

研究期間全年度 研究業績

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1. 発表論文等 (査読付き論文, 著書, 総説等の発表状況)

- (1) Direct Aldol Strategy in Enantioselective Total Synthesis of Thuggacin B
Matsuzawa, A.; Opie, Christopher R.; Kumagai, N.*; Shibasaki, M.* *Chem. Eur. J.* **2014**, *20*, 68-71. (10.1002/chem.201304297)
- (2) A Modified Preparation Procedure for Carbon Nanotube-Confined Nd/Na Heterobimetallic Catalyst for *anti*-Selective Catalytic Asymmetric Nitroaldol Reactions
Sureshkumar, D.; Hashimoto, K.; Kumagai, N.*; Shibasaki, M.* *J. Org. Chem.* **2013**, *78*, 11494-11500. (10.1021/jo402042s)
- (3) Direct Catalytic Asymmetric Addition of Acetonitrile to *N*-Thiophosphinoylimines
Kawato, Y.; Kumagai, N.*; Shibasaki, M.* *Chem. Commun.* **2013**, *49*, 11227-11229. (10.1039/C3CC47117A)
- (4) An Enantioselective Synthesis of Voriconazole
Tamura, K.; Kumagai, N.*; Shibasaki, M.* *J. Org. Chem.* **2013**, *78*, 11396-11403. (10.1021/jo4019528)
- (5) Catalytic Asymmetric Hydrophosphonylation of Ketimines
Yin, L.; Bao, Y.; Kumagai, N.*; Shibasaki, M.* *J. Am. Chem. Soc.* **2013**, *135*, 10338-10341. (10.1021/ja4059316)
- (6) Direct Catalytic Asymmetric Vinylogous Mannich-type Reaction of γ -Butenolides to Ketimines
Yin, L.; Takada, H.; Kumagai, N.*; Shibasaki, M.* *Angew. Chem., Int. Ed.* **2013**, *52*, 7310-7313. (10.1002/anie.201303119)
- (7) Direct Catalytic Asymmetric Mannich-type Reaction of α -Sulfanyl Lactones
Takechi, S.; Kumagai, N.* and Shibasaki, M.* *Org. Lett.* **2013**, *15*, 2632-2635. (10.1021/ol4008734)
- (8) Self-Assembling Nd/Na Heterobimetallic Asymmetric Catalyst Confined in Carbon Nanotube Network
Ogawa, T.; Kumagai, N.* and Shibasaki, M.* *Angew. Chem., Int. Ed.* **2013**, *52*, 6196-6201. (10.1002/anie.201302236)
- (9) In situ Manipulation of Catalyst Performance via Photocontrolled Aggregation/Dissociation State of the Catalyst
Nojiri, A.; Kumagai, N.* and Shibasaki, M.* *Chem. Commun.* **2013**, *49*, 4628-4630. (10.1039/C3CC00008G)

- (10) Two Approaches toward the Formal Total Synthesis of Oseltamivir Phosphate (Tamiflu[®]): Catalytic Enantioselective Three-Component Reaction Strategy and L-Glutamic Acid Strategy
Alagiri, K.; Furutachi, M.; Yamatsugu, K.; Kumagai, N.; Watanabe, T. and Shibasaki, M.* *J. Org. Chem.* **2013**, *78*, 4019-4026. (10.1021/jo400360j)
- (11) Streamlined Catalytic Asymmetric Synthesis of Atorvastatin
Kawato, Y.; Chaudhary, S.; Kmagai, N.* and Shibasaki, M.* *Chem. Eur. J.* **2013**, *19*, 3802-3806. (10.1002/chem.201204609)
- (12) Direct Catalytic Asymmetric Alkynylation of Ketoimines
Yin, L.; Otsuka, Y.; Takada, H.; Mouri, S.; Yazaki, R.; Kumagai, N.* and Shibasaki, M.* *Org. Lett.* **2013**, *15*, 698-701. (10.1021/ol3035609)
- (13) Direct Catalytic Asymmetric Addition of Allylic Cyanides to Aldehydes for Expedient Access to Enantioenriched Unsaturated δ -Valerolactones
Otsuka, Y.; Takada, H.; Yasuda, S.; Kumagai, N.* and Shibasaki M.* *Chem. Asian J.* **2013**, *8*, 354-358. (10.1002/asia.201201021)
- (14) Asymmetric Catalysis with Bis(hydroxyphenyl)diamides/Rare Earth Metal Complexes
Kumagai, N.* and Shibasaki, M.* *Angew. Chem., Int. Ed.* **2013**, *52*, 223-234. (10.1002/anie.201206582)
- (15) Catalytic Chemical Transformations with Conformationally Dynamic Catalytic Systems
Kumagai, N.* and Shibasaki, M.* *Catal. Sci. Technol.* **2013**, *3*, 41-57.
- (16) Direct Asymmetric α -Allylation of Ketones with Allylic Alcohols via Pd/Enamine Cooperative Function
Yasuda, S.; Kumagai, N.*; Shibasaki, M.* *Heterocycles* **2012**, *86*, 745-757. (10.3987/COM-12-S(N)34)
- (17) Catalytic Asymmetric Conjugate Addition of Thiols to α,β -Unsaturated Thioamides: Expedient Access to Enantioenriched 1,5-Benzothiazepines
Ogawa, T.; Kumagai, N.*; Shibasaki, M.* *Angew. Chem., Int. Ed.* **2012**, *51*, 8551-8554. (10.1002/anie.201204365)
- (18) *anti*-Selective Direct Catalytic Asymmetric Aldol Reaction of Thiolactams
Sureshkumar, D.; Kawato, Y.; Iwata, M.; Kumagai, N.*; Shibasaki, M.* *Org. Lett.* **2012**, *14*, 3108-3111. (10.1021/ol301200q)
- (19) A Direct Catalytic Asymmetric Aldol Reaction of α -Sulfanyl Lactones: Efficient Synthesis of SPT Inhibitors
Takechi, S.; Yasuda, S.; Kumagai, N.* and Shibasaki, M.* *Angew. Chem., Int. Ed.* **2012**, *51*, 4218-4222. (10.1002/anie.201200520)

- (20) Reversible Heterochiral Aggregation/Dissociation of Bis(2-hydroxyphenyl)diamides Driven by UV/Vis Irradiation
Nojiri, A.; Kumagai, N.* and Shibasaki, M.* *Angew. Chem., Int. Ed.* **2012**, *51*, 2137-2141. (10.1002/anie.201106832)
- (21) Intermediate as Catalyst; Catalytic Asymmetric Conjugate Addition of Nitroalkanes to α,β -Unsaturated Thioamides
Ogawa, T.; Mouri, S.; Yazaki, R.; Kumagai, N.* and Shibasaki, M.* *Org. Lett.* **2012**, *14*, 110-113. (10.1021/ol202898e)
- (22) Cooperative Catalysis Using Thioamides Toward Truly Practical Organic Synthesis
Kumagai, N.* and Shibasaki, M.* *Isr. J. Chem.* **2012**, *52*, 604-612.
- (23) Chapter 4.14: Reactions Using Thioamide and Allylic Cyanides” In *Comprehensive Chirality*, Eds. Carreira E. M. and Yamamoto H., , **2012**,
Kumagai, N.

[著書]

- (1) Kumagai, N. In *Comprehensive Chirality*; Carreira E. M. and Yamamoto H., Eds.; Chapter 4.14: Reactions Using Thioamide and Allylic Cyanides; Elsevier: Amsterdam, y2012; Chapter 4.14.

2. 学会発表等（国内外の招待講演および国際会議での発表状況）

- (1) Cooperative Asymmetric Catalysis and Its Application to Efficient Synthesis of Therapeutics
熊谷 直哉, 第24回新薬創製談話会, 沼津, 2013.9.25（招待講演）
- (2) Cooperative Asymmetric Catalysis and Its Application to Efficient Synthesis of Therapeutics
Kumagai, N. University of Freiburg, Freiburg, Germany, 2013.6.24（招待講演）
- (3) Cooperative Asymmetric Catalysis and Its Application to Efficient Synthesis of Therapeutics
Kumagai, N. Technical University of Berlin, Berlin, Germany, 2013.6.21（招待講演）
- (4) 協奏機能型不斉触媒の開発と医薬品合成への応用
熊谷 直哉, 九州大学薬学部, 福岡, 2013.5.16（招待講演）
- (5) Cooperative Asymmetric Catalysis and Its Application to Efficient Synthesis of Therapeutics
Kumagai, N. University of Geneva, Geneva, Switzerland, 2013.5.10（招待講演）

- (6) Cooperative Asymmetric Catalysis and Its Application to Efficient Synthesis of Therapeutics
Kumagai, N. ETH Zurich, Zurich, Switzerland, 2013.5.3 (招待講演)
- (7) Cooperative catalysis for enantioselective C-C bond formation
Kumagai, N. The 11th International Symposium on Advanced Technology (ISAT-Special), Kogakuin University, Hachioji, Tokyo, 2012.10.30 (招待講演)
- (8) Soft lewis acid/hard bronsted base cooperative asymmetric catalysis
Kumagai, N. University of Cologne, Germany, 2012.6.25 (招待講演)
- (9) Soft lewis acid/hard bronsted base cooperative asymmetric catalysis
Kumagai, N. RWTH Aachen University, Germany, 2012.6.23 (招待講演)
- (10) Soft lewis acid/hard bronsted base cooperative asymmetric catalysis
Kumagai, N. Bielefeld University, Germany, 2012.6.13 (招待講演)
- (11) Soft lewis acid/hard bronsted base cooperative asymmetric catalysis
Kumagai, N. University of Texas at El Paso, TX, USA, 2012.6.22 (招待講演)
- (12) Soft lewis acid/hard bronsted base cooperative asymmetric catalysis
Kumagai, N. University of Texas at Austin, TX, USA, 2012.6.21 (招待講演)
- (13) Soft lewis acid/hard bronsted base cooperative asymmetric catalysis
Kumagai, N. University of California Berkeley, CA, USA, 2012.6.19 (招待講演)

3. 特許

- (1) 化合物、及びその製造方法、並びにポリコナゾールの製造方法
公益財団法人微生物化学研究会, 田村圭司, 熊谷直哉, 柴崎正勝
特願 JP2013-191653, 2013.9.17
- (2) 化合物、及びその製造方法、並びに光学活性 α -アミノホスホン酸誘導体の製造方法
公益財団法人微生物化学研究会, Liang Yin, Youmei Bao, 熊谷直哉, 柴崎正勝
特願 JP2013-134633, 2013.6.27
- (3) 触媒、及び光学活性アンチ-1,2-ニトロアルカノール化合物の製造方法
公益財団法人微生物化学研究会, 小川貴徳, 熊谷直哉, 柴崎正勝
特願 JP2013-026234, 2013.2.14
- (4) 化合物、及びその製造方法、並びにリン酸オセルタミビルの製造方法
公益財団法人微生物化学研究会, 古舘信, Alagiri Kaliyamoorthy, 山次健三,
熊谷直哉, 渡邊匠, 柴崎正勝
特願 JP2012-266285, 2012.12.5

- (5) 化合物、該化合物の製造方法、アセテート誘導体の製造方法、及びアトルバスタチンの製造方法、並びに不斉配位子の回収方法
公益財団法人微生物化学研究会, 川戸勇士, 熊谷直哉, 柴崎正勝
特願 JP2012-223349, 2012.10.5

4. 学会・シンポジウム等の開催状況

なし。

5. 受賞等

- (1) 熊谷直哉
文部科学大臣表彰若手科学者賞, 2013.
- (2) 熊谷直哉
Thieme Chemistry Journal Award, 2013.
- (3) 熊谷直哉
Banyu Chemist Award (BCA), 万有生命科学振興国際交流財団、2012.10.22

6. 新聞報道等

- (1) 微化研と J S T、再利用性と高機能性の不斉触媒を論文発表、カーボンナノチューブで自己組織化
柴崎正勝, 日経バイオテク (net), 2013.4.22
- (2) ナノチューブで触媒効率化＝医薬品開発への応用期待－微生物化学研
柴崎正勝, 時事ドットコム (net), 2013.4.22
- (3) 不斉触媒 CNT 用い再利用実現－活性も向上－医薬品合成に貢献
柴崎正勝, 化学工業日報1面, 2013.4.23
- (4) 不斉触媒 CNT に封じ込め－再利用・活性向上を実現－微生物化研
柴崎正勝, 日刊工業新聞21面, 2013.4.23
- (5) ナノチューブ使い薬を効率よく合成
柴崎正勝, 日本経済新聞16面, 2013.4.23
- (6) 触媒の性能向上－筒状炭素分子混ぜ－表面積増やす 微生物化学研
柴崎正勝, 日経産業新聞9面, 2013.4.23
- (7) リンザ製造効率アップ－微生物研触媒にカーボンナノチューブ
柴崎正勝, 毎日新聞26面, 2013.4.24

7. 国民との科学・技術対話

なし。

8. 領域内の共同研究の準備・実施状況とその成果

(1) 共同研究先：東京大学，小林研究室（A01 班，公募班員，宮村浩之）

派遣人員（派遣）：熊谷直哉（主席研究員），小川貴徳（研究生）

派遣期間（派遣）：2013.1.18

共同研究内容：透過型電子顕微鏡(TEM)を用いた MWNT 固定型触媒の局所構造
観測

共同研究成果：MWNT の網目状ネットワークに Nd/Na 異種 2 核触媒が存在して
いることを明らかにした。