

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) Triplet Diphenylcarbene Protected by Iodine and Bromine Groups
Hirai, K.;* Bessho, K.; Kitagawa, T.; Tomioka, T. *J. Phys. Org. Chem.* **2010**, *23*, 347-356.
(10.1002/poc.1651)
- (2) Stable-Ion NMR Spectroscopy and GIAO-DFT Study of Carbocations Derived from Multibridged [3n]Cyclophanes
Laali, K. K.;* Okazaki, T.; Kitagawa, T.; Shinmyozu, T. *Eur. J. Org. Chem.* **2009**,
4451-4457. (10.1002/ejoc.200901453)
- (3) Self-Sensitized Photooxygenation of a C₆₀-Cycloheptatriene Dyad to Form Norcaradiene-Derived Endoperoxides
Hanamura, M.; Kamada, J.; Amano, A.; Takeuchi, K.; Okazaki, T.; Hirai, K. Kitagawa, T.* *Eur. J. Org. Chem.* **2010**, 3257-3264. (10.1002/ejoc.200901453)
- (4) Cyclobutadieneiron Tricarbonyl Annelated with Homoadamantene Frameworks,
Minegishi, S.; Komatsu, K.; Kitagawa, T.*
Organometallics **2011**, *30*, 1002-1007. (10.1021/om101054d)
- (5) Allyl Radical Nature of a Phenylcyclopentadienyl Radical Annelated with Two Homoadamantene Frameworks
Ogawa, K.; Komatsu, K.; Kitagawa, T.* *J. Org. Chem.* **2011**, *76*, 6095-6100.
(10.1021/jo200748m)
- (6) Generation and Reactivities of Triplet Diphenylcarbenes Protected by Bulky Groups as *para* Substituents
Hirai, K.;* Hatanaka, K.; Yamaguchi, T.; Miyajima, A.; Kitagawa, T.;* Tomioka, H. *J. Phys. Org. Chem.* **2011**, *24*, 909-920. (10.1002/poc.1898)
- (7) Ideal Redox Behavior of the High-density Self-assembled Monolayer of a Molecular Tripod on a Au(111) Surface with a Terminal Ferrocene Group
Kitagawa, T.*; Matsubara, H.; Komatsu, K.; Hirai, K.; Okazaki, T.; Hase, T. *Langmuir*, **2013**, *29*, 4275-4282. (10.1021/la305092g)
- (8) NMR and DFT Study on Onium Ions Derived from Substituted Fluoranthenes and Benzo[k]fluoranthenes
Okazaki, T.*; Adachi, T.; Kitagawa, T.* *Bull. Chem. Soc. Jpn.*, **2013**, *86*, 464-471.
(10.1246/bcsj.20120308)

- (9) Tailoring Electronic States of a Single Molecule Using Adamantane-based Molecular Tripods
Katano, S.;* Kim, Y.; Kitagawa, T.; Kawai, M. *Phys. Chem. Chem. Phys.*, **2013**, *15*, 14229-14233. (10.1039/c3cp51612a)
- (10) Single Molecule Study of the Electronic Structures of Molecular Tripods with Functional Units
Katano, S.;* Kim, Y.; Kitagawa, T.; Kawai, M. *J. Vac. Soc. Jpn.*, **2014**, in press.

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) A Dyad Consisting of Tripod-shaped Trithiol and Ferrocene: Preparation and Electrochemical Property of Self-assembled Monolayer on Au(111)
Kitagawa, T. 12th Kyushu International Symposium on Physical Organic Chemistry, Fukuoka, Japan, 2009.12.15-18 (口頭発表)
- (2) Stable-Ion and GIAO-DFT Study of Carbocations Derived From Multi-bridged [3n] (n = 3, 4, and 5) Cyclophanes
Okazaki, T.; Kitagawa, T.; Shinmyozu, T.; Laali, K. K. 12th Kyushu International Symposium on Physical Organic Chemistry, Fukuoka, Japan, 2009.12.15-18 (ポスター発表)
- (3) Experimental and DFT Studies of Carbocations Derived from Hetero-Polycyclic Aromatic Hydrocarbons: Dibenzofuran and Dinaphthofuran
Okazaki, T.; Nakagawa, M.; Kitagawa, T.; Laali, K. K. 13th International Symposium on Novel Aromatic Compounds (ISNA-13), Luxembourg, Grand-Duchy of Luxembourg, 2009.7.19-24 (ポスター発表)
- (4) 自己組織化単分子膜の化学変換と機能化
北川敏一 , 東海コンファレンス 2010 , 三重大学 , 2010 年 12 月 10 日 (招待講演) .
- (5) Persistent Triplet Diphenylcarbenes: Steric Protection by Ortho or Para-substituents
Hirai, K.; Kitagawa, T.; Tomioka, H. The 2010 International Chemical Congress of Pacific Basin Societies (Pacifichem 2010), Honolulu, Hawaii, USA, 2010.12.15-20 (招待講演) .
- (6) Self-assembled Monolayers of Dyads Consisting of Tripod-shaped Trithiol and Ferrocene on Au(111)
Kitagawa, T. The 2010 International Chemical Congress of Pacific Basin Societies (Pacifichem 2010), Honolulu, Hawaii, USA, 2010.12.15-20 (口頭発表) .
- (7) Synthesis of Hexa-Substituted Benzene Derivatives by an Aldol Cyclotrimerization Reaction in Ionic Liquids

Nakanishi, R.; Okazaki, T.; Kitagawa, T. The 2010 International Symposium for Sustainability by Engineering at MIU (IS2EMU 2011), Tsu, Japan, 2011.12.1-2 (ポスター発表) .

- (8) Molecular Elongation by Repeated Cross-coupling Reactions on the Self-assembled Monolayer of a Tripod-shaped Trithiol and Electrochemical Determination of Product Yield

Umemura, H.; Kitagawa, T. The 2nd International Symposium for Sustainability by Engineering at MIU (IS2EMU 2012), Tsu, Japan, 2012.11.1-2 (ポスター発表) .

- (9) Self-assembled Monolayers of Ferrocene Bound to Au(111) Surface through Tripod-shaped Trithiol and Oligo(*p*-phenyleneethynylene) Bridge

Kitagawa, T.; Hase, T.; Tanaka, T.; Umemura, H. The 12th International Kyoto Conference on New Aspects of Organic Chemistry (IKCOC-12), Kyoto, Japan, 2012.11.12-16 (ポスター発表) .

- (10) Generation, Characterization and Reactivity of Triplet Diphenylcarbene Protected by Four Iodine Groups

Hirai, K. Tsujita, K.; Bessho, K.; Kitagawa, T. The 12th International Kyoto Conference on New Aspects of Organic Chemistry (IKCOC-12), Kyoto, Japan, 2012.11.12-16 (ポスター発表) .

- (11) Generation and Reaction Control of Persistent Triplet Diphenylcarbene in a Flow Microreactor

Okidono, K.; Kurita, S.; Hirai, K.; Kitagawa, T. The 3rd International Symposium for Sustainability by Engineering at MIU (IS2EMU 2013), Tsu, Japan, 2013.9.17-18 (ポスター発表) .

- (12) Reaction Integration of Sonogashira Couplings for Synthesis of Substituted 1,3,5-Tris[(4-benzoylphenyl)ethynyl]benzenes in Ionic Liquid

Hayashi, K.; Okazaki, T.; Kitagawa, T. The 3rd International Symposium for Sustainability by Engineering at MIU (IS2EMU 2013), Tsu, Japan, 2013.9.17-18 (ポスター発表) .

- (13) Self-assembled Monolayers of Ferrocene Bound to Au(111) Surface through Tripod-shaped Trithiol and Oligo(*p*-phenyleneethynylene) Bridge

Kitagawa, T.; Hase, T.; Tanaka, T.; Umemura, H. The 8th International Symposium on Integrated Synthesis (ISIS-8), Nara, Japan, 2013.11.29-12.1 (ポスター発表) .

- (14) Generation, Characterization and Reactivity of Triplet Diphenylcarbene Protected by Four Iodine Groups

Hirai, K.; Tsujita, K. Bessho, K.; Kitagawa, T. The 8th International Symposium on Integrated Synthesis (ISIS-8), Nara, Japan, 2013.11.29-12.1 (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) 新学術領域研究「反応集積化の合成化学 革新的手法の開拓と有機物質創成への展開」第4回若手シンポジウム(中部地区), 三重大学, 2011.6.11(北川敏一, 世話人).

5. 受賞等

なし

6. 新聞報道等

なし

7. 国民との科学・技術対話

- (1) 三重県立津高等学校スーパーサイエンススクール, 講義と実験実習
対象者: 高校生6名(男子3名, 女子3名), 2011.7.21, アンケート実施無し.
- (2) 「化学への招待」講演会. 対象者: 企業・大学研究者, 大学生, 高校生.
120名(男子90名, 女子30名), 2012.8.9, アンケート実施無し.

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: 物質・材料研究機構, 三木一司グループ(A01班, 公募班員)
共同研究内容: トリプチセン-アダマンタン三脚分子単分子膜のSTM観察
共同研究成果: 北川グループで合成した試料について三木グループでSTM測定を行い, 試行で規則配列が確認できた。この結果をもとに、平成26年9月に北川グループの大学院生1名を三木グループに派遣して精密観測データを取得する予定である。