Curriculum Vitae with Publication List

update: February 17, 2024

Personal Data

Name: Tsuyoshi MITA（美多　剛）
Date of Birth: August 09, 1976
Place of Birth: Tokyo, Japan
Gender: Male
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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
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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-present: Graduate School of Science, Kyoto University (Part-time Lecturer)
2023.10-present: Graduate School of Medical and Pharmaceutical Sciences, Chiba University (Part-time Lecturer)

Membership

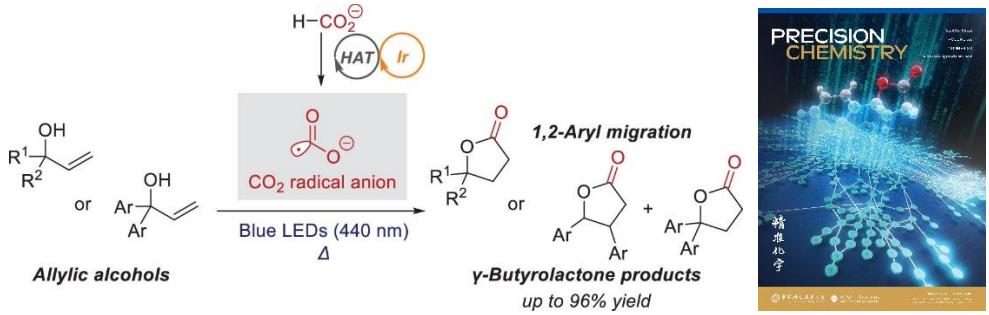
Pharmaceutical Society of Japan (PSJ), Chemical Society of Japan (CSJ), Society of Synthetic Organic Chemistry of Japan (SSOCJ), American Chemical Society (ACS), Kinka Chemical Society

Awards

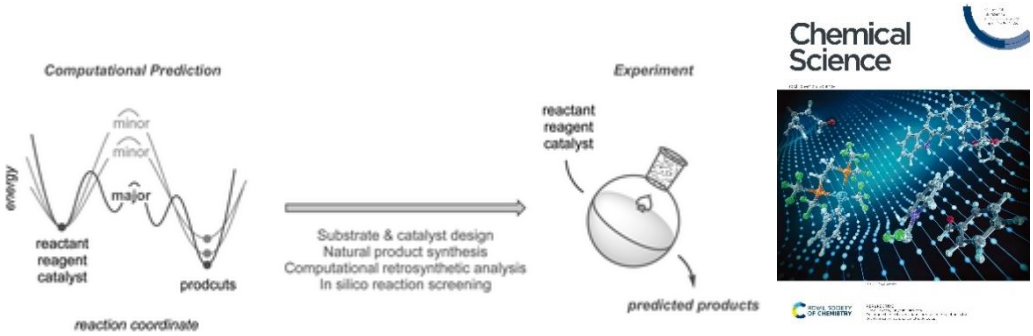
2007.3: The Representative of Graduating PhD Students, Faculty of Pharmaceutical Sciences The University of Tokyo
2007: JSPS Postdoctoral Fellowship (Superlative Postdoctoral Fellow (SPD))
2009: Tosoh Corporation Award in Synthetic Organic Chemistry, Japan
2014: Incentive Award in Synthetic Organic Chemistry, 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

Publications

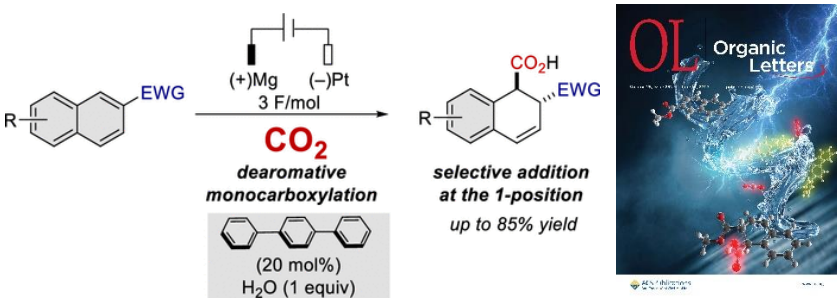
1) Mangaonkar, S. R.; Hayashi, H.; Kanna, W.; Debbarma, S.; Harabuchi, Y.; Maeda, S.*; Mita, T.* "γ-Butyrolactone Synthesis from Allylic Alcohols Using the CO_2 Radical Anion" *Precis. Chem.* **2024**, *2*, DOI: 10.1021/prechem.3c00117.



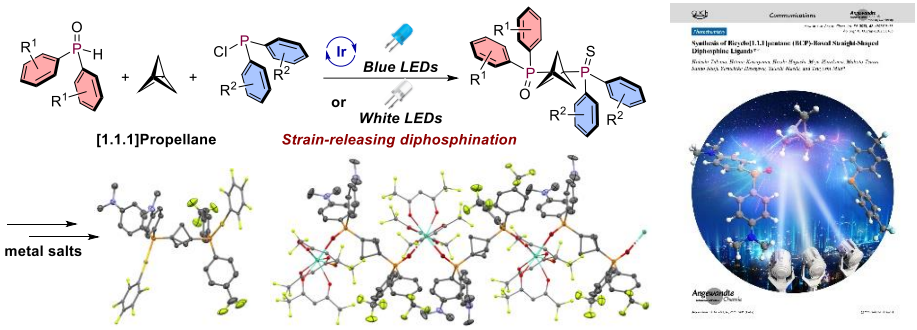
2) Hayashi, H.*; Maeda, S; Mita, T.* "Quantum Chemical Calculations for Reaction Prediction in the Development of Synthetic Methodologies" *Chem. Sci.* **2023**, *14* (42), 11601-11616.



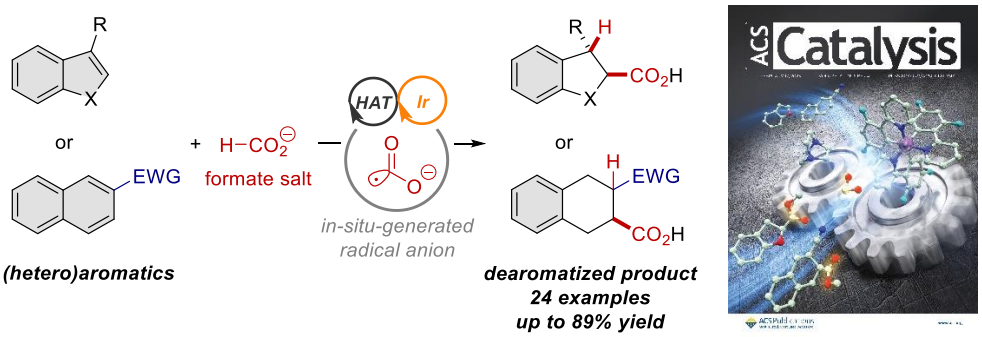
3) Rawat, V. K.; Hayashi, H.; Katsuyama, H.; Mangaonkar, S. R.; Mita, T.* "Revisiting the Electrochemical Carboxylation of Naphthalene with CO_2: Selective Monocarboxylation of 2-Substituted Naphthalenes" *Org. Lett.* **2023**, *25* (23), 4231-4235.



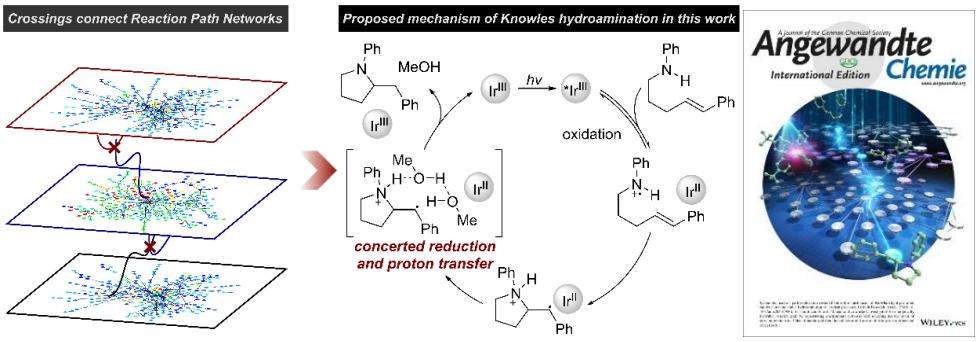
4) Takano, H.; Katsuyama, H.; Hayashi, H.; Harukawa, M.; Tsurui, M.; Shoji, S.; Hasegawa, Y.; Maeda, S.; Mita, T.* "Synthesis of Bicyclo[1.1.1]pentane (BCP)-Based Straight-Shaped Diphosphine Ligands" *Angew. Chem., Int. Ed.* **2023**, *62* (23), e202303435.



5) 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.

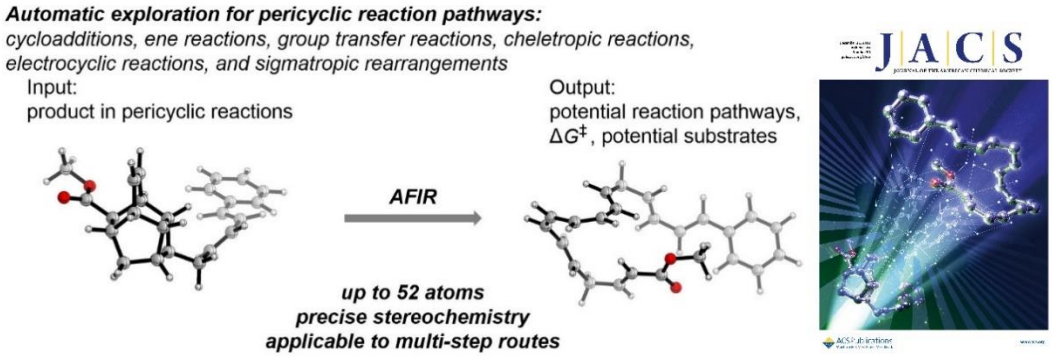


6) Harabuchi, Y.*; Hayashi, H.; Takano, H.; Mita, T.; Maeda, S.* "Oxidation and Reduction Pathways in the Knowles Hydroamination via a Photoredox-Catalyzed Radical Reaction" *Angew. Chem., Int. Ed.* **2023**, *62* (1), e202211936.

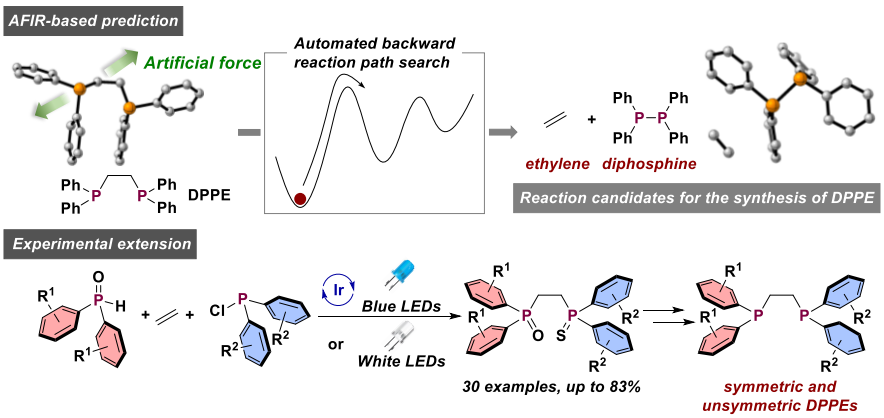


7) Maeda, S.*; Harabuchi, Y.; Hayashi, H.; Mita, T.* “Toward Ab Initio Reaction Discovery Using the Artificial Force Induced Reaction Method” *Annu. Rev. Phys. Chem.* **2023**, *74*, 287-311.

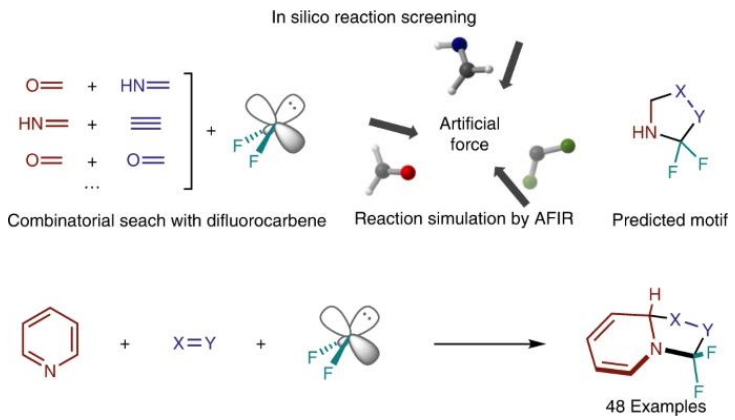
8) Mita, T.*; Takano, H.; Hayashi, H.; Kanna, W.; Harabuchi, Y.; Houk, K. N.; Maeda, S.* “Prediction of High-Yielding Single-Step or Cascade Pericyclic Reactions for the Synthesis of Complex Synthetic Targets” *J. Am. Chem. Soc*. **2022**, *144* (50), 22985-23000.



9) 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.

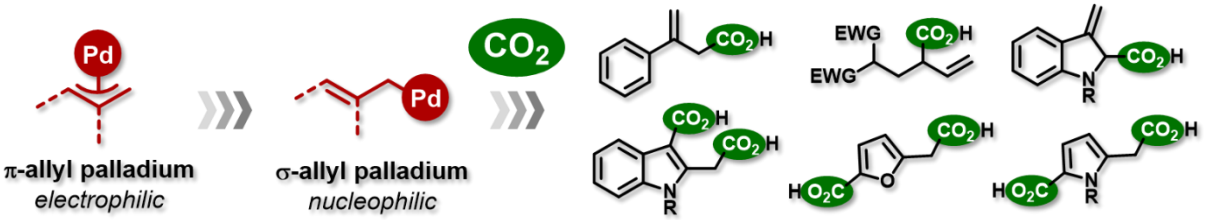


10) Hayashi, H.; Katsuyama, H.; Takano, H.; Harabuchi, Y.; Maeda, S.*; Mita, T.* “In Silico Reaction Screening with Difluorocarbene for *N*-Difluoroalkylative Dearomatization of Pyridines” *Nat. Synth.* **2022**, *1* (10), 804-814.

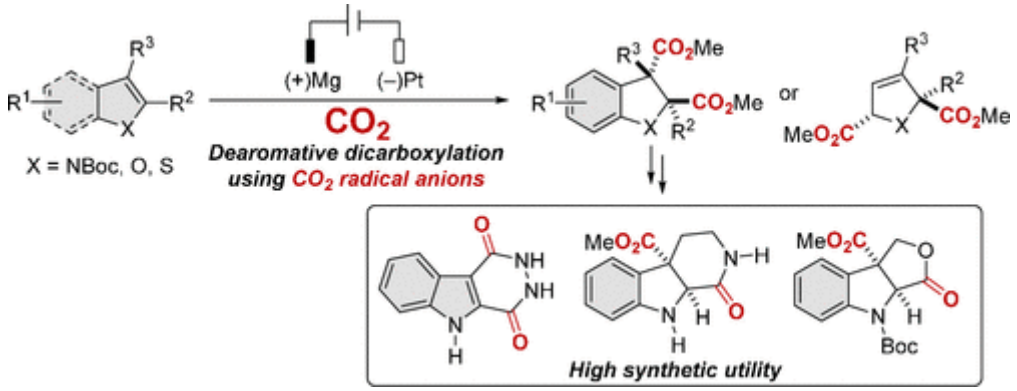


11) 美多 剛,* 樋口 裕紀, 佐藤 美洋* “π-アリルパラジウムの極性転換による二酸化炭素を用いた触媒的カルボキシル化の開発” *有機合成化学協会誌* **2022**, *80* (9), 806-816 (written in

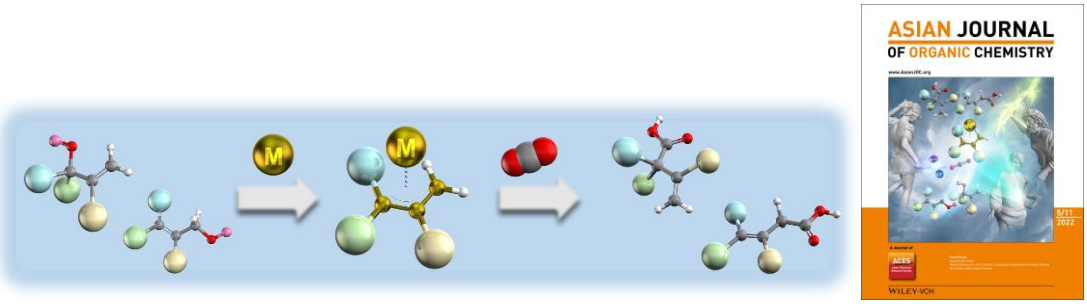
Japanese).



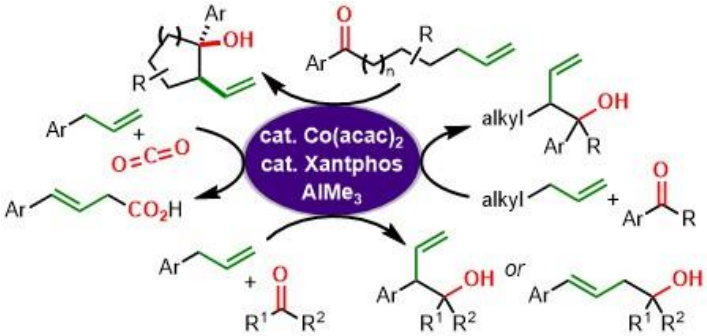
12) You, Y.; Kanna, W.; Takano, H.; Hayashi, H.; Maeda, S.*; Mita, T.* "Electrochemical Dearomative Dicarboxylation of Heterocycles with Highly Negative Reduction Potentials" *J. Am. Chem. Soc.* **2022**, *144* (8), 3685-3695.



13) 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.



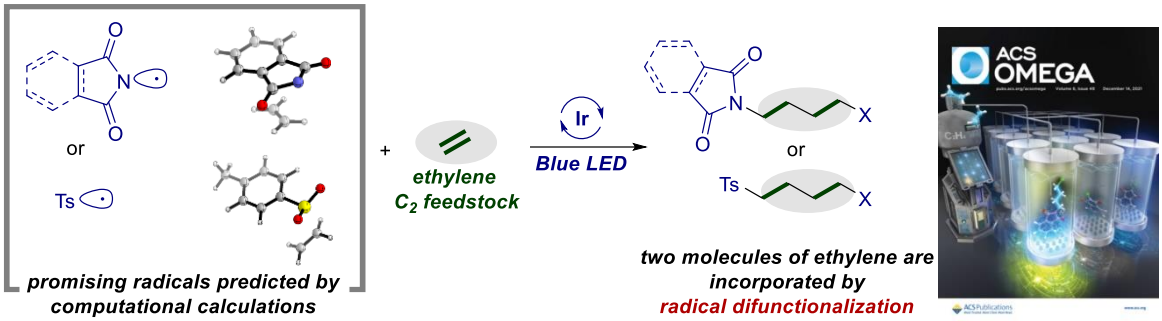
14) 道上 健一, 美多 剛,* 佐藤 美洋* "末端アルケンを求核剤とするカルボニル化合物の触媒的アリル化反応" *有機合成化学協会誌* **2022**, *80* (3), 210-221 (written in Japanese).



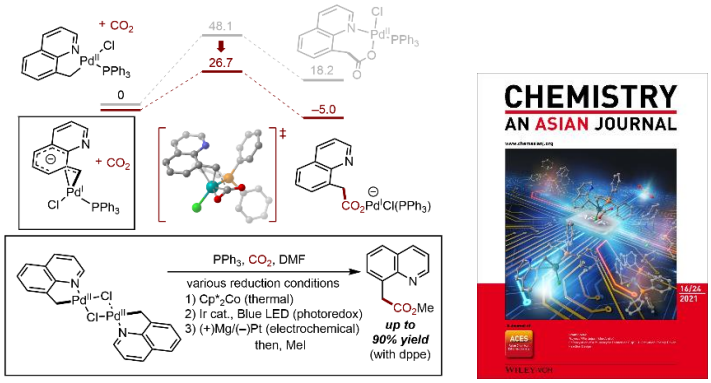
15) Maeda, S.*; Harabuchi, Y.; Hasegawa, T.; Suzuki, K.; Mita, T. "Reactivity Prediction through Quantum Chemical Calculations" *AsiaChem Magazine* **2021**, *2* (1), 56-63.

16) Takano, H.; You, Y.; Hayashi, H.; Harabuchi, Y.; Maeda, S.*; Mita, T.* "Radical Difunctionalization of Gaseous Ethylene Guided by Quantum Chemical Calculations: Selective

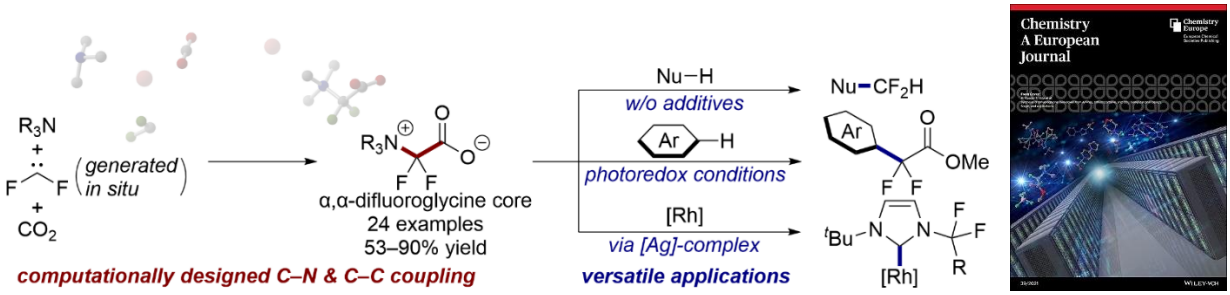
Incorporation of Two Molecules of Ethylene" *ACS Omega* **2021**, *6* (49), 33846-33854.



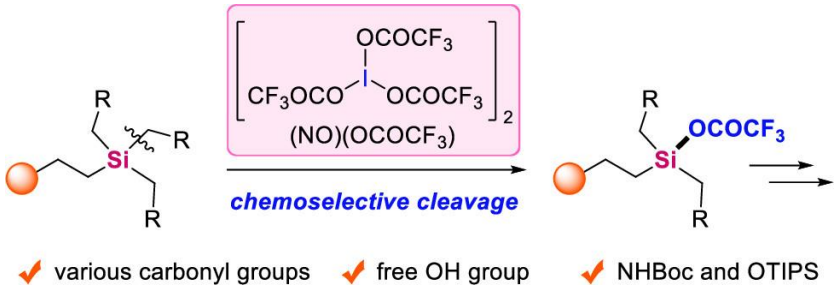
17) Kanna, W.; Harabuchi, Y.; Takano, H.; Hayashi, H.; Maeda, S.*; Mita, T.* "Carboxylation of a Palladacycle Formed via C(sp^3)-H Activation: Theory-Driven Reaction Design" *Chem. Asian J.* **2021**, *16* (24), 4072-4080.



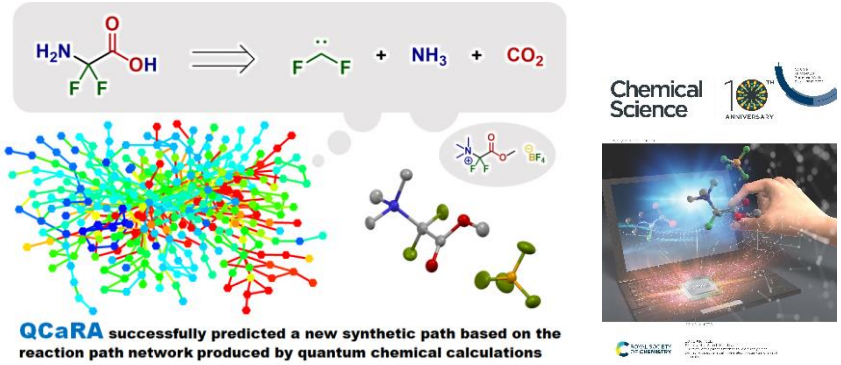
18) Hayashi, H.; Takano, H.; Katsuyama, H.; Harabuchi, Y.; Maeda, S.*; Mita, T.* "Synthesis of Difluoroglycine Derivatives from Amines, Difluorocarbene, and CO_2: Computational Design, Scope, and Application" *Chem. Eur. J.* **2021**, *27* (39), 10040-10047.



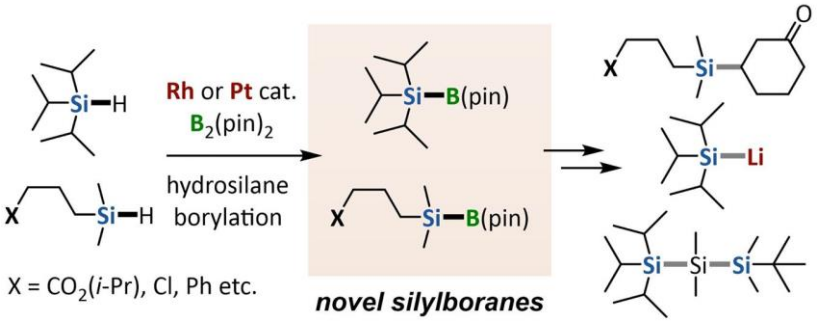
19) Matsuoka, K.; Komami, N.; Kojima, M.; Mita, T.; Suzuki, K.; Maeda, S.; Yoshino, T.*; Matsunaga, S.* "Chemoselective Cleavage of Si-C(sp^3) Bonds in Unactivated Tetraalkylsilanes Using Iodine Tris(trifluoroacetate)" *J. Am. Chem. Soc.* **2021**, *143* (1), 103-108.



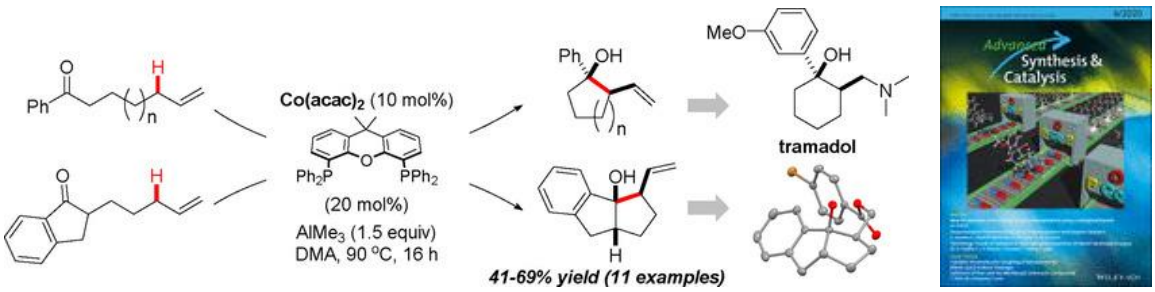
20) Mita, T.*; Harabuchi, Y.; Maeda, S.* "Discovery of a Synthesis Method for a Difluoroglycine Derivative Based on a Path Generated by Quantum Chemical Calculations" *Chem. Sci.* **2020**, *11* (29), 7569-7577.



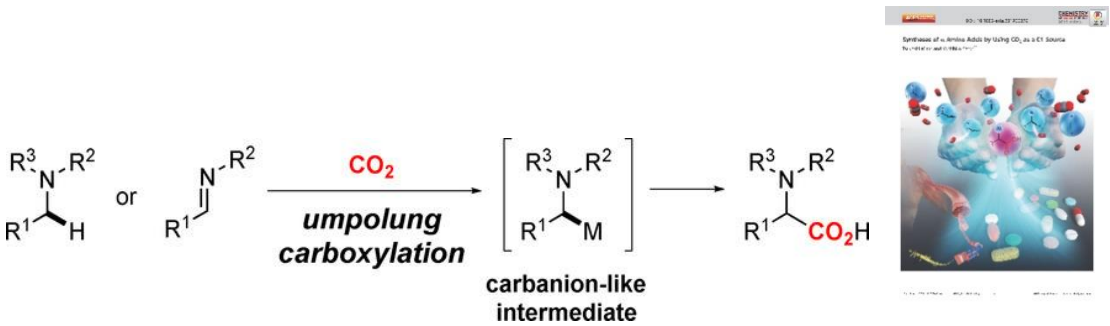
21) Shishido, R.; Uesugi, M.; Takahashi, R.; Mita, T.; Ishiyama, T.; Kubota, K.*; Ito, H.* "General Synthesis of Trialkyl- and Dialkylarylsilylboranes: Versatile Silicon Nucleophiles in Organic Synthesis" *J. Am. Chem. Soc.* **2020**, *142* (33), 14125-14133.



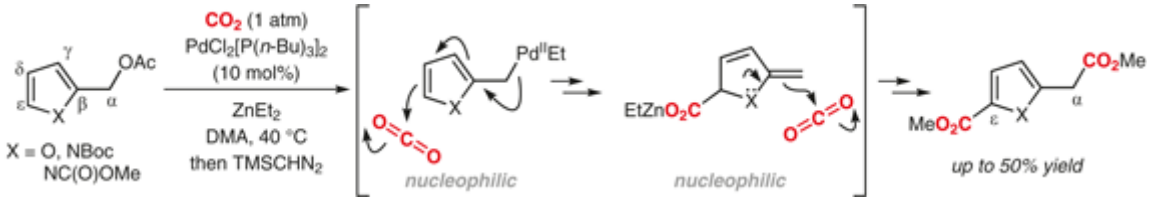
22) Mita, T.*; Uchiyama, M.; Sato, Y.* "Catalytic Intramolecular Coupling of Ketoalkenes by Allylic C(sp^3)-H Bond Cleavage: Synthesis of Five- and Six-Membered Carbocyclic Compounds" *Adv. Synth. Catal.* **2020**, *362* (6), 1275-1280.



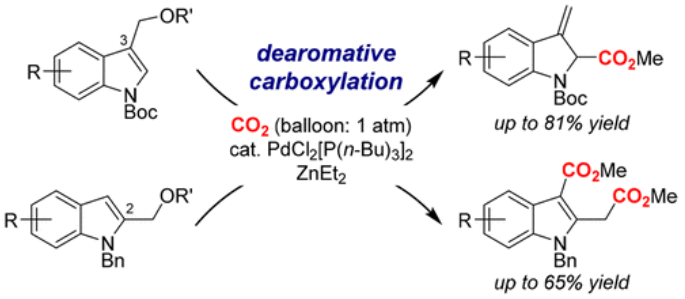
23) Mita, T.*; Sato, Y.* "Syntheses of α-Amino Acids by Using CO_2 as a C1 Source" *Chem. Asian J.* **2019**, *14* (12), 2038-2047.



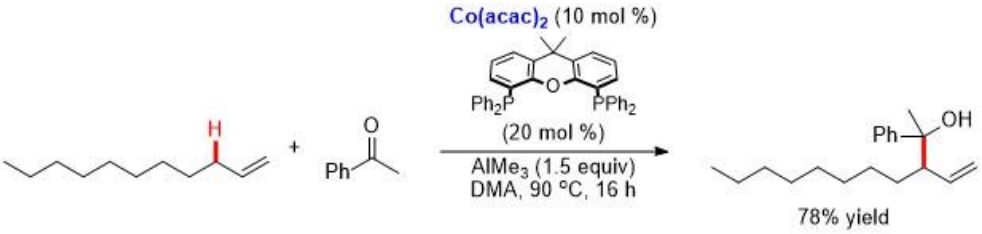
24) Mita, T.*; Masutani, H.; Ishii, S.; Sato, Y.* "Catalytic Carboxylation of Heteroaromatic Compounds: Double and Single Carboxylation with CO_2" *Synlett* **2019**, *30* (7), 841-844.



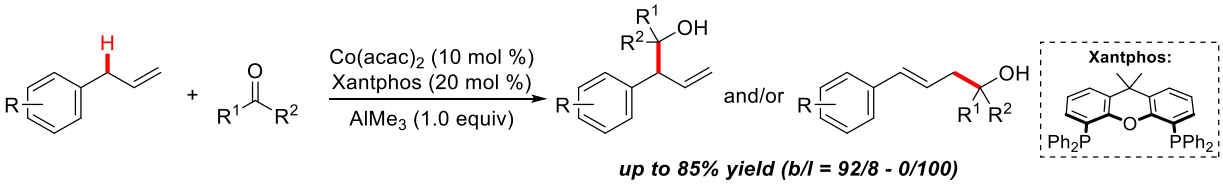
25) Mita, T.*; Ishii, S.; Higuchi, Y.; Sato, Y.* "Pd-Catalyzed Dearomative Carboxylation of Indolylmethanol Derivatives" *Org. Lett.* **2018**, *20* (23), 7603-7606.



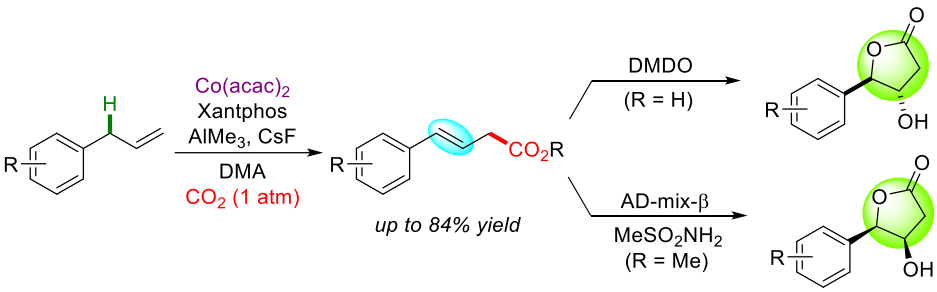
26) Mita, T.*; Uchiyama, M.; Michigami, K.; Sato, Y.* "Cobalt-Catalyzed Nucleophilic Addition of the Allylic C(sp^3)-H Bond of Simple Alkenes to Ketones" *Beilstein J. Org. Chem.* **2018**, *14*, 2012-2017.



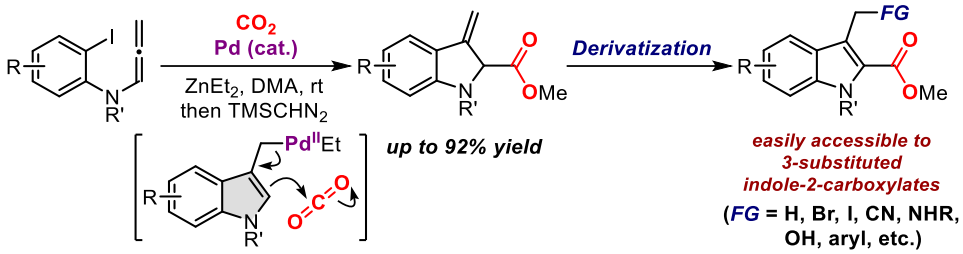
27) Mita, T.*; Hanagata, S.; Michigami, K.; Sato, Y.* "Co-Catalyzed Direct Addition of Allylic C(sp^3)-H Bonds to Ketones" *Org. Lett.* **2017**, *19* (21), 5876-5879.【highlighted by *Synfacts* **2018**, *14*, 74.】



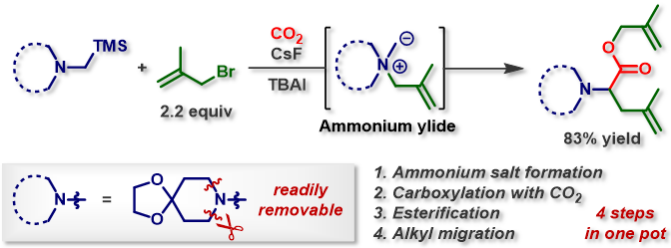
28) Michigami, K.; Mita, T.*; Sato, Y.* "Cobalt-Catalyzed Allylic C(sp^3)-H Carboxylation with CO_2" *J. Am. Chem. Soc.* **2017**, *139* (17), 6094-6097.



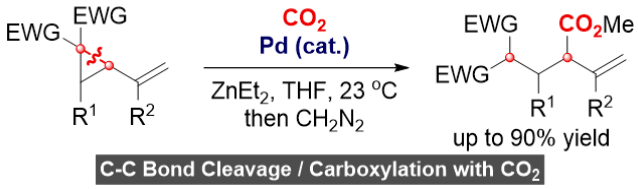
29) Higuchi, Y.; Mita, T.*; Sato, Y.* "Palladium-Catalyzed Intramolecular Arylative Carboxylation of Allenes with CO_2 for the Construction of 3-Substituted Indole-2-Carboxylic Acids" *Org. Lett.* **2017**, *19* (10), 2710-2713.



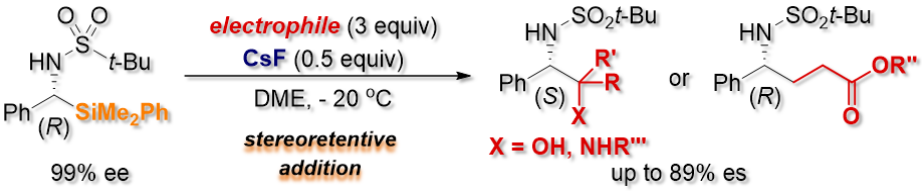
30) Mita, T.*; Sugawara, M.; Sato, Y.* "One-Pot Synthesis of α-Amino Acids through Carboxylation of Ammonium Ylides with CO_2 Followed by Alkyl Migration" *J. Org. Chem.* **2016**, *81* (12), 5236-5243.



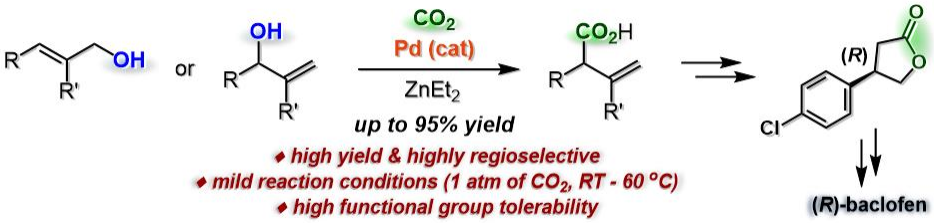
31) Mita, T.*; Tanaka, H.; Higuchi, Y.; Sato, Y.* "Palladium-Catalyzed Carboxylation of Activated Vinylcyclopropanes with CO_2" *Org. Lett.* **2016**, *18* (11), 2754-2757.



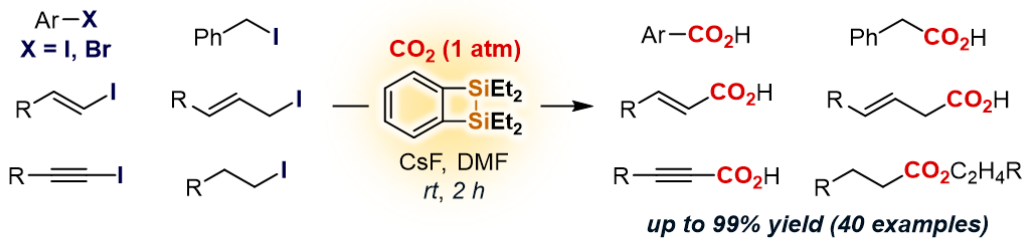
32) Mita, T.*; Saito, K.; Sugawara, M.; Sato, Y.* "Stereoretentive Addition of *N-tert*-Butylsulfonyl-α-Amido Silanes to Aldehydes, Ketones, α,β-Unsaturated Esters, and Imines" *Chem. Asian. J.* **2016**, *11* (10), 1528-1531.



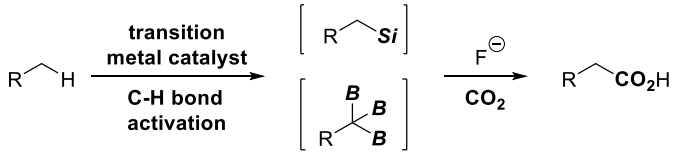
33) Mita, T.*; Higuchi, Y.; Sato, Y.* "Highly Regioselective Palladium-Catalyzed Carboxylation of Allylic Alcohols with CO_2" *Chem. Eur. J.* **2015**, *21* (46), 16391-16394.



34) 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.



35) 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).



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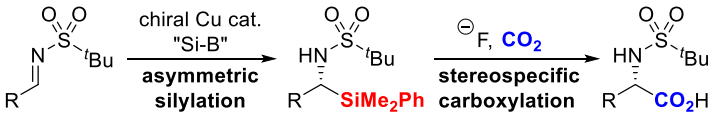

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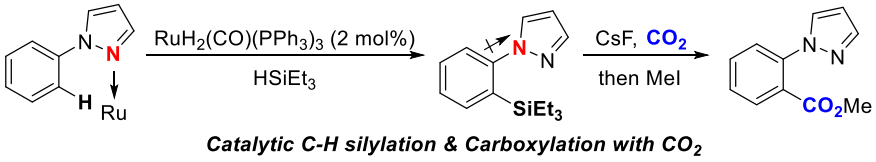

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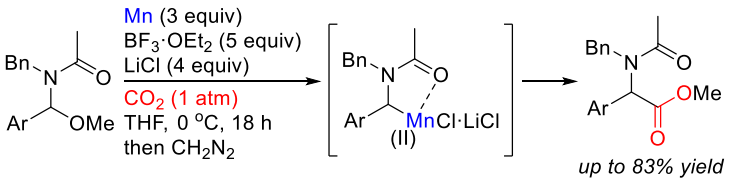

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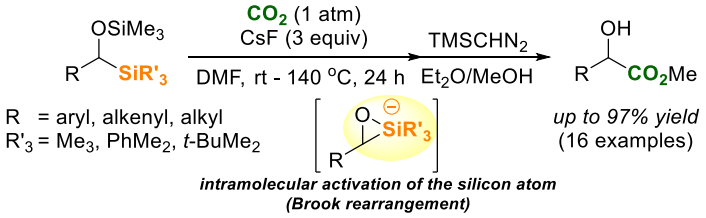

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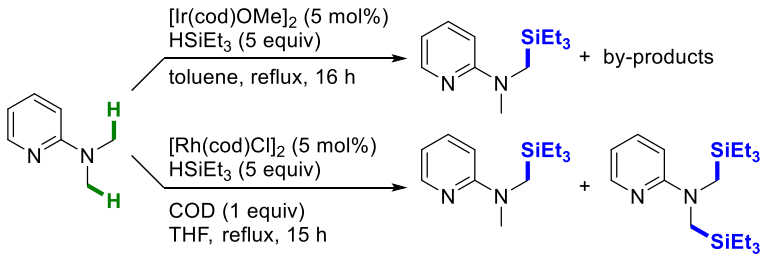

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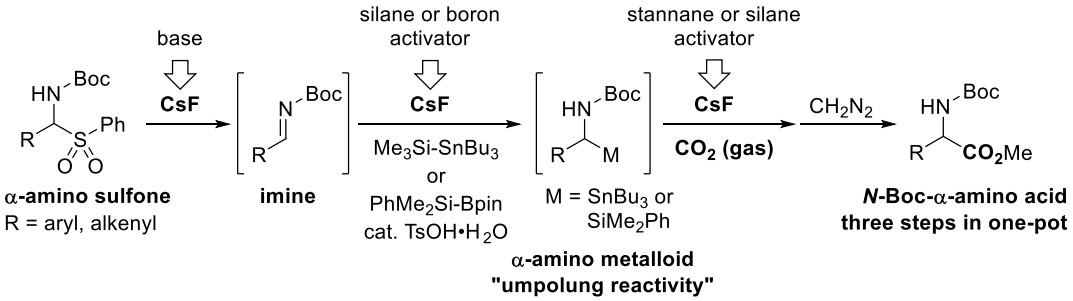

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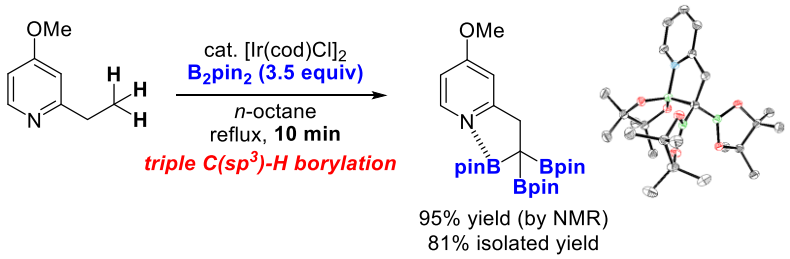

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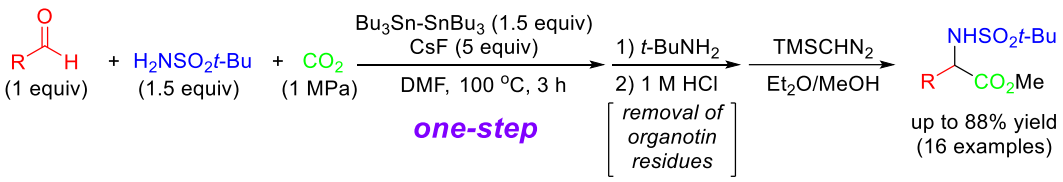

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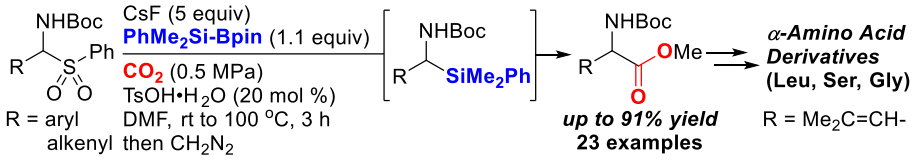

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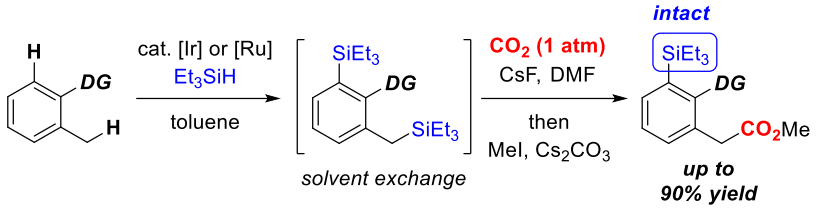

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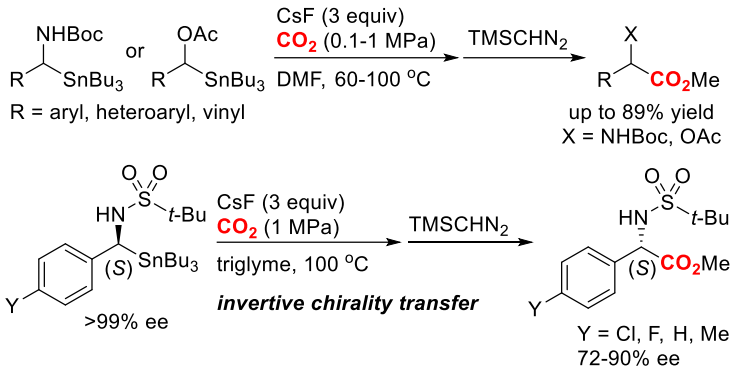

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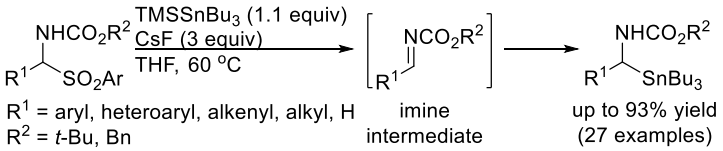

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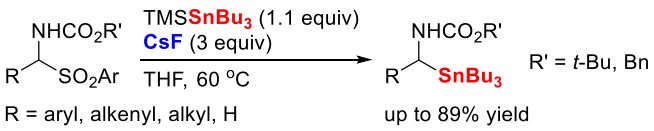

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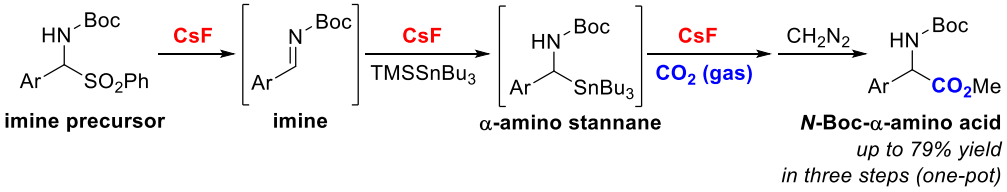

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Book Chapters

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Commentaries

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Patents

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Invited Lectures

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2) 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.
3) 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）.
4) 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）.
5) 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.
6) 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.

7) 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.
8) 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.
9) Mita, T. "Theory-Driven Organic Synthesis" The 5th ICReDD International Symposium, オンライン, 2023 年 1 月 10 日.
10) 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.
11) 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.
12) 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.
13) 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.
14) 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.
15) 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.
16) 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.
17) 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.
18) 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.
19) 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.
20) 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.
21) 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.

22) 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.

23) 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.

24) 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.

25) 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.

26) 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.

27) 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.

28) 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.

29) 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.

30) 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.

31) 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.

32) 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.

33) 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) <u>Grant-in-Aid for Scientific Research B</u>

Research theme: Expansion of MHAT/RPC Chemistry

Person in charge: Hiroki Shigehisa

Duration of research: 2023-2027

Budget distribution: 1,500,000 yen

2) 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

3) 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

4) 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

5) 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

6) 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

7) 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

8) 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

9) 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

10) 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

11) 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

12) 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

13) 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

14) 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

15) 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

16) 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

17) 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

18) 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

19) 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

20) 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

21) 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