, T.*; Takano, H.; Hayashi, H.; Kanna, W.; Harabuchi, Y.; Houk, K. N.; Maeda, S.* "Prediction of High-Yielding Single-Step or Cascade Pericyclic Reactions for the Synthesis of Complex Synthetic Targets" *J. Am. Chem. Soc*. **2022**, *144* (50), 22985-23000.



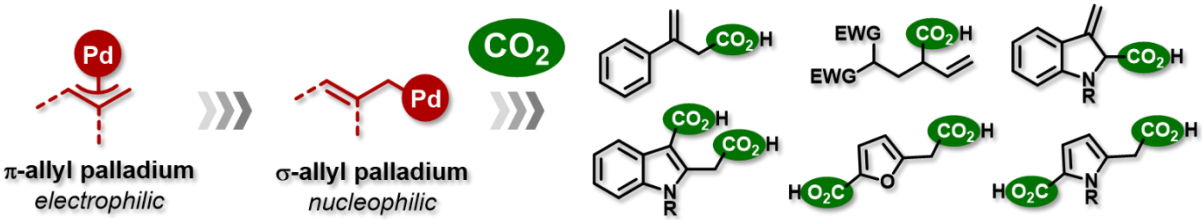
14) Takano, H.; Katsuyama, H.; Hayashi, H.; Kanna, W.; Harabuchi, Y.; Maeda, S.*; Mita, T.* "A Theory-driven Synthesis of Symmetric and Unsymmetric 1,2-Bis(diphenylphosphino)ethane Analogues via Radical Difunctionalization of Ethylene" *Nat. Commun.* **2022**, *13*, 7034.



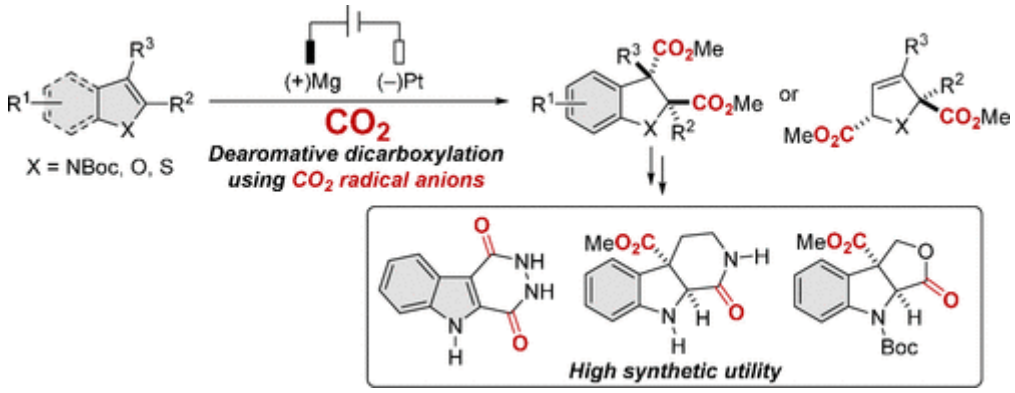
15) Hayashi, H.; Katsuyama, H.; Takano, H.; Harabuchi, Y.; Maeda, S.*; Mita, T.* "In Silico Reaction Screening with Difluorocarbene for *N*-Difluoroalkylative Dearomatization of Pyridines" *Nat. Synth.* **2022**, *1* (10), 804-814.



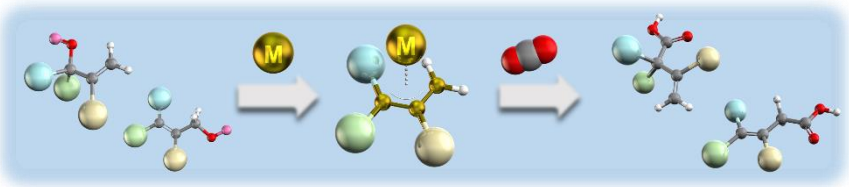
16) 美多 剛,* 樋口 裕紀, 佐藤 美洋* "π-アリルパラジウムの極性転換による二酸化炭素を用いた触媒的カルボキシル化の開発" *有機合成化学協会誌* **2022**, *80* (9), 806-816 (written in Japanese).

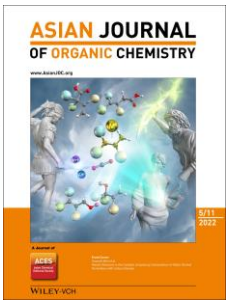


17) You, Y.; Kanna, W.; Takano, H.; Hayashi, H.; Maeda, S.*; Mita, T.* “Electrochemical Dearomative Dicarboxylation of Heterocycles with Highly Negative Reduction Potentials” *J. Am. Chem. Soc.* **2022**, *144* (8), 3685-3695.

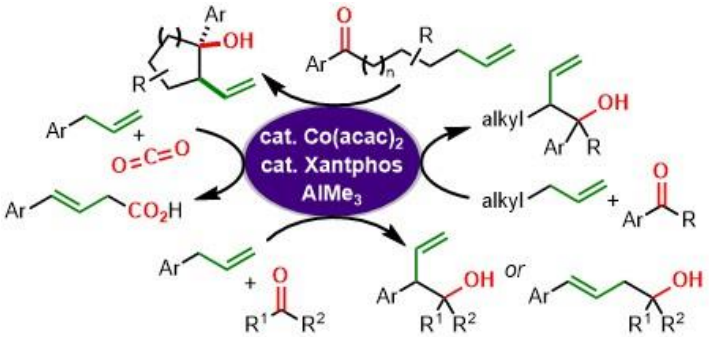


18) You, Y.; Mita. T.* “Recent Advances in the Catalytic Umpolung Carboxylation of Allylic Alcohol Derivatives with Carbon Dioxide” *Asian J. Org. Chem.* **2022**, *11* (5), e202200082.



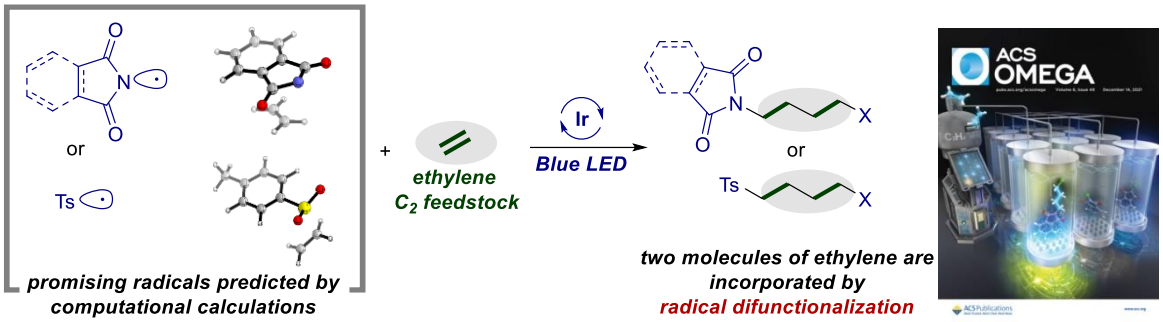


19) 道上 健一, 美多 剛,* 佐藤 美洋* “末端アルケンを求核剤とするカルボニル化合物の触媒的アリル化反応” *有機合成化学協会誌* **2022**, *80* (3), 210-221 (written in Japanese).

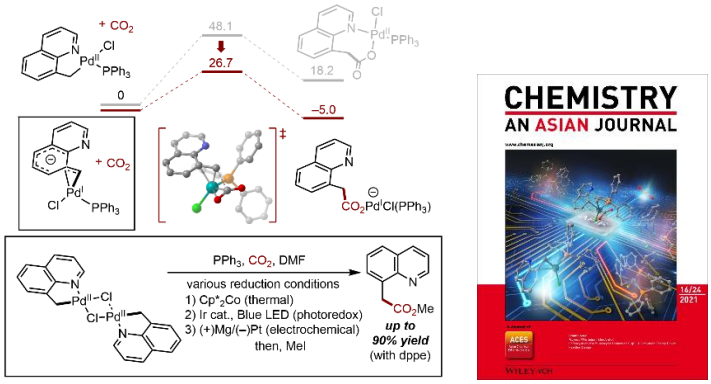


20) Maeda, S.*; Harabuchi, Y.; Hasegawa, T.; Suzuki, K.; Mita, T. “Reactivity Prediction through Quantum Chemical Calculations” *AsiaChem Magazine* **2021**, *2* (1), 56-63.

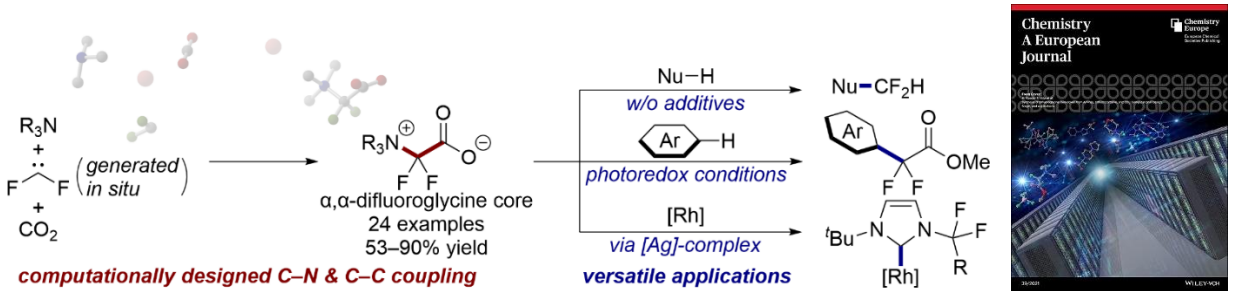
21) Takano, H.; You, Y.; Hayashi, H.; Harabuchi, Y.; Maeda, S.*; Mita, T.* “Radical Difunctionalization of Gaseous Ethylene Guided by Quantum Chemical Calculations: Selective Incorporation of Two Molecules of Ethylene” *ACS Omega* **2021**, *6* (49), 33846-33854.



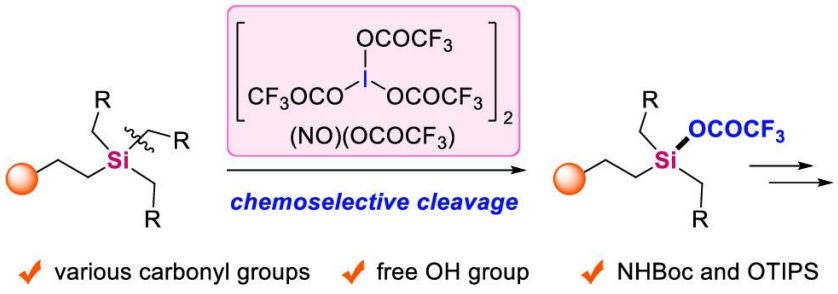
22) Kanna, W.; Harabuchi, Y.; Takano, H.; Hayashi, H.; Maeda, S.*; Mita, T.* "Carboxylation of a Palladacycle Formed via C(sp^3)–H Activation: Theory-Driven Reaction Design" *Chem. Asian J.* **2021**, *16* (24), 4072-4080.



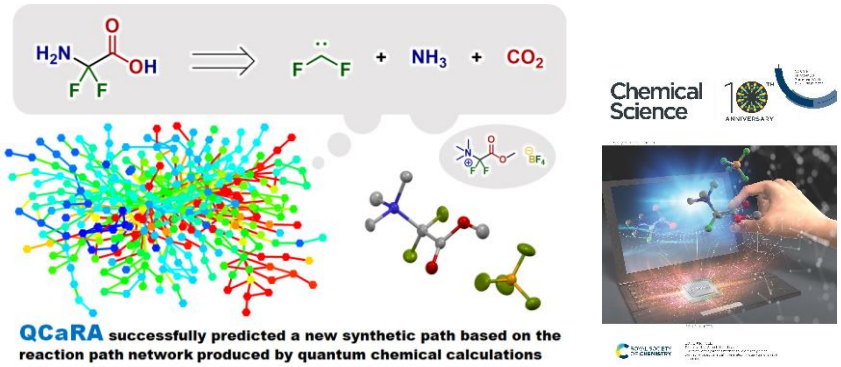
23) Hayashi, H.; Takano, H.; Katsuyama, H.; Harabuchi, Y.; Maeda, S.*; Mita, T.* "Synthesis of Difluoroglycine Derivatives from Amines, Difluorocarbene, and CO_2: Computational Design, Scope, and Application" *Chem. Eur. J.* **2021**, *27* (39), 10040-10047.



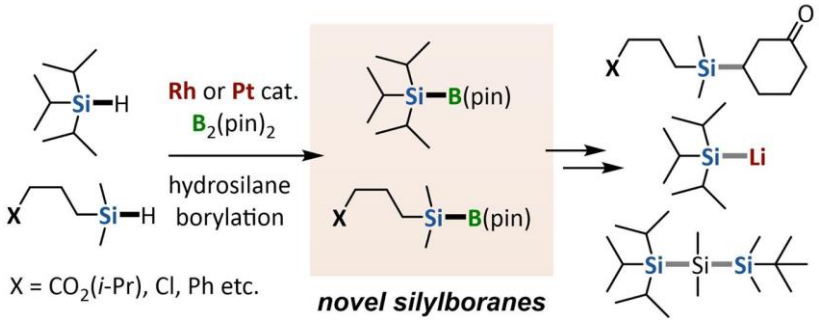
24) Matsuoka, K.; Komami, N.; Kojima, M.; Mita, T.; Suzuki, K.; Maeda, S.; Yoshino, T.*; Matsunaga, S.* "Chemoselective Cleavage of Si-C(sp^3) Bonds in Unactivated Tetraalkylsilanes Using Iodine Tris(trifluoroacetate)" *J. Am. Chem. Soc.* **2021**, *143* (1), 103-108.



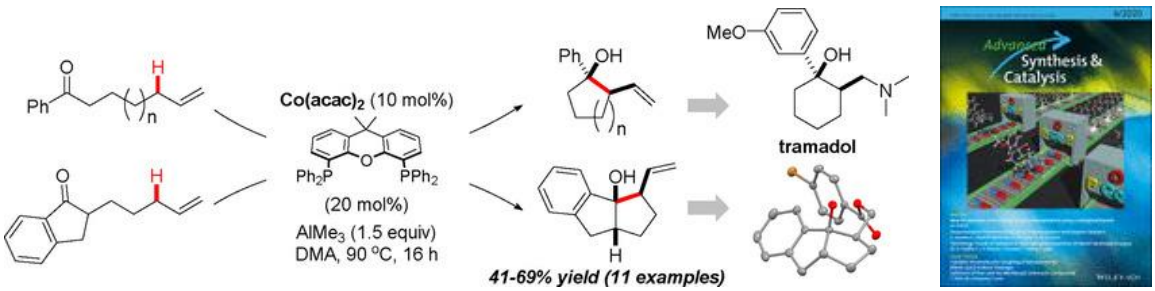
25) Mita, T.*; Harabuchi, Y.; Maeda, S.* "Discovery of a Synthesis Method for a Difluoroglycine Derivative Based on a Path Generated by Quantum Chemical Calculations" *Chem. Sci.* **2020**, *11* (29), 7569-7577.



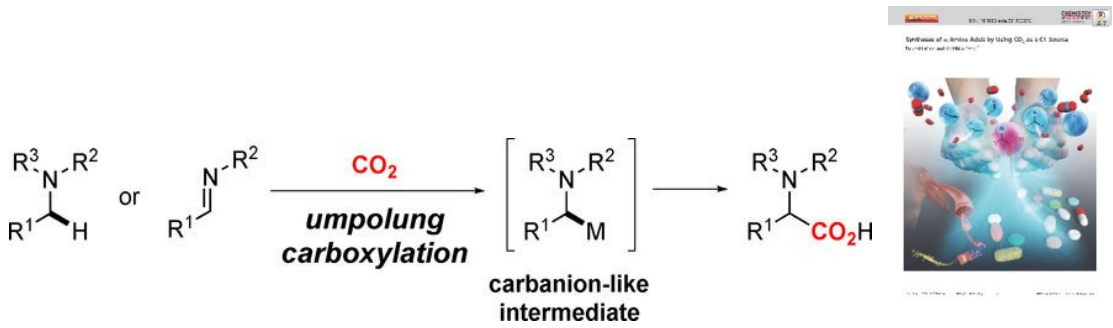
26) Shishido, R.; Uesugi, M.; Takahashi, R.; Mita, T.; Ishiyama, T.; Kubota, K.*; Ito, H.* "General Synthesis of Trialkyl- and Dialkylarylsilylboranes: Versatile Silicon Nucleophiles in Organic Synthesis" *J. Am. Chem. Soc.* **2020**, *142* (33), 14125-14133.



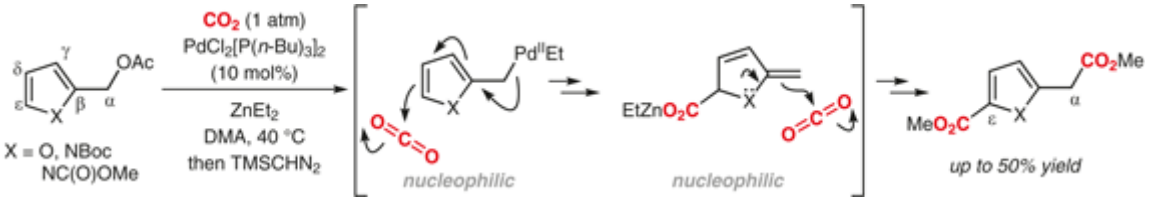
27) Mita, T.*; Uchiyama, M.; Sato, Y.* "Catalytic Intramolecular Coupling of Ketoalkenes by Allylic C(sp^3)-H Bond Cleavage: Synthesis of Five- and Six-Membered Carbocyclic Compounds" *Adv. Synth. Catal.* **2020**, *362* (6), 1275-1280.



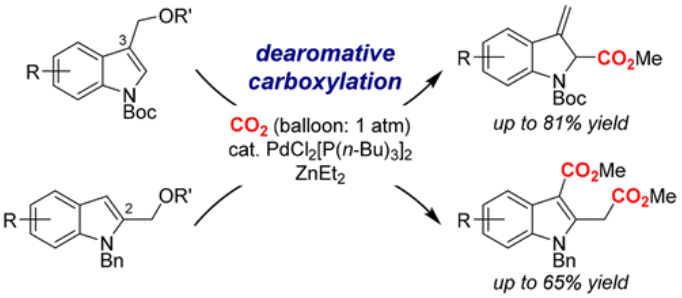
28) Mita, T.*; Sato, Y.* "Syntheses of α-Amino Acids by Using CO_2 as a C1 Source" *Chem. Asian J.* **2019**, *14* (12), 2038-2047.



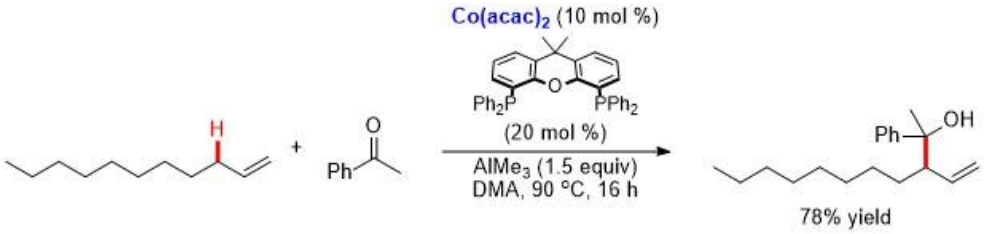
29) Mita, T.*; Masutani, H.; Ishii, S.; Sato, Y.* "Catalytic Carboxylation of Heteroaromatic Compounds: Double and Single Carboxylation with CO_2" *Synlett* **2019**, *30* (7), 841-844.



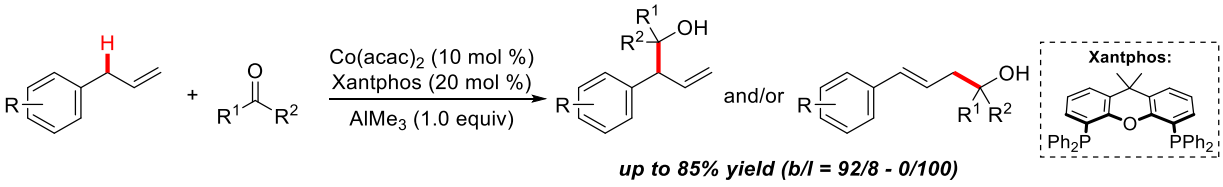
30) Mita, T.*; Ishii, S.; Higuchi, Y.; Sato, Y.* "Pd-Catalyzed Dearomative Carboxylation of Indolylmethanol Derivatives" *Org. Lett.* **2018**, *20* (23), 7603-7606.



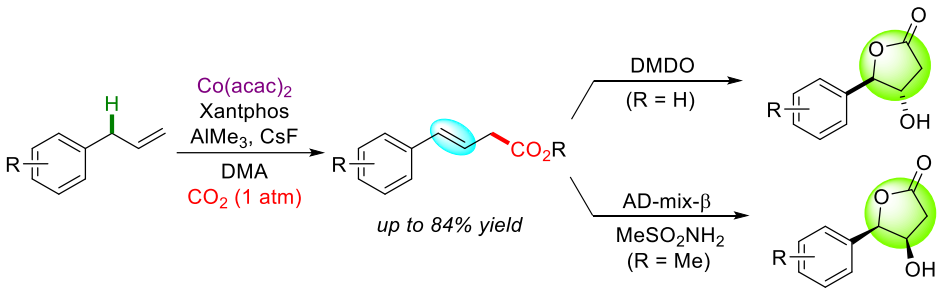
31) Mita, T.*; Uchiyama, M.; Michigami, K.; Sato, Y.* "Cobalt-Catalyzed Nucleophilic Addition of the Allylic C(sp^3)-H Bond of Simple Alkenes to Ketones" *Beilstein J. Org. Chem.* **2018**, *14*, 2012-2017.



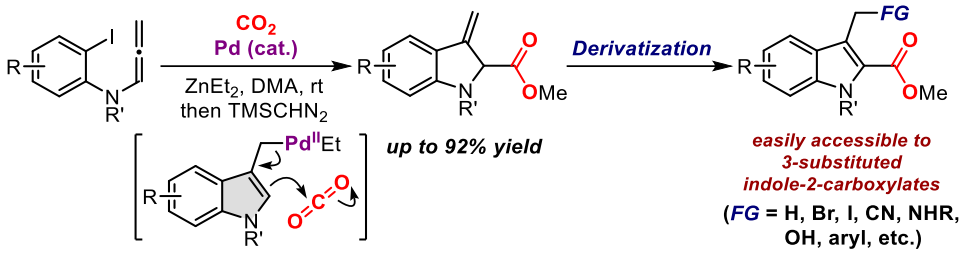
32) Mita, T.*; Hanagata, S.; Michigami, K.; Sato, Y.* "Co-Catalyzed Direct Addition of Allylic C(sp^3)-H Bonds to Ketones" *Org. Lett.* **2017**, *19* (21), 5876-5879.【highlighted by *Synfacts* **2018**, *14*, 74.】



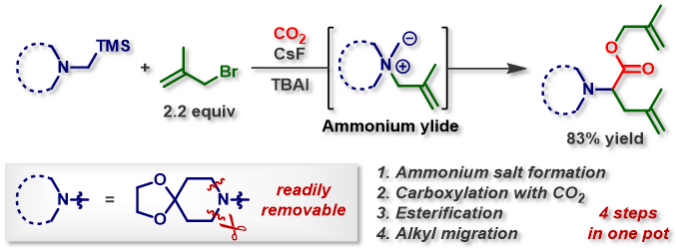
33) Michigami, K.; Mita, T.*; Sato, Y.* "Cobalt-Catalyzed Allylic C(sp^3)-H Carboxylation with CO_2" *J. Am. Chem. Soc.* **2017**, *139* (17), 6094-6097.



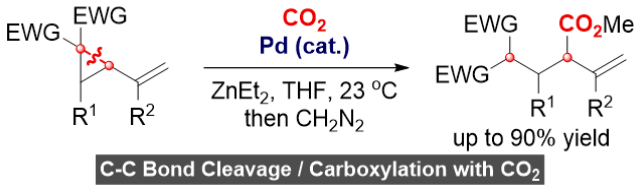
34) Higuchi, Y.; Mita, T.*; Sato, Y.* "Palladium-Catalyzed Intramolecular Arylative Carboxylation of Allenes with CO_2 for the Construction of 3-Substituted Indole-2-Carboxylic Acids" *Org. Lett.* **2017**, *19* (10), 2710-2713.



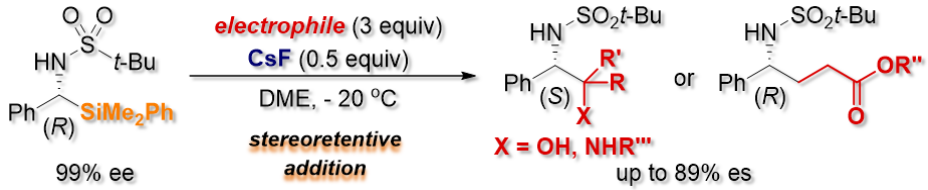
35) Mita, T.*; Sugawara, M.; Sato, Y.* "One-Pot Synthesis of α-Amino Acids through Carboxylation of Ammonium Ylides with CO_2 Followed by Alkyl Migration" *J. Org. Chem.* **2016**, *81* (12), 5236-5243.



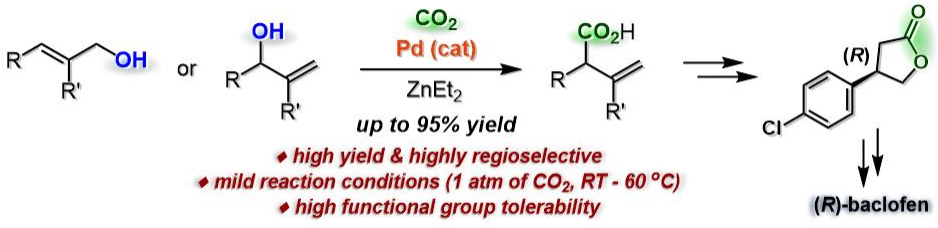
36) Mita, T.*; Tanaka, H.; Higuchi, Y.; Sato, Y.* "Palladium-Catalyzed Carboxylation of Activated Vinylcyclopropanes with CO_2" *Org. Lett.* **2016**, *18* (11), 2754-2757.



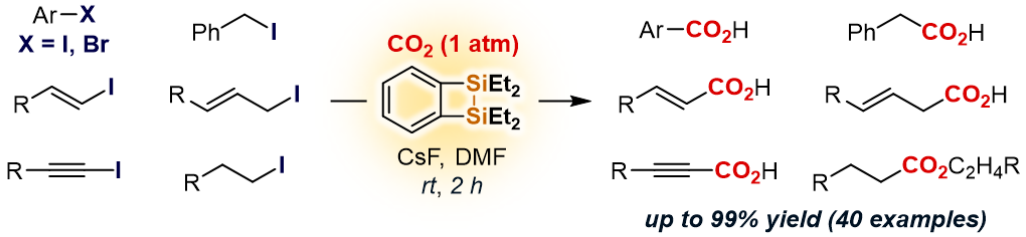
37) Mita, T.*; Saito, K.; Sugawara, M.; Sato, Y.* "Stereoretentive Addition of *N*-*tert*-Butylsulfonyl-α-Amido Silanes to Aldehydes, Ketones, α,β-Unsaturated Esters, and Imines" *Chem. Asian. J.* **2016**, *11* (10), 1528-1531.



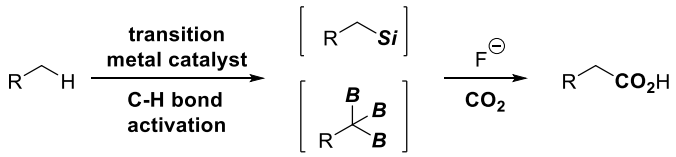
38) Mita, T.*; Higuchi, Y.; Sato, Y.* "Highly Regioselective Palladium-Catalyzed Carboxylation of Allylic Alcohols with CO_2" *Chem. Eur. J.* **2015**, *21* (46), 16391-16394.



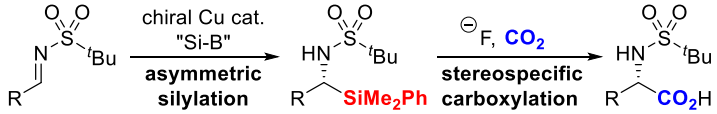
39) Mita, T.*; Suga, K.; Sato, K.; Sato, Y.* "A Strained Disilane-Promoted Carboxylation of Organic Halides with CO_2 under Transition-Metal-Free Conditions" *Org. Lett.* **2015**, *17* (21), 5276-5279.



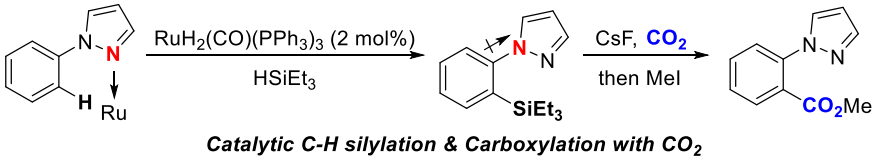
40) 美多 剛* "C(sp^3)-H 結合のシリル化およびトリホウ素化、続く二酸化炭素によるカルボキシル化の開発" *有機合成化学協会誌* **2015**, *73* (8), 810-820 (written in Japanese).



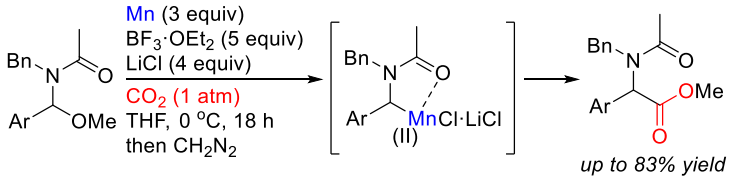
41) Mita, T.*; Sugawara, M.; Saito, K.; Sato, Y.* "Catalytic Enantioselective Silylation of *N*-Sulfonylimines: Asymmetric Synthesis of α-Amino Acids from CO_2 via Stereospecific Carboxylation of α-Amino Silanes" *Org. Lett.* **2014**, *16* (11), 3028-3031.【highlighted by *Synfacts* **2014**, *10*, 839.】



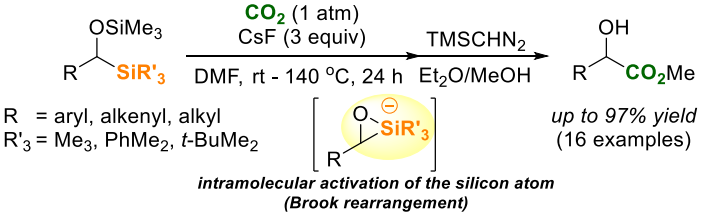
42) Mita, T.*; Tanaka, H.; Michigami, K.; Sato, Y.* "Ruthenium-Catalyzed C-H Silylation of 1-Arylpyrazole Derivatives and Fluoride-Mediated Carboxylation: Use of Two Nitrogen Atoms of the Pyrazole Group" *Synlett* **2014**, *25* (9), 1291-1294.



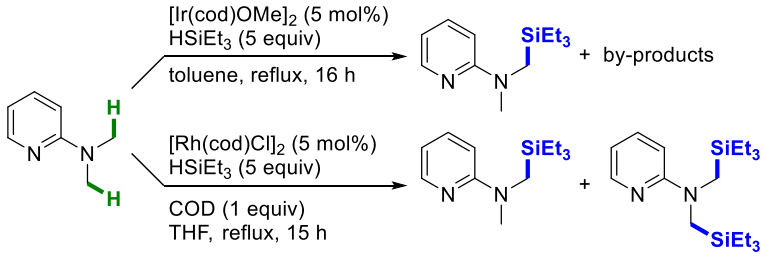
43) Mita, T.*; Chen, J.; Sato, Y.* "Synthesis of Arylglycines from CO_2 through α-Amino Organomanganese Species" *Org. Lett.* **2014**, *16* (8), 2200-2203.【highlighted by *Synfacts* **2014**, *10*, 742.】



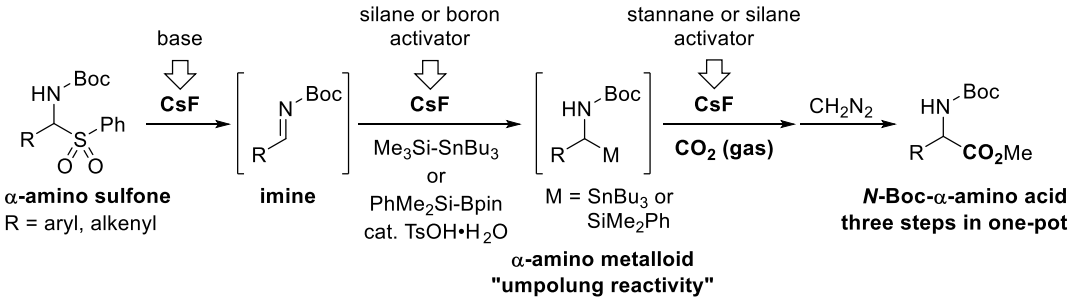
44) Mita, T.*; Higuchi, Y.; Sato, Y.* "Carboxylation with CO_2 via Brook Rearrangement: Preparation of α-Hydroxy Acid Derivatives" *Org. Lett.* **2014**, *16* (1), 14-17.



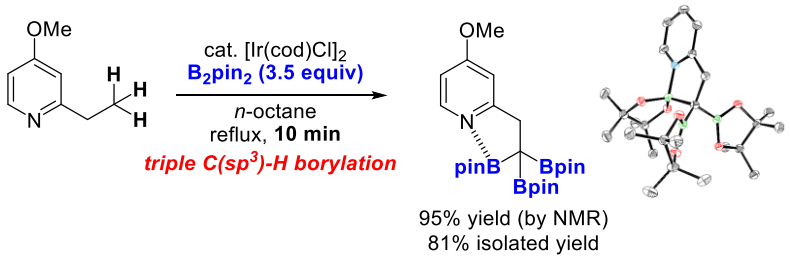
45) Mita, T.*; Michigami, K.; Sato, Y.* "Iridium- and Rhodium-Catalyzed Dehydrogenative Silylations of C(sp^3)-H Bonds Adjacent to a Nitrogen Atom Using Hydrosilanes" *Chem. Asian. J.* **2013**, *8* (12), 2970-2973.



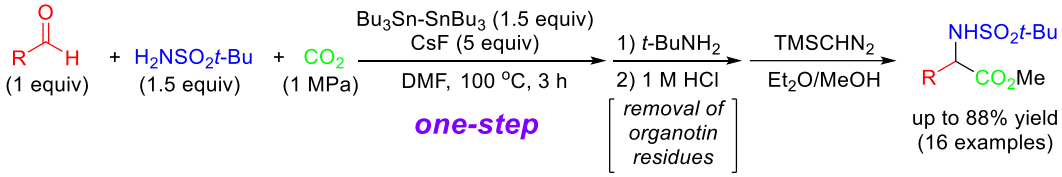
46) Mita, T.; Sato, Y.* "One-Pot Synthesis of α-Amino Acids from CO_2 Using Bismetal Reagents" *J. Synth. Org. Chem., Jpn.* **2013**, *71* (11), 1163-1171.



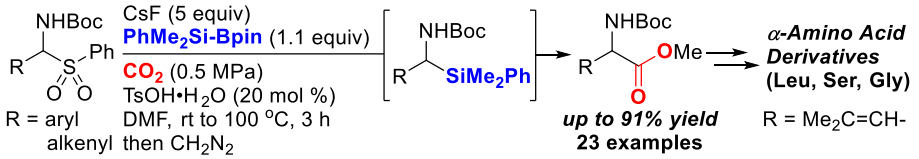
47) Mita, T.*; Ikeda, Y.; Michigami, K.; Sato, Y.* "Iridium-Catalyzed Triple C(sp^3)-H Borylations: Construction of Triborylated Sp^3-Carbon Centers" *Chem. Commun.* **2013**, *49* (49), 5601-5603.



48) Mita, T.*; Higuchi, Y.; Sato, Y.* "One-Step Synthesis of Racemic α-Amino Acids from Aldehydes, Amine Components, and Gaseous CO_2 by the Aid of a Bismetal Reagent" *Chem. Eur. J.* **2013**, *19* (3), 1123-1128.

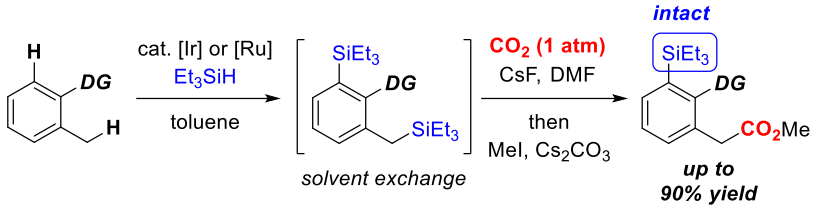


49) Mita, T.*; Chen, J.; Sugawara, M.; Sato, Y.* "One-Pot Synthesis of α-Amino Acids from CO_2 Using a Bismetal Reagent with Si-B Bond" *Org. Lett.* **2012**, *14* (24), 6202-6205.

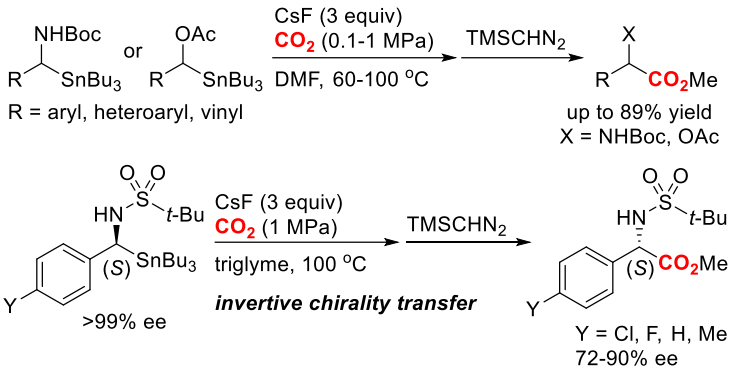


50) Mita, T.*; Michigami, K.; Sato, Y.* "Sequential Protocol for C(sp^3)-H Carboxylation with CO_2:

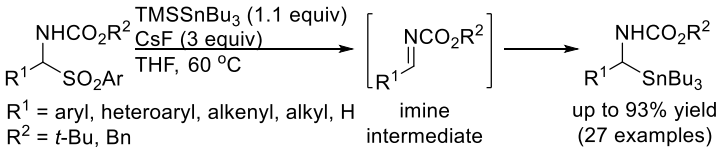
Transition Metal-Catalyzed Benzylic C-H Silylation and Fluoride-Mediated Carboxylation" *Org. Lett.* **2012**, *14* (13), 3462-3465. 【highlighted by *Synfacts* **2012**, *8*, 1132.】



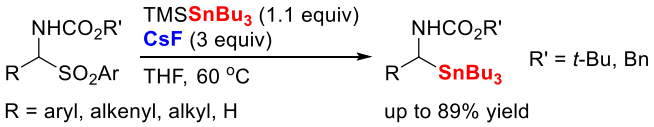
51) Mita, T.*; Sugawara, M.; Hasegawa, H.; Sato, Y.* "Synthesis of Arylglycine and Mandelic Acid Derivatives through Carboxylations of α-Amido and α-Acetoxy Stannanes with Carbon Dioxide" *J. Org. Chem.* **2012**, *77* (5), 2159-2168.



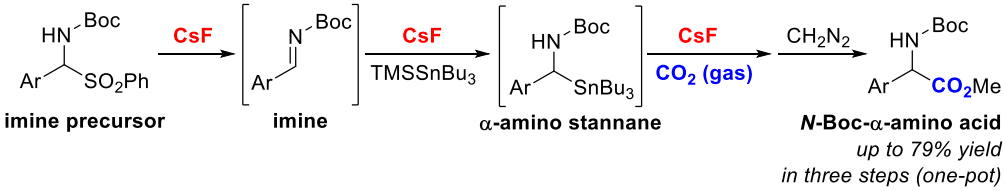
52) Mita, T.*; Higuchi, Y.; Sato, Y.* "Convenient and Practical Synthesis of α-Amido Stannanes" *Synthesis* **2012**, *44* (2), 194-200. [PSP (Practical Synthetic Procedures)-article]



53) Mita, T.*; Higuchi, Y.; Sato, Y.* "Practical Synthesis of *N*-Boc- and *N*-Cbz-α-Amido Stannanes from α-Amido Sulfones Using $TMSSnBu_3$ and CsF" *Org. Lett.* **2011**, *13* (9), 2354-2357. 【highlighted by *Synfacts* **2011**, *7*, 772.】



54) Mita, T.*; Chen, J.; Sugawara, M.; Sato, Y.* "One-Pot Synthesis of α-Amino Acids from Imines through CO_2 Incorporation: An Alternative Method for Strecker Synthesis" *Angew. Chem., Int. Ed.* **2011**, *50* (6), 1393-1396.



55) Mita, T.; Jacobsen, E. N.* "Bifunctional Asymmetric Catalysis with Hydrogen Chloride: Enantioselective Ring-Opening of Aziridines Catalyzed by a Phosphinothiourea" *Synlett* **2009**, *2009* (10), 1680-1684.

56) Fujimori, I.; Mita, T.; Maki, K.; Shiro, M.; Sato, A.; Furusho, S.; Kanai, M.*; Shibasaki, M.* "Toward a Rational Design of the Assembly Structure of Polymetallic Asymmetric Catalysts: Design, Synthesis, and Evaluation of New Chiral Ligands for Catalytic Asymmetric Cyanation Reactions" *Tetrahedron* **2007**, *63* (26), 5820-5831.

57) Mita, T.; Fukuda, N.; Roca, F. X.; Kanai, M.*; Shibasaki, M.* "Second Generation Catalytic Asymmetric Synthesis of Tamiflu: Allylic Substitution Route" *Org. Lett.* **2007**, *9* (2), 259-262. 【highlighted by *Synfacts* **2007**, *3*, 567.】

58) Fujimori, I.; Mita, T.; Maki, K.; Shiro, M.; Sato, A.; Furusho, S.; Kanai, M.*; Shibasaki, M.* "Key Role of the Lewis Base Position in Asymmetric Bifunctional Catalysis: Design and Evaluation of a New Ligand for Chiral Polymetallic Catalysts" *J. Am. Chem. Soc.* **2006**, *128* (51), 16438-16439. 【highlighted by *Synfacts* **2007**, *3*, 285.】

59) Kato, N.; Mita, T.; Kanai, M.*; Therrien, B.; Kawano, M.; Yamaguchi, K.; Danjo, H.; Sei, Y.; Sato, A.; Furusho, S.; Shibasaki, M.* "Assembly State of Catalytic Modules as Chiral Switches in Asymmetric Strecker Amino Acid Synthesis" *J. Am. Chem. Soc.* **2006**, *128* (21), 6768-6769.

60) Fukuta, Y.; Mita, T.; Fukuda, N.; Kanai, M.*; Shibasaki, M.* "De Novo Synthesis of Tamiflu via a Catalytic Enantioselective Ring-Opening of *meso*-Aziridines with $TMSN_3$" *J. Am. Chem. Soc.* **2006**, *128* (19), 6312-6313.【highlighted by *Synfacts* **2006**, *2*, 975.】

61) Mita, T.; Fujimori, I.; Wada, R.; Wen, J.; Kanai, M.*; Shibasaki, M.* "Catalytic Enantioselective Desymmetrization of *meso*-*N*-Acylaziridines with TMSCN" *J. Am. Chem. Soc*. **2005**, *127* (32), 11252-11253.【highlighted by *Synfacts* **2005**, *1*, 322.】

62) 毛塚 智子, 美多 剛, 岩倉 いずみ, 池野 健人, 山田 徹* "光学活性コバルト錯体をルイス酸として用いる触媒的不斉合成反応" *有機合成化学協会誌* **2005**, *63* (6), 604-615 (written in Japanese).

63) Mita, T.; Sasaki, K.; Kanai, M.*; Shibasaki, M.* "Catalytic Enantioselective Conjugate Addition of Cyanide to α,β-Unsaturated *N*-Acylpyrroles" *J. Am. Chem. Soc.* **2005**, *127* (2), 514-515.

64) Kezuka, S.; Ohtsuki, N.; Mita, T.; Kogami, Y.; Ashizawa, T.; Ikeno, T.; Yamada, T.* "Enantioselective 1,3-Dipolar Cycloaddition Reaction of Nitrones with α,β-Unsaturated Aldehydes Catalyzed by Cationic 3-Oxobutylideneaminatocobalt(III) Complexes" *Bull. Chem. Soc. Jpn.* **2003**, *76* (11), 2197-2207.

65) Ohtsuki, N.; Kezuka, S.; Kogami, Y.; Mita, T.; Ashizawa, T.; Ikeno, T.; Yamada, T.* "Enantioselective 1,3-Dipolar Cycloaddition Reactions between Nitrones and α-Substituted α,β-Unsaturated Aldehydes Catalyzed by Chiral Cationic Cobalt(III) Complexes" *Synthesis* **2003**, *2003* (9), 1462-1466.

66) Mita, T.; Ohtsuki, N.; Ikeno, T.; Yamada, T.* "Enantioselective 1,3-Dipolar Cycloaddition of Nitrones Catalyzed by Optically Active Cationic Cobalt(III) Complexes" *Org. Lett*. **2002**, *4* (15), 2457-2460.

67) Kezuka, S.; Mita, T.; Ohtsuki, N.; Ikeno, T.; Yamada, T.* "Highly Active 3-Oxobutylideneaminatocobalt Complex Catalysts for an Enantioselective Hetero Diels-Alder Reaction" *Bull. Chem. Soc. Jpn.* **2001**, *74* (7), 1333-1342.

68) Kezuka, S.; Mita, T.; Ohtsuki, N.; Ikeno, T.; Yamada, T.* "Optically Active Cationic Cobalt(III)

Complexes: Highly Efficient Catalysts for Enantioselective Hetero Diels-Alder Reaction" *Chem. Lett.* **2000**, *29* (7), 824-825.

69) Yamada, T.*; Kezuka, S.; Mita, T.; Ikeno, T. "Optically Active Aldiminato Cobalt(II) Complex Catalyst for Enantioselective Hetero Diels-Alder Reaction" *Heterocycles* **2000**, *52* (3), 1041-1045.

Book Chapters

1) 美多 剛, 佐藤 美洋 "第 7 節 二酸化炭素を一炭素源として用いる α-アミノ酸の化学合成" *二酸化炭素を用いた化学品製造技術* **2016**, pp 132-145, Ed. 杉本 裕, S&T 出版.
2) Shibasaki, M.; Kanai, M.; Mita, T. "Chapter 1 The Catalytic Asymmetric Strecker Reaction" *Organic Reactions* **2008**, *70*, pp 1-119, Ed. Larry E. Overman, John Wiley & Sons.
3) 美多 剛 "合格体験記 大学院でもう一度研究を！" *医歯薬農学系のための大学院の歩き方* **2006**, pp.170-171, Ed. 東京図書編集部, 東京図書.

Commentaries

1) 美多 剛, "安定なヘテロ芳香環に CO_2 を導入する新反応の開発" *化学と工業* **2024**, *77* (1), 28-30.
2) 美多 剛, "おらが春 辰年生れ大いに語る" *近畿化学工業界* **2024**, *76* (1), 22.
3) 美多 剛, "犠牲陽極を使用しない芳香族化合物の電解 C-H カルボキシル化" *Organometallic News* **2023**, (3), 108.
4) 美多 剛, 前田 理 "超の世界 反応経路自動探索法で有機化合物の出発原料をゼロから予測 ー量子化学的逆合成解析により高収率な化学反応を予測ー" *自動車技術* **2023**, *77* (10), 110-111.
5) 美多 剛 "書評『有機化学のための量子化学計算入門 : Gaussian の基本と有効活用のヒント』" *理論化学会誌 フロンティア* **2023**, *5* (3), 217-218.
6) 原渕 祐, 林 裕樹, 髙野 秀明, 美多 剛 "量子化学計算に基づく反応経路ネットワークの構築と有機合成反応開発への展開" *アンサンブル* **2023**, *25* (1), 34-40.
7) 美多 剛 "極性転換" *十字路 有機合成化学協会誌* **2022**, *80* (9), 871.
8) 美多 剛, "合成化学実験のように反応条件を自在に変えて計算できる日を夢見て！" *フォーラム, 量子化学探索研究所 (IQCE)*, 2021 年 4 月号.
9) 美多 剛, "計算科学による α-アミノ酸の合成経路予測と実験科学による具現化" *月刊 機能材料* **2020**, *40* (11), 23-32.
10) 美多 剛, 佐藤 美洋 "二酸化炭素を炭素資源とした有機合成 -アリル遷移金属種を用いた触媒的カルボキシル化-" *現代化学* **2019**, *578* (5), 64-69.
11) Mita, T. "Transition Metal-Promoted Carboxylation of Terminal Alkynes with CO_2" *Mini-Reviews in Organic Chemistry* **2019**, *16* (5), 406-409.
12) 美多 剛, 佐藤 美洋 "二酸化炭素固定化反応の新手法の開発 -反応性の低い $C(sp^3)$-H 結合の切断を伴う触媒的カルボキシル化-" *今日の話題 化学と生物* **2018**, *56* (6), 381-383.
13) 美多 剛 "二酸化炭素から飽和脂肪酸を合成 遠隔カルボキシル化による新手法" *注目の論文 月刊 化学* **2017**, *72* (8), 62-63.
14) 美多 剛 "ビスメタル化合物" *十字路 有機合成化学協会誌* **2015**, *73* (8), 850.

15) 美多 剛 “有機合成化学に用いるスズ試薬 –比較的安定で反応性に富む金属。有機スズ(IV)には毒性あり。–” *講座: 身近な元素の世界 化学と教育* **2014**, *62* (8), 400-403.
16) 美多 剛 “π-アリルイリジウムとエナミンの共同作用による 4 つの立体異性体の作り分け” *Topics (化学系薬学) ファルマシア*, **2014**, *50* (1), 62.
17) 柴崎 正勝, 金井 求, 福田 展久, 美多 剛 “タミフルの新合成法ができた！不斉触媒が拓く安定供給の道” *月刊 化学* **2006**, *61* (7), 12-17.

Patents

1) 美多 剛, 前田 理, 髙野 秀明 “化合物の新規製造方法、新規化合物および金属触媒” PCT/JP2022/ 30598, 2022 年 8 月 10 日 PCT 出願.
2) 美多 剛、前田 理、髙野秀明 “化合物の新規製造方法、新規化合物および金属触媒” 特願 2021-131481, 2021 年 8 月 11 日出願.
3) Sato, Y.; Mita, T.; Miyaji, N. “Method for Producing α-Amino Acid Salt” No. 5794569, 2011 年 9 月 13 日出願.
4) Sato, Y.; Mita, T.; Miyaji, N. “Manufacturing Method for α-Hydroxy Acid Salt” No. 5747740, 2011 年 8 月 30 日出願.
5) Haga, K.; Mita, T.; Hirasawa, S.; Tatara, A.; Yamanaka, N.; Yamanaka, J.; Okado, K.; Niwa, S. “Method for Producing Lactam Compound and Production Intermediate Thereof” WO2008139576 (A1), 2007 年 4 月 27 日国際出願.
6) Shibasaki, M.; Kanai, M.; Mita, T.; Fukuta, Y. “α,β-Unsaturated Cyclohexanone Derivative, Process for Producing the Same, and Process for Producing Intermediate therefor” WO2007099843 (A1), 2007 年 2 月 22 日国際出願.
7) Shibasaki, M.; Kanai, M.; Mita, T. “Method for Enantioselectively Preparing β-Cyanocarboxylic Acid Derivative from α,β-Unsaturated Carboxylic Acid Derivative and Catalyst Used in the Method” JP2006151839 (A), 2004 年 11 月 26 日出願.

Invited Lectures

1) 美多 剛 “Woodward-Hoffmann則の完全理解と量子化学計算への応用” 早稲田大学大学院先進理工学研究科・有機化学特論, 東京新宿区, 2024年9月3日（早稲田大学大学院先進理工学研究科・非常勤講師）.
2) 美多 剛 “量子化学計算が先導する有機合成化学” 早稲田大学大学院先進理工学研究科・特別講演会, 東京新宿区, 2024年9月2日.
3) 美多 剛 “量子化学計算が先導する新反応開発” 長崎, 日本プロセス化学会2024サマーシンポジウム, 長崎, 長崎ブリックホール, 2024年7月4日-5日.
4) Mita, T. “Development of New Chemical Reactions Based on Quantum Chemical Calculations” International Joint Symposium 2023 on Synthetic Organic Chemistry, 兵庫, 淡路夢舞台国際会議場, 2023年12月6日-8日.
5) 美多 剛 “量子化学計算を活用した反応経路設計とその実現－現実世界との乖離を乗り越えて” 京都大学大学院理学研究科・特別講演会, 京都, 2023年11月16日.
6) 美多 剛 “ペリ環状反応－Woodward-Hoffmann則の理解と応用” 京都大学大学院理学研

究科・化学特別講義, 京都, 2023年11月15日-16日（京都大学大学院理学研究科・非常勤講師）.

7) 美多 剛 “ペリ環状反応－Woodward-Hoffmann則の理解と応用” 千葉大学大学院医学薬学府・薬化学特論, 千葉, 2023年11月10日（千葉大学大学院医学薬学府・非常勤講師）.
8) 美多 剛 “量子化学計算によるCO_2ラジカルアニオンカルボキシル化の設計” 第132回触媒討論会, 北海道大学, 札幌, 2023年9月15日.
9) Mita, T. “AFIR-Based Reaction Design and Realization: Three-component Reactions using Difluorocarbene and Free Radicals” The 5th Conference of Theory and Applications of Computational Chemistry (TACC2023), 北海道大学, 札幌, 2023年9月9日.
10) 美多 剛 “反応経路自動探索法を用いた新反応の設計とその実現－挑戦と今後の課題” 第 35 回万有札幌シンポジウム, 北海道大学, 札幌, 2023 年 7 月 1 日.
11) Mita, T. “Transition-Metal-Catalyzed C(sp^3)–H Carboxylation of CO_2” The 7th International Symposium on Catalysis and Chemical Engineering (CCE-2023), オンライン, 2023 年 2 月 20 日-23 日.
12) Mita, T. “Theory-Driven Organic Synthesis” The 5th ICReDD International Symposium, オンライン, 2023 年 1 月 10 日.
13) 美多 剛 “計算化学主導の新反応開発” 徳島大学・特別講演会, 徳島大学, 徳島, 2022 年 10 月 24 日.
14) Mita, T. “Calculation-Based Reaction Design: Three-Component Reactions Using Difluorocarbene” Joint Symposium of S-Membrane Project and F-Material Project at Gunma University, 群馬大学, 桐生, 2022 年 10 月 21 日.
15) Mita, T. “Electrochemical Dearomative Carboxylations of Heteroaromatics with Highly Negative Reduction Potentials” Carbon Chemistry and Materials (CCM-2022), オンライン, 2022 年 10 月 10 日-12 日.
16) 美多 剛 “Transition-Metal-Catalyzed Carboxylation of C(sp^3)–H bonds with CO_2” 錯体化学会第 72 回討論会, 九州大学伊都キャンパス, 福岡, 2022 年 9 月 26 日-28 日.
17) 美多 剛 “量子化学計算を使った新しい分子変換反応のみつけ方 - 挑戦と今後の課題” 化学反応経路探索のニューフロンティア 2021, オンライン, 札幌, 2021 年 9 月 22 日.
18) 美多 剛 “計算科学を活用した有機合成” 日本質量分析学会 第 30 回北海道談話会・講演会, オンライン, 2021 年 8 月 3 日.
19) Mita, T. “Theory-Driven Approach to Chemical Synthesis of Difluoroglycine Derivatives and Its Application” Joint Symposium of Engineering & Information Science & WPI-ICReDD in Hokkaido University, オンライン, 2021 年 4 月 26 日.
20) 美多 剛 “α,α-ジフルオログリシン誘導体の化学合成とその応用” 第 6 回北大・部局横断シンポジウム 若手研究者による生命と物質の融合を目指して！, オンライン, 2020 年 10 月 19 日.
21) 美多 剛 “二酸化炭素を炭素資源とした有機合成：α-アミノ酸の化学合成およびアリル金属種のカルボキシル化” 第 7 回柴﨑セミナー, 微生物化学研究所, 東京都品川区, 2019 年 9 月 21 日.

22) Mita, T. “Palladium-Catalyzed Allylic Carboxylation with Carbon Dioxide” Asia Pacific Society for Materials Research 2019 Annual Meeting, Sapporo Convention Center, Sapporo, 2019 月 7 月 26 日-29 日.
23) Mita, T. “Cobalt(I)-Catalyzed Direct Addition of Allylic C(sp^3)–H Bonds to Carbonyl Electrophiles” Hokkaido Summer Symposium 2019 on Catalysis for Organic Synthesis, 北海道大学学術交流会館, 札幌, 2019 年 7 月 1 日-2 日.
24) 美多 剛 “二酸化炭素を用いた有機合成：α-アミノ酸の化学合成および遷移金属を駆使した触媒的カルボキシル化” 早稲田大学先進理工学部化学・生命化学科, 東京都新宿区, 2018 年 12 月 21 日.
25) Mita, T. “New Strategies for Carbon Dioxide Incorporation through C–C Bond Forming Process” 南洋理工大学理学院化学生物化学科, Singapore, 2018 年 11 月 5 日.
26) Mita, T. “Palladium-Catalyzed Dearomative Carboxylation of Indole Derivatives” International Congress on Pure & Applied Chemistry (ICPAC) Langkawi 2018, Langkawi, Malaysia, 2018 年 10 月 30 日-11 月 2 日.
27) 美多 剛 “コバルト触媒によるアリル位 C(sp^3)-H 結合の切断と求電子剤との反応” 第 5 回辰巳午会化学シンポジウム, 北海道大学大学院地球環境科学研究院, 札幌, 2018 年 8 月 18 日-19 日.
28) Mita, T. “Development of Novel Carboxylation Reactions with Carbon Dioxide through C-C Bond Formation” 国立中山大学化学科, 高雄, 台湾, 2018 年 4 月 2 日.
29) Mita, T. “Cobalt-Catalyzed Allylic C(sp^3)-H Additions to Low Reactive Carbonyl Compounds, CO_2 and Ketones” International Congress on Pure & Applied Chemistry (ICPAC) 2018, Sakhalay Angkor Resort & Spa, Siem Reap, Cambodia, 2018 年 3 月 7-10 日.
30) 美多 剛 “C(sp^3)-H 結合切断による求核的アリルコバルト種の生成と求電子剤との反応” 第 50 回有機金属若手の会夏の学校, 定山渓万世閣ホテルミリオーネ, 札幌, 2017 年 8 月 7 日-9 日.
31) 美多 剛 “Synthesis of α-Amino Acids from Carbon Dioxide” The 19th HU-SNU Joint Symposium, 北海道大学薬学部, 札幌, 2016 年 11 月 24 日.
32) 美多 剛 “二酸化炭素を用いた α-アミノ酸の化学合成” 第 10 回プロセス化学ラウンジ, 和光純薬工業㈱湯河原研修所, 静岡, 2015 年 12 月 4-5 日.
33) 美多 剛 “二酸化炭素を一炭素源として用いた新規カルボキシル化反応の開発” 第 32 回有機合成化学セミナー奨励賞受賞講演, ニューウェルシティ湯河原, 静岡, 2015 年 9 月 15-17 日.
34) Mita, T.; Sugawara, M.; Chen, J.; Higuchi, Y.; Sato, Y. “One-Pot Synthesis of α-Amino Acids from CO_2 and Imine Equivalents” Symposium on Organic Chemistry-Royal Society of Chemistry Roadshow, 東北大学青葉山キャンパス, 仙台, 2015 年 6 月 1 日.
35) 美多 剛 “二酸化炭素ガス、フッ化セシウム、および Sn、Si、B を用いる有機合成: α-アミノ酸のワンポット合成、並びに触媒的 C-H カルボキシル化の開発” 若手研究者のための有機化学札幌セミナー, 北海道大学農学部, 札幌, 2012 年 11 月 26 日.
36) 美多 剛 “ハーバード大学での生活” 特別講演会, 慶應義塾大学理工学部, 横浜, 2008 年 8 月 23 日.

Research Grant

Grants-in Aid for Scientific Research (KAKENHI) (Researcher Number: 00548183)

1) Grant-in-Aid for Transformative Research Areas A (Digitalization-driven Transformative Organic Synthesis (Digi-TOS)
   Research theme: Development of Photo-Digital Carboxylation Reaction by Fine Bubble Gas Flow
   Person in charge: Tsuyoshi MITA
   Duration of research: 2024-2025
   Budget distribution: 6,400,000 yen
2) Grant-in-Aid for Scientific Research B
   Research theme: Expansion of MHAT/RPC Chemistry
   Person in charge: Hiroki SHIGEHISA
   Duration of research: 2023-2027
   Budget distribution: 1,500,000 yen
3) Grant-in-Aid for Transformative Research Areas A (Digitalization-driven Transformative Organic Synthesis (Digi-TOS)
   Research theme: Selective and High-Yielding Carboxylations Based on Information Science
   Person in charge: Tsuyoshi MITA
   Duration of research: 2022-2023
   Budget distribution: 6,200,000 yen
4) Grant-in-Aid for Scientific Research B
   Research theme: Development of Novel CO_2 Fixation Reactions Guided by Quantum Chemical Calculations
   Person in charge: Tsuyoshi MITA
   Duration of research: 2022-2025
   Budget distribution: 13,400,000 yen
5) Grant-in-Aid for Challenging Research (Exploratory)
   Research theme: Proposing the Reaction Pathway of a New Radical Transformation and Validation by Synthetic Organic Chemistry
   Person in charge: Tsuyoshi MITA
   Duration of research: 2021-2022
   Budget distribution: 5,000,000 yen
6) Grant-in-Aid for Scientific Research C
   Research theme: Catalytic Multi-Carboxylation Using CO_2
   Person in charge: Tsuyoshi MITA
   Duration of research: 2018-2020
   Budget distribution: 3,400,000 yen
7) Grant-in-Aid for Scientific Research C
   Research theme: Catalytic and Direct Carboxylation of C(sp^3)-H Bonds with CO_2

Person in charge: Tsuyoshi MITA
Duration of research: 2014-2016
Budget distribution: 4,000,000 yen

8) Grant-in-Aid for Young Scientist B
Research theme: Catalytic and Asymmetric Synthesis of α-Amino Acids from Imines and CO_2
Person in charge: Tsuyoshi MITA
Duration of research: 2012-2013
Budget distribution: 3,600,000 yen

9) Grant-in-Aid for Young Scientist B
Research theme: Synthesis of α-Amino Acids Using CO_2 as a C1 Source
Person in charge: Tsuyoshi MITA
Duration of research: 2010-2011
Budget distribution: 3,100,000 yen

10) Grant-in-Aid for Research Activity Start-Up
Research theme: Synthesis of α-Amino Acids from CO_2 Using a Nickel Catalyst
Person in charge: Tsuyoshi MITA
Duration of research: 2009
Budget distribution: 1,070,000 yen

Other Funds

11) Chugai Foundation for Innovative Drug Discovery Science
Research theme: Computational Approaches to Trifluoromethyl Radical Generation and Their Applications in Drug Discovery
Person in charge: Tsuyoshi MITA
Duration of research: 2025-2026
Budget distribution: 4,000,000 yen

12) Astellas Foundation for Research on Metabolic Disorders
Research theme: Advancing Drug Discovery Resources through Interdisciplinary Integration with Computational Chemistry
Person in charge: Tsuyoshi MITA
Duration of research: 2025-2026
Budget distribution: 4,000,000 yen

13) Tokyo Ohka Foundation for the Promotion of Science and Technology
Research theme: Development of a Novel Synthesis Method for Lactones and Lactams Using CO_2 Radical Anions
Person in charge: Tsuyoshi MITA
Duration of research: 2024
Budget distribution: 1,500,000 yen

14) The Naito Foundation

Research theme: Computational-Chemistry-Guided Chemical Synthesis of Fluorinated Amino Acids
Person in charge: Tsuyoshi MITA
Duration of research: 2021
Budget distribution: 3,000,000 yen

15) The Fugaku Trust for Medical Research
Research theme: Synthesis of Fluorinated *N*-Heterocycles towards the Development of Pharmaceutical Substances
Person in charge: Tsuyoshi MITA
Duration of research: 2021
Budget distribution: 2,000,000 yen

16) The Uehara Memorial Foundation
Research theme: Chemical Synthesis of Pharmaceutical Ingredients by Quantum Chemical Calculations
Person in charge: Tsuyoshi MITA
Duration of research: 2020
Budget distribution: 5,000,000 yen

17) The Akiyama Life Science Foundation
Research theme: Chemical Synthesis of Fluorinated Amino Acids Guided by Quantum Chemical Calculations
Person in charge: Tsuyoshi MITA
Duration of research: 2020
Budget distribution: 1,000,000 yen

18) Young Researcher's Award in the Ube Industries Foundation
Research theme: Development of Novel Chemical Reactions Based on Quantum Chemical Calculations
Person in charge: Tsuyoshi MITA
Duration of research: 2020
Budget distribution: 1,000,000 yen

19) Astellas Foundation for Research on Metabolic Disorders
Research theme: Synthesis of Pharmaceutical Resources Based on Calculation
Person in charge: Tsuyoshi MITA
Duration of research: 2019
Budget distribution: 2,000,000 yen

20) The Sumitomo Foundation
Research theme: Instant Carboxylation with CO_2 for the Synthesis of PET Tracers
Person in charge: Tsuyoshi MITA
Duration of research: 2018
Budget distribution: 1,100,000 yen

21) The Takeda Science Foundation

Research theme: Carboxylation Triggered by the Cleavage of Heteroaromatics
Person in charge: Tsuyoshi MITA
Duration of research: 2018
Budget distribution: 2,000,000 yen

22) The Naito Foundation
Research theme: Development of Novel C(sp^3)-H Activation Reactions and their Applications
Person in charge: Tsuyoshi MITA
Duration of research: 2017
Budget distribution: 3,000,000 yen

23) Grant-in-Aid for Regional R&D Proposal-Based Program from Northern Advancement Center for Science & Technology of Hokkaido
Research theme: Synthesis of Biological Active Molecules via C(sp^3)-H Activation
Person in charge: Tsuyoshi MITA
Duration of research: 2016
Budget distribution: 400,000 yen

24) The Uehara Memorial Foundation
Research theme: Amino Acid Synthesis via C-H Activation
Person in charge: Tsuyoshi MITA
Duration of research: 2010
Budget distribution: 2,000,000 yen

25) Corporation Award in Synthetic Organic Chemistry, Japan
Research theme: Amino Acid Synthesis from Carbon Dioxide
Person in charge: Tsuyoshi MITA
Duration of research: 2009
Budget distribution: 500,000 yen