

平成24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) Two Approaches toward the Formal Total Synthesis of Oseltamivir Phosphate (Tamiflu<sup>®</sup>): Catalytic Enantioselective Three-Component Reaction Strategy and L-Glutamic Acid Strategy.  
Alagiri, K.; Furutachi, M.; Yamatsugu, K.; Kumagai, N.; Watanabe, T.\*; Shibasaki, M.\*  
*J. Org. Chem.* **2013**, in press.
- (2) Streamlined Catalytic Asymmetric Synthesis of Atorvastatin.  
Kawato, Y.; Chaudhary, S.; Kumagai, N.\*; Shibasaki, M.\* *Chem. Eur. J.* **2013**, in press.
- (3) Direct Catalytic Asymmetric Alkynylation of Ketoimines.  
Yin, L.; Otsuka, Y.; Takada, H.; Mouri, S.; Yazaki, R.; Kumagai, N.\*; Shibasaki, M.\* *Org. Lett.* **2013**, *15*, 698-701.
- (4) Direct Catalytic Asymmetric Addition of Allylic Cyanides to Aldehydes for Expedient Access to Enantioenriched Unsaturated  $\delta$ -Valerolactones.  
Otsuka, Y.; Takada, H.; Yasuda, S.; Kumagai, N.\*; Shibasaki, M.\* *Chem. Asian J.* **2013**, *8*, 354-358.
- (5) Asymmetric Catalysis with Bis(hydroxyphenyl)diamides/Rare Earth Metal Complexes.  
Kumagai, N.\*; Shibasaki, M.\* *Angew. Chem., Int. Ed.* **2013**, *52*, 223-234.
- (6) Catalytic Chemical Transformations with Conformationally Dynamic Catalytic Systems.  
Kumagai, N.\*; Shibasaki, M.\* *Catal. Sci. Technol.* **2013**, *3*, 41-57.
- (7) Direct Asymmetric  $\alpha$ -Allylation of Ketones with Allylic Alcohols via Pd/Enamine Cooperative Function  
Yasuda, S.; Kumagai, N.\*; Shibasaki, M.\* *Heterocycles* **2012**, *86*, 745-757.
- (8) Catalytic Asymmetric Conjugate Addition of Thiols to  $\alpha,\beta$ -Unsaturated Thioamides: Expedient Access to Enantioenriched 1,5-Benzothiazepines.  
Ogawa, T.; Kumagai, N.\*; Shibasaki, M.\* *Angew. Chem., Int. Ed.* **2012**, *51*, 8551-8554.
- (9) *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) Concise Enantioselective Synthesis of Duloxetine via Direct Catalytic Asymmetric Aldol Reaction of Thioamide.  
Suzuki, Y.; Iwata, M.; Yazaki, R.; Kumagai, N.\*; Shibasaki, M.\* *J. Org. Chem.* **2012**, *77*, 4496-4500.

- (11) A Direct Catalytic Asymmetric Aldol Reaction of  $\alpha$ -Sulfanyl Lactones: Efficient Synthesis of SPT Inhibitors.  
Takechi, S.; Yasuda, S.; Kumagai, N.\*; Shibasaki, M.\* *Angew. Chem., Int. Ed.* **2012**, *51*, 4218-4222.
- (12) Reversible Heterochiral Aggregation/Dissociation of Bis(2-hydroxyphenyl)diamides Driven by UV/Vis Irradiation.  
Nojiri, A.; Kumagai, N.\*; Shibasaki, M.\* *Angew. Chem., Int. Ed.* **2012**, *51*, 2137-2141.
- (13) Catalytic Asymmetric *anti*-Selective Nitroaldol Reaction En Route to Zanamivir  
Nitabaru, T.; Kumagai, N.\*; Shibasaki, M.\* *Angew. Chem., Int. Ed.* **2012**, *51*, 1644-1647.
- (14) Intermediate as Catalyst; Catalytic Asymmetric Conjugate Addition of Nitroalkanes to  $\alpha,\beta$ -Unsaturated Thioamides”  
Ogawa, T.; Mouri, S.; Yazaki, R.; Kumagai, N.\*; Shibasaki, M.\* *Org. Lett.* **2012**, *14*, 110-113.
- (15) Cooperative Catalysis Using Thioamides Toward Truly Practical Organic Synthesis  
Kumagai, N.\*; Shibasaki, M.\* *Isr. J. Chem.* **2012**, *52*, 604-612.
- (16) “Chapter 4.14: Reactions Using Thioamide and Allylic Cyanides” In *Comprehensive Chirality*, Eds. Carreira E. M. and Yamamoto H., Elsevier, Amsterdam (**2012**)  
Kumagai, N.

## 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 catalysis for enantioselective C-C bond formation.  
Naoya Kumagai and Masakatsu Shibasaki, The 11th International Symposium on Advanced Technology, 工学院大学, 2012年10月30日（依頼講演）.
- (2) Soft Lewis acid/hard Brønsted base cooperative asymmetric catalysis.  
Naoya Kumagai, University of Cologne, Germany, 2012 Jul 25（依頼講演）.
- (3) Soft Lewis acid/hard Brønsted base cooperative asymmetric catalysis.  
Naoya Kumagai, RWTH Aachen University, Germany, 2012 Jul 23（依頼講演）.
- (4) Direct Catalytic Asymmetric Aldol Reaction of  $\alpha$ -Sulfanyl Lactones for Efficient Synthesis of SPT Inhibitors  
Sho Takechi, Shigeo Yasuda, Naoya Kumagai, Masakatsu Shibasaki, BOSS XIII, Leuven (Belgium) 2012 Jul 17（ポスター発表）.
- (5) Reversible Heterochiral Aggregation/Dissociation of Bis(2-hydroxyphenyl)diamides Driven by UV/Vis Irradiation and its Application to Catalysis  
Akihiro Nojiri, Naoya Kumagai, Masakatsu Shibasaki, BOSS XIII, Leuven (Belgium) 2012 Jul 17（ポスター発表）.

- (6) A Synthesis of Tamiflu Employing the Copper(I)-Catalyzed Asymmetric 3-Component Reaction  
Kenzo Yamatsugu, Makoto Furutachi, Naoya Kumagai, Masakatsu Shibasaki, BOSS XIII, Leuven (Belgium) 2012 Jul 17 (ポスター発表).
- (7) Enantioselective Synthesis of Zanamivir via *anti*-Selective Catalytic Asymmetric Nitroaldol Reaction  
Tatsuya Nitabaru, Naoya Kumagai, Masakatsu Shibasaki, BOSS XIII, Leuven (Belgium) 2012 Jul 17 (ポスター発表).
- (8) Soft Lewis acid/hard Brønsted base cooperative asymmetric catalysis.  
Naoya Kumagai, Bielefeld University, Germany, 2012 Jul 13 (依頼講演).
- (9) Reversible Heterochiral Aggregation and Its Application to Regulated Catalysis  
Naoya Kumagai, Akihiro Nojiri, Akinobu Matsuzawa, Masakatsu Shibasaki, Gordon Research Conference on Bioinspired Materials, Davidson University, NC, USA, 2012 Jun 26 (ポスター発表).
- (10) Soft Lewis acid/hard Brønsted base cooperative asymmetric catalysis.  
Naoya Kumagai, University of Texas at El Paso, TX, USA, 2012 Jun 22 (依頼講演).
- (11) Soft Lewis acid/hard Brønsted base cooperative asymmetric catalysis.  
Naoya Kumagai, University of Texas at Austin, TX, USA, 2012 Jun 21 (依頼講演).
- (12) Soft Lewis acid/hard Brønsted base cooperative asymmetric catalysis.  
Naoya Kumagai, University of California Berkeley, CA, USA, 2012 Jun 19 (依頼講演).
- (13) Soft Lewis Acid/Hard Brønsted Base Cooperative Asymmetric Catalysis  
Naoya Kumagai, Shenyang Pharmaceutical University, Shenyang China, 2012 May 17 (依頼公演).
- (14) Rare Earth Metal/Amide-based Ligand Complexes: Asymmetric Catalysis and Their Application  
Naoya Kumagai, Shenyang Pharmaceutical University, Shenyang China, 2012 May 16 (依頼公演).
- (15) Enantioselective Synthesis of Zanamivir via *anti*-Selective Catalytic Asymmetric Nitroaldol Reaction  
Naoya Kumagai, Tatsuya Nitabaru, Masakatsu Shibasaki, World Congress of Catalytic Asymmetric Synthesis, Beijing China, 2012 May 13 (依頼講演).

### 3. 特許

- (1) 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
- (2) 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
- (3) 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) Naoya Kumagai  
2013 Thieme Chemistry Journal Award, Georg Thieme Verlag, 2013.
- (2) 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

なし

### 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

なし