

平成22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) Vicinal C-Functionalization of Alkenes. Pd/Light-Induced Multi-Component Coupling Reactions Leading to 4-Keto Esters and Lactones
Fusano, A.; Sumino, S.; Fukuyama, T.; Ryu, I.* *Org. Lett.* in press.
- (2) Radical Carbonylation of ω -Alkynylamines Leading to α -Methylene lactams. Synthetic Scope and the Mechanistic Insights
Ryu, I.*; Fukuyama, T.; Tojino, M.; Uenoyama, Y.; Yonamine, Y.; Terasoma, N.; Matsubara, H. *Org. Biomol. Chem.* in press
- (3) Efficient Iridium-Catalyzed Decarbonylation Reaction of Aliphatic Carboxylic Acids Leading to Internal or Terminal Alkenes
Maetani, S.; Fukuyama, T.; Suzuki, N.; Ishihara, D.; Ryu, I.* *Organometallics* **2011**, 30, 1389–1394.
- (4) Atom-Economical Synthesis of Unsymmetrical Ketones through Photocatalyzed CH Activation of Alkanes and Coupling with CO and Electrophilic Alkenes
Ryu, I.*; Tani, A.; Fukuyama, T.; Ravelli, D.; Fagnoni, M.; Albini, A. *Angew. Chem. Int. Ed* **2011**, 50, 1869–1872.
- (5) Microflow photo-radical chlorination of cycloalkanes
Matsubara, H.; Hino, Y.; Tokizane, M.; Ryu, I.* *Chemical Engineering Journal* **2011**, 167, 567–571.
- (6) Monolithic and Flexible Polyimide Film Microreactors for Organic Microchemical Applications Fabricated by Laser Ablation
Min, K. I.; Lee, T. H.; Park, C. P.; Wu, Z. W.; Girault, H. H.; Ryu, I.*; Fukuyama, T.; Mukai, Y.; Kim, D. P. *Angew. Chem. Int. Ed.* **2010**, 49, 7063–7067.
- (7) Regioselective Synthesis of 1-Bromo-1,4-dienes by Free-Radical-Mediated Bromoallylation of Activated Acetylenes
Kippo, T.; Fukuyama, T.; Ryu, I.* *Org. Lett.* **2010**, 12, 4006–4009.
- (8) Diastereoselective [2+2] Photocycloaddition of Chiral Cyclic Enone and Cyclopentene Using a Microflow Reactor System
Tsutsumi, K.; Terao, K.; Yamaguchi, H.; Yoshimura, S.; Morimoto, T.; Kakiuchi, K.; Fukuyama, T.; Ryu, I.* *Chem. Lett.* **2010**, 39, 828–829.
- (9) Thermal Retro-Aldol Reaction Using Fluorous Ether F-626 as a Reaction Medium
Fukuyama, T.; Kawamoto, T.; Okamura, T.; Denichoux, A.; Ryu, I.* *Synlett* **2010**, 14, 2193–2196.
- (10) A Photoirradiative Phase-Vanishing Method: Efficient Generation of HBr from Alkanes and Molecular Bromine and Its Use for Subsequent Radical Addition to Terminal Alkenes
Matsubara, H.; Tsukida, M.; Ishihara, D.; Kuniyoshi, K.; Ryu, I.* *Synlett* **2010**, 13, 2014–2018.

- (11) Synthesis of Functionalized Resorcinols by Rhodium-Catalyzed [5+1] Cycloaddition Reaction of 3-Acyloxy-1,4-Enynes with CO
Brancour, C.; Fukuyama, T.; Ohta, Y.; Ryu, I.*; Dhimane, A. L.; Fensterbank, L.; Malacria, M. *Chem. Commun.* **2010**, 46, 5470–5472.
- (12) Synthesis of Alkyl Alkynyl Ketones by Pd/Light-Induced Three-Component Coupling Reactions of Iodoalkanes, CO, and 1-Alkynes
Fusano, A.; Fukuyama, T.; Nishitani, S.; Inouye, T.; Ryu, I.* *Org. Lett.* **2010**, 12, 10, 2410–2413.
- (13) Stannylcarbonylation of Hydroxy-substituted Alkynes. Intramolecular Trapping of α -Ketenyl Radicals by a Hydroxy Group Leading to Lactols
Ryu, I.*; Fukuyama, T.; Nobuta, O.; Uenoyama, Y. *Bull. Korean Chem. Soc.* **2010**, 31, 3, 545–546.
- (14) Synthesis of 2-Hydroxymethyl Ketones by Ruthenium Hydride-Catalyzed Cross-Coupling Reaction of α,β -Unsaturated Aldehydes with Primary Alcohols
Denichoux, A.; Fukuyama, T.; Doi, T.; Horiguchi, J.; Ryu, I.* *Org. Lett.* **2010**, 12, 1-3.

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) 「オキシ-Favorskii 転位を用いる双環性置換エーテル化合物の立体選択的構築手法」
木下達弘, 小林正治, 片山達矢, 和田昌人, 益山新樹, 柳日馨
日本化学会第 91 春季年会, 神奈川県横浜市, 2011.3.26-29
- (2) 21 世紀の化学製造はフロー系で: 巨大プラントとの決別
柳日馨, 大阪府立大学理学部公開セミナー; 21 世紀における化学のあるべき姿とは, 大阪, 2011.1.22 (招待講演).
- (3) Energy-Saving Photoreaction System Using Microreactor and Compact Light Source
Fukuyama, T.; Ryu, I. The 2010 International Chemical Congress of Pacific Basin Societies (Pacifichem 2010), Honolulu, Hawaii, USA, 2010.12.15-20 (招待講演).
- (4) Continuous Catalyst Recycling System Using Microreactor and Ionic Liquid, and Its Application to 100-Gram Scale Synthesis of Matrix Metalloproteinase Inhibitor's Precursor
Fukuyama, T.; Rahman, M. T.; Ryu, I. The 2010 International Chemical Congress of Pacific Basin Societies (Pacifichem 2010), Honolulu, Hawaii, USA, 2010.12.15-20 (口頭発表).
- (5) One-Pot Synthesis of Substituted 1,4-Dienes via the Consecutive Radical-Mediated Bromoallylation of Alkynes and Pd-catalyzed Cross-Coupling Reactions
Kippo, T.; Fukuyama, T.; Ryu, I. The 2010 International Chemical Congress of Pacific Basin Societies (Pacifichem 2010), Honolulu, Hawaii, USA, 2010.12.15-20 (ポスター発表).

- (6) Organocatalytic Enantioselective Synthesis of Nitrogen-Substituted Dihydropyran-2-ones, a Key Synthetic Intermediate of 1 β -Methylcarbapenems
Kinoshita, T.; Kobayashi, S.; Uehara; H. Sudo, T.; Masuyama, A.; Ryu, I. The 2010 International Chemical Congress of Pacific Basin Societies (Pacifichem 2010), Honolulu, Hawaii, USA, 2010.12.15-20 (ポスター発表).
- (7) Application of a Continuous Microflow System to Radical Multi-Component Reactions
Fusano, A.; Fukuyama, T.; Ryu, I. The 2010 International Chemical Congress of Pacific Basin Societies (Pacifichem 2010), Honolulu, Hawaii, USA, 2010.12.15-20 (ポスター発表).
- (8) Pd/light Induced Radical Multi-Component Reactions
Fusano, A.; Fukuyama, T.; Ryu, I. The 2010 International Chemical Congress of Pacific Basin Societies (Pacifichem 2010), Honolulu, Hawaii, USA, 2010.12.15-20 (ポスター発表).
- (9) Photocatalytic Radical Carbonylation Reaction at C-H Bond Using Tetrabutylammonium Decatungstate (TBADT)
Tani, A.; Fukuyama, T.; Ryu, I.; Fagnoni, M. The 2010 International Chemical Congress of Pacific Basin Societies (Pacifichem 2010), Honolulu, Hawaii, USA, 2010.12.15-20 (ポスター発表).
- (10) Nitroxide-Mediated Radical Polymerization of Methyl Methacrylate Using a Microflow Reactor
Kajihara, Y.; Fukuyama, T.; Ryu, I.; Studer, A. The 2010 International Chemical Congress of Pacific Basin Societies (Pacifichem 2010), Honolulu, Hawaii, USA, 2010.12.15-20 (ポスター発表).
- (11) Koch-Haaf Reaction Using a Hastelloy-Made Microreactor
Mukai, Y.; Fukuyama, T.; Ryu, I. The 2010 International Chemical Congress of Pacific Basin Societies (Pacifichem 2010), Honolulu, Hawaii, USA, 2010.12.15-20 (ポスター発表).
- (12) Oxy-Favorskii Rearrangement as a Tool for the Synthesis of Stereochemically Defined Bicyclic Ethers and Its Application to the Total Synthesis of (\pm)-Communiol E
Kobayashi, S.; Kinoshita, T.; Kawamoto, T.; Masuyama, A.; Ryu, I. The 2010 International Chemical Congress of Pacific Basin Societies (Pacifichem 2010), Honolulu, Hawaii, USA, 2010.12.15-20 (ポスター発表).

- (13) Diastereoselective [2+2] Photocycloaddition of Chiral Cyclic Enone and Cyclopentene Using a Microflow Reactor System
Terao, K.; Tsutsumi, K.; Yamaguchi, H.; Yoshimura, S.; Nishiyama, Y.; Morimoto, T.; Kakiuchi, K.; Fukuyama, T.; Ryu, I. The 2010 International Chemical Congress of Pacific Basin Societies (Pacifichem 2010), Honolulu, Hawaii, USA, 2010.12.15-20 (ポスター発表).
- (14) マイクロリアクターによる連続フロー型有機合成の進歩
柳日馨, マイクロ化学プロセス分科会講演会, 東京, 2010.11.26 (招待講演).
- (15) 一酸化炭素を組み込む多成分連結反応の新展開
柳日馨, 第27回有機合成夏期セミナー, 神戸, 2010.9.2 (招待講演).
- (16) Regioselective Synthesis of 1-Bromo-1,4-Dienes: Radical Bromoallylation of Terminal Acetylenes
Kippo, T.; Fukuyama, T.; Ryu, I. The Sixth International Symposium on Integrated Synthesis (ISIS-6), Maiko Villa Kobe, Kobe, Japan 2010. 8. 23-24 (ポスター発表).
- (17) Radical Carbonylation under Atmospheric Pressure of CO. Tin-Free Hydroxymethylation of Alkyl Iodides
Kobayashi, S.; Kawamoto, T.; Uehara, S.; Fukuyama, T.; Ryu, I. The Sixth International Symposium on Integrated Synthesis (ISIS-6), Maiko Villa Kobe, Kobe, Japan 2010. 8. 23-24 (ポスター発表).
- (18) Pd/Light Induced Radical Multi-Component Coupling Reactions
Fusano, A.; Fukuyama, T.; Sumino, S.; Ryu, I. The Sixth International Symposium on Integrated Synthesis (ISIS-6), Maiko Villa Kobe, Kobe, Japan 2010. 8. 23-24 (ポスター発表).
- (19) Stereoselective Synthesis of the 2-Substituted Bicyclic Ethers through Oxy-Favorskii Rearrangement
Kinoshita, T.; Kobayashi, S.; Katayama, T.; Wada, M.; Kawamoto, T.; Masuyama, A.; Ryu, I. The Sixth International Symposium on Integrated Synthesis (ISIS-6), Maiko Villa Kobe, Kobe, Japan 2010. 8. 23-24 (ポスター発表).
- (20) Some Unique Anionic Strategies for Multi-Component Coupling Reactions
Ryu, I. 9th International Symposium on Carbanion Chemistry, Florence, Italy, 2010, 7. 20-24 (招待講演).
- (21) Acyl Radicals from Alkanes by a Tandem Photocatalytic C-H Activation/Carbonylation Process.
Ryu, I. Tani, A.; Fukuyama, T.; Ravelli, D.; Fagnoni, M.; Albini, A. EUCHEM Conference on Organic Free Radical, Bologna, Italy, 2010, 7. 1-2 (ポスター発表).

3. 特許

なし

4. 学会・シンポジウム等の開催状況

- (1) The 2010 International Chemical Congress of Pacific Basin Societies (Pacifichem 2010), Achieving Efficiency in Organic Reactions via Greener Processes and Practices (#139) Honolulu, Hawaii, USA, 2010.12.15-20 (Ilhyong Ryu, Chief Organizer)
- (2) 大阪府立大学 21 世紀科学研究機構 第 1 回マイクロリアクターシステム研究所シンポジウム, 大阪府立大学, 2011.7.29 (柳日馨, 研究所長).
- (3) 大阪府立大学 21 世紀科学研究機構 第 2 回マイクロリアクターシステム研究所シンポジウム, 大阪府立大学, 2011.11.11 (柳 日馨, 研究所長).

5. 受賞等

なし

6. 新聞報道等

Introduced in Organic Chemistry Portal.

Taber, D. F. *Org. Chem. Highlights* **2011**, February 21.

Black-Light-Induced Radical/Ionic Hydroxymethylation of Alkyl Iodides with Atmospheric CO in the Presence of Tetrabutylammonium Borohydride. Kobayashi, S.; Kawamoto, T.; Uehara, S.; Fukuyama, T.; Ryu, I. *Org. Lett.* **2010**, 12 (7), 1548.

7. 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：京都大学，辻研究室（A03 班，公募班員）（準備中）
派遣人員（派遣）：（隅野修平，修士 1 年）（予定）
派遣期間（派遣）：2011.6.20-2011.6.30（予定）
共同研究内容：フルオラスポリエーテルを有するフルオラス配位子の合成と触媒反応への利用
共同研究成果：

8. その他特記事項

なし