Takuya SUGA

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BIOGRAPHY

2025 – present	Assistant professor in Kanazawa University (Prof. Takahiro Soeta)
2022	Research fellow in Regensburg University (Prof. Burkhard König)
2016 – 2025	Assistant professor in Kanazawa University (Prof. Yutaka Ukaji)
2015 – 2016	Postdoctoral fellow in Gakushuin University (Prof. Takahiko Akiyama)
2015	Ph.D. in Science
Tokyo Institute of Technology (Prof. Nobuharu Iwasawa)	
2011	M.Sc. in Organic Chemistry
Tokyo Institute of Technology (Prof. Nobuharu Iwasawa)	
2009	B.Sc. in Organic Chemistry
Tokyo Institute of Technology (Prof. Nobuharu Iwasawa)	

RESEARCH

Kanazawa University

"C–OH as Precursor of C•" — Alcohol C–OH bond is indeed a pivot of organic synthesis in ionic reactions but was not in radical reactions (in a direct way) because of its high bond-dissociation energy. I designed and realized a new method for directly converting benzylic alcohols to the corresponding benzylic radicals by using low-valent titanium reagents. It was applied to alkene insertion and Ni-catalyzed radical cross-coupling.

Gakushuin University

"C–OH Activation for Asymmetric Synthesis" — I planned and discovered a carbocation-based asymmetric C–OH bond reduction reaction catalyzed by chiral phosphoric acids. I was also responsible for several other projects.

EDUCATION

Tokyo Institute of Technology

Supervisor: Prof. Nobuharu Iwasawa

"Benzene + CO_2 -> Benzoic Acid" — I achieved the coupling of inert benzene and inert carbon dioxide (CO_2) by Rh-catalyzed C–H activation. The reaction mechanism was unveiled by the detailed kinetic study with newly designed model Rh complexes capable of activating benzene C–H bond even at room temperature.

"Isolating Benzyne as Complex" — I accomplished the synthesis of benzo[*c*]thioph-4,5-yne-$Co_2(CO)_6$ complex; this was the second synthesis of benzyne-$Co_2(CO)_6$ complex analogues, of which synthetic challenge is attributed to the highly strained alkyne-$Co_2(CO)_6$ complex moiety in the six-membered ring.

SELECTED PUBLICATIONS

My full publication list is available on our laboratory website.

[1] Suga, T.*; Takada, R.; Sakamoto, M. Ukaji, Y. Directing-Group-Assisted Non-Strained Ether C–O Bond Homolysis Mediated by Low-Valent Titanium. *Org. Lett.* **2024**, *26*, 2315–2310.

[2] Suga, T.*; Takahashi, Y.; Miki, C.; Ukaji, Y. Direct and Unified Access to Carbon Radicals from Aliphatic Alcohols by Cost-Efficient Titanium-Mediated Homolytic C–OH Bond Cleavage. *Angew. Chem. Int. Ed.* **2022**, *61*, e202112533.

[3] Suga, T.*; Shimazu, S.; Ukaji, Y.*, Low-Valent Titanium-Mediated Radical Conjugate Addition Using Benzyl Alcohols as Benzyl Radical Sources, *Org. Lett.* **2018**, *20*, 5389. **Highlighted in *Synfacts*, 2018,** *14***,** 1184.

[4] Suga, T.*; Ukaji, Y.* Nickel-Catalyzed Cross-Electrophile Coupling between Benzyl Alcohols and Aryl Halides Assisted by Titanium Co-Reductant, *Org. Lett.* **2018**, *20*, 7846. **Top 10 article in Dec. 2018.**

[5] Osakabe, H.; Saito, S.; Miyagawa, M.; Suga, T.; Uchikura, T.; Akiyama, T.* Enantioselective Dehydroxyhydrogenation of 3-Indolylmethanols by the Combined Use of Benzothiazoline and Chiral Phosphoric Acid: Construction of a Tertiary Carbon Center, *Org. Lett.* **2020**, *22*, 2225.

[6] Suga, T.; Iizuka, S.; Akiyama, T.* Versatile and highly efficient oxidative C(sp^3)–H bond functionalization of tetrahydroisoquinoline promoted by bifunctional diethyl azodicarboxylate (DEAD): scope and mechanistic insights, *Org. Chem. Front.* **2016**, *3*, 1259.

[7] Suga, T.; Saitou, T.; Takaya, J.; Iwasawa, N.* Mechanistic study of rhodium-catalyzed carboxylation of simple aromatic compounds with carbon dioxide, *Chem. Sci.* **2016**, *8*, 1454.

[8] Suga, T.; Mizuno, H.; Takaya, J.; Iwasawa, N.* Direct Carboxylation of Simple Arenes with CO_2 through a rhodium-catalyzed C-H bond activation, *Chem. Commun.* **2014**, *50*, 14360.

FUNDING

2023 JSPS Grant-in-Aid for Scientific Research (C)
2023 Shibuya Science Culture and Sports Foundation Grant
2021 The New Energy and Industrial Technology Development Organization JPNP20004
2021 JSPS Grant-in-Aid for Young Scientists
2021 Takahashi Industrial and Economic Research Foundation Grant
2019 Hokuriku Bank Research Grant for Young Scientists
2018 Ube Industry Foundation Award
2012 JSPS Research Fellowship for Young Scientists, DC2 (Student Fellowship)

AWARDS

2024 Incentive Award in Synthetic Organic Chemistry, Japan
2024 Certificate for Young Scholar Lecture at the 104th CSJ Annual Meeting
2018 Ube Industry Foundation Award
2018 Mitsui Chemical Award in Synthetic Organic Chemistry, Japan
2015 Student Presentation Award at the 95th CSJ Annual Meeting
2014 Poster Award at the 61st Symposium on Organometallic Chemistry

INTERNATIONAL CONFERENCES ATTENDED

2023 10th Pacific Symposium on Radical Chemistry (PSRC), Uji, Japan
2019 International Congress on Pure & Applied Chemistry (ICPAC), Yangon, Myanmar
2018 The 14th International Kyoto Conference on New Aspects of Organic Chemistry (IKCOC), Kyoto, Japan
2014 26th International Conference on Organometallic Chemistry (ICOMC), Sapporo, Japan
2011 The 16th IUPAC International Symposium on Organometallic Chemistry Directed Towards Organic Synthesis (OMCOS), Shanghai, China

SKILLS

• Established skills for organic chemistry such as:
- Well-trained techniques for organic synthesis (reaction set-up, purification, etc.)
- Standard knowledge on the safe handling of chemicals
- Air-free techniques (Schlenk techniques and glovebox)
- Synthesizing/manipulating unstable organometallic compounds
- Manipulating apparatuses for analyzing organic materials (NMR, IR, ESI-MS, SCXRD)
• English proficiency for academic writing, reading and daily communication

TEACHING EXPERIENCES

- Instructed and assessed undergraduate students in experiment classes
- Created educational videos and materials for undergraduates (owing to COVID-19)
- Taught basic chemistry and basic use of computers in classes
- Advised and taught students in weekly laboratory meetings

ADMINISTRATION

- Administrated students' research in my project
- Assessing students' defense and thesis
- Invigilated and marked in entrance examinations
- Invigilated in class examinations

POSITIONS OF RESPONSIBILITY

- Supervised students in my research project (currently 4 students)
- Primary responsibility for writing and submitting paper
- Communication with reviewers and editorial boards
- Assisted students' activity for defense, thesis and other presentation works
- Managed students' daily experiments
- Partially assisted students' job-hunting
- Campus-life mentor (10-15 students/year)
- Wrote a letter of recommendation for students' scholarship

SERVICE

- Peer-review contribution to:

ACS catalysis, Advanced Synthesis & Catalysis, Asian Journal of Organic Chemistry, Bulletin of the Chemical Society of Japan, Chemistry – A European Journal, European Journal of Organic Chemistry, Journal of Organic Chemistry, Nature Communications, Organic Letters, Science China Chemistry, Tetrahedron, Tetrahedron Letters (alphabetical)

- Outreach public services, for example:

- Participated in the organizing committee of the prefectural high-school science club conference
- Admitted high-school students who want to conduct their study in university
- Planned and conducted kid's science activity