

## 研究期間全年度 研究業績

橋本俊一（北海道大学大学院薬学研究院、A02 班 計画班員）

### 1 . 発表論文等（査読付き論文，著書，総説等の発表状況）

- (1) Highly Enantioselective Hetero-Diels-Alder Reactions between Rawal's Diene and Aldehydes Catalyzed by Chiral Dirhodium(II) Carboxamidates  
Watanabe, Y.; Washio, T.; Shimada, N.; Anada, M.; Hashimoto, S.\* *Chem. Commun.* **2009**, 7294-7296. (10.1039/B919535A)
- (2) Asymmetric Synthesis of Neolignans (-)-*epi*-Conocarpan and (+)-Conocarpan via Rh(II)-Catalyzed C-H Insertion Process and Revision of the Absolute Configuration of (-)-*epi*-Conocarpan  
Natori, Y.; Tsutsui, H.; Sato, N.; Nakamura, S.; Nambu, H.; Shiro, M.; Hashimoto, S.\* *J. Org. Chem.*, **2009**, *74*, 4418-4421. (10.1021/jo900502d)
- (3) Enantioselective Construction of 2,8-Dioxabicyclo[3.2.1]octane Ring System via [2,3]-Sigmatropic Rearrangement of Oxonium Ylide Using Chiral Dirhodium(II) Carboxylates  
Shimada, N.; Nakamura, S.; Anada, M.; Shiro, M.; Hashimoto, S.\* *Chem. Lett.* **2009**, *38*, 488-489. (10.1246/cl.2009.488)
- (4) Asymmetric Approach to the Pentacyclic Skeleton of Aspidosperma Alkaloids via Enantioselective Intramolecular 1,3-Dipolar Cycloaddition of Carbonyl Ylides Catalyzed by Chiral Dirhodium(II) Carboxylates  
Nambu, H.; Hikime, M.; Krishnamurthi, J.; Kamiya, M.; Shimada, N.; Hashimoto, S.\* *Tetrahedron Lett.* **2009**, *50*, 3675-3678. (10.1016/j.tetlet.2009.03.142)
- (5) Asymmetric Formal Synthesis of (-)-Pancreacine via Catalytic Enantioselective C-H Amination Process  
Anada, M.; Tanaka, M.; Shimada, N.; Nambu, H.; Yamawaki, M.; Hashimoto, S.\* *Tetrahedron* **2009**, *65*, 3069-3077. (10.1016/j.tet.2008.10.091)
- (6) Direct and Stereoselective Synthesis of 2-Azido-2-deoxy- $\beta$ -D-Mannosides Using the Phosphate Method  
Nakamura, S.; Tsuda, T.; Suzuki, N.; Hashimoto, S.\* *Heterocycles* **2009**, *77*, 843-848. (10.3987/COM-08-S(F)108)
- (7) Stereocontrolled Construction of 1,2-*cis*- $\alpha$ -Glycosidic Linkages Using Glycosyl Diphenyl Phosphates and Synthesis of  $\alpha$ -galactosylceramide KRN7000  
Nambu, H.; Nakamura, S.; Suzuki, N.; Hashimoto, S.\* *Trends Glycosci. Glycotechnol.* **2010**, *22*, 26-40.

- (8) The Mukaiyama Aldol and Mukaiyama-Michael Reaction Promoted by Commercially Available Molecular Sieves  
Anada, M.; Washio, T.; Watanabe, Y.; Hashimoto, S.\* *Heterocycles* **2010**, *80*, 1489-1503. (10.3987/COM-09-S(S)133)
- (9) Catalytic Asymmetric Construction of the 7-*exo*-Aryl-6,8-dioxabicyclo[3.2.1]octane Framework of Psoracorylifols B and C Using a Carbonyl Ylide Cycloaddition Strategy  
Kurosaki, Y.; Shimada, N.; Anada, M.; Nambu, H.; Hashimoto, S.\* *Bull. Korean Chem. Soc.* **2010**, *31*, 694-696. (10.5012/bkcs.2010.31.03.694)
- (10) Asymmetric Intermolecular N-H Insertion Reaction of Phenyl diazoacetates with Anilines Catalyzed by Achiral Dirhodium(II) Carboxylates and Cinchona Alkaloids  
Saito, H.; Uchiyama, H.; Miyake, M.; Anada, M.; Hashimoto, S.\*; Takabatake, T.; Miyairi, S. *Heterocycles* **2010**, *81*, 1149-1155. (10.3987/COM-10-11930)
- (11) Catalytic Asymmetric Synthesis of the *endo*-6-Aryl-8-oxabicyclo[3.2.1]oct-3-en-2-one Natural Product from *Ligusticum Chuanxing* via 1,3-Dipolar Cycloaddition of a Formyl-Derived Carbonyl Ylide Using Rh<sub>2</sub>(*S*-TCPTTL)<sub>4</sub>  
Shimada, N.; Hanari, T.; Kurosaki, Y.; Takeda, K.; Anada, M.; Nambu, H.; Shiro, M.; Hashimoto, S.\* *J. Org. Chem.* **2010**, *75*, 6039-6042. (10.1021/jo101175b)
- (12) A Polymer-Supported Chiral Dirhodium(II) Complex: Highly Durable and Recyclable Catalyst for Asymmetric Intramolecular C-H Insertion Reactions  
Takeda, K.; Oohara, T.; Anada, M.; Nambu, H.; Hashimoto, S.\* *Angew. Chem. Int. Ed.* **2010**, *49*, 6979-6983. (10.1002/anie.201003730)
- (13) Catalytic Asymmetric Synthesis of Descurainin via 1,3-Dipolar Cycloaddition of a Carbonyl Ylide using Rh<sub>2</sub>(*R*-TCPTTL)<sub>4</sub>  
Shimada, N.; Hanari, T.; Kurosaki, Y.; Anada, M.; Nambu, H.; Hashimoto, S.\* *Tetrahedron Lett.* **2010**, *51*, 6572-6575. (10.1016/j.tetlet.2010.10.036)
- (14) A Short Catalytic Asymmetric Synthesis of Diospongins A and B via a One-pot Sequential Hetero-Diels-Alder/Mukaiyama-Michael Reaction Process  
Anada, M.; Washio, T.; Watanabe, Y.; Takeda, K.; Hashimoto, S.\* *Eur. J. Org. Chem.* **2010**, 6850-6854. (10.1002/ejoc.201001125)
- (15) Highly Enantioselective Cyclopropanation Reaction of 1-Alkynes with  $\alpha$ -Alkyl- $\alpha$ -diazoesters Catalyzed by Dirhodium(II) Carboxylates  
Goto, T.; Takeda, K.; Shimada, N.; Nambu, H.; Anada, M.; Shiro, M.; Ando, K.; Hashimoto, S.\* *Angew. Chem. Int. Ed.* **2011**, *50*, 6803-6808. (10.1002/anie.201101905)

- (16) Catalytic Enantioselective C–H Functionalization of Indoles with  $\alpha$ -Diazopropionates Using Chiral Dirhodium(II) Carboxylates: Asymmetric Synthesis of the (+)- $\alpha$ -Methyl-3-indolylacetic Acid Fragment of Acremoxin A  
Goto, T.; Natori, Y.; Takeda, K.; Nambu, H.; Hashimoto, S.\* *Tetrahedron: Asymmetry* **2011**, 22, 907-915. (10.1016/j.tetasy.2011.05.011)
- (17) Enantio- and Diastereoselective Cyclopropanation with *tert*-Butyl  $\alpha$ -Diazopropionate Catalyzed by Dirhodium(II) Tetrakis[*N*-tetrabromophthaloyl-(*S*)-*tert*-leucinate]  
Goto, T.; Takeda, K.; Anada, M.; Ando, K.; Hashimoto, S.\* *Tetrahedron Lett.* **2011**, 52, 4200-4203. (10.1016/j.tetlet.2011.06.008)
- (18) Continuous Flow System with a Polymer-Supported Dirhodium(II) Catalyst: Application to Enantioselective Carbonyl Ylide Cycloaddition Reactions  
Takeda, K.; Oohara, T.; Shimada, N.; Nambu, H.; Hashimoto, S.\* *Chem. Eur. J.* **2011**, 50, 13992-13998. (10.1002/chem.201102733)
- (19) Catalytic Enantioselective Intermolecular Cycloaddition of Diazodiketoester-Derived Carbonyl Ylides with Indoles Using Chiral Dirhodium(II) Carboxylates  
Shimada, N.; Oohara, T.; Krishnamurthi, J.; Nambu, H.; Hashimoto, S.\* *Org. Lett.* **2011**, 13, 6284-6287. (10.1021/ol2027625)
- (20) A Stereocontrolled Construction of 2-Azido-2-deoxy-1,2-*cis*- $\alpha$ -galactosidic Linkages Utilizing 2-Azido-4,6-*O*-benzylidene-2-deoxygalactopyranosyl Diphenyl Phosphates: Stereoselective Synthesis of Mucin Core 5 and Core 7 Structures  
Kakita, K.; Tsuda, T.; Suzuki, N.; Nakamura, S.; Nambu, H.; Hashimoto, S.\* *Tetrahedron* **2012**, 68, 5005-5017. (10.1016/j.tet.2012.04.059)
- (21) Total Syntheses of (+)-Polygalolide A and (+)-Polygalolide B: Elucidation of the Absolute Stereochemistry and Biogenetic Implications  
Sugano, Y.; Kikuchi, F.; Toita, A.; Nakamura, S.; Hashimoto, S.\* *Chem. Eur. J.* **2012**, 18, 9682-9690. (10.1002/chem.201200542)
- (22) Enantio- and Diastereoselective Hetero-Diels-Alder Reactions between 2-Aza-3-silyloxy-1,3-butadienes and Aldehydes Catalyzed by Chiral Dirhodium(II) Carboxamidates  
Watanabe, Y.; Washio, T.; Krishnamurthi, J.; Anada, M.; Hashimoto, S.\* *Chem. Commun.* **2012**, 48, 6969-6971. (10.1039/C2CC32876C)
- (23) A Polymer-Supported Chiral Fluorinated Dirhodium(II) Complex for Asymmetric Amination of Silyl Enol Ethers  
Oohara, T.; Nambu, H.; Anada, M.; Takeda, K.; Hashimoto, S.\* *Adv. Synth. Catal.* **2012**, 354, 2331-2338. (10.1002/adsc.201200219)

- (24) Catalytic Asymmetric Intermolecular C-H Insertion Reactions of 1,4-Cyclohexadiene with 2,4-Dimethyl-3-pentyl  $\alpha$ -Alkyl- $\alpha$ -diazoacetates using Chiral Dirhodium(II) Carboxylates  
Goto, T.; Onozuka, T.; Kosaka, Y.; Anada, M.; Takeda, K.; Hashimoto, S.\* *Heterocycles* **2012**, *86*, 1647-1659. (10.3987/COM-12-S(N)120)
- (25) Enantioselective Cycloaddition of Carbonyl Ylides with Arylallenes using  $Rh_2(S\text{-TCPTTL})_4$   
Krishnamurthi, J.; Nambu, H.; Takeda, K.; Anada, M.; Yamano, A.; Hashimoto, S.\* *Org. Biomol. Chem.* **2013**, *11*, 5374-5382, (10.1039/c3ob41236a)
- (26) Asymmetric Total Synthesis of (-)-*trans*-Blechnic Acid via Rhodium(II)-Catalyzed C-H Insertion and Palladium(II)-Catalyzed C-H Olefination Reactions  
Ito, M.; Namie, R.; Krishnamurthi, J.; Miyamae, H.; Takeda, K.; Nambu, H.; Hashimoto, S.\* *Synlett* **2014**, *25*, 288-292. (10.1055/s-0033-1340291)
- (27) Enantio- and Diastereoselective Hetero-Diels-Alder Reactions between 4-Methyl-substituted Rawal's Diene and Aldehydes Catalyzed by Chiral Dirhodium(II) Carboxamidates: Catalytic Asymmetric Synthesis of (-)-*cis*-Aerangis Lactone  
Watanabe, Y.; Shimada, N.; Anada, M.; Hashimoto, S.\* *Tetrahedron: Asymmetry* **2014**, *25*, 63-73. (10.1016/j.tetasy.2013.10.016)
- (28) Synthesis of Chiral Building Blocks for Oxygenated Terpenoids through a Simultaneous and Stereocontrolled Construction of Contiguous Quaternary Stereocenters by an Ireland-Claisen Rearrangement  
Akahori, Y.; Yamayoshi, H.; Sawayama, Y.; Hashimoto, S.\*; Nakamura, S. *J. Org. Chem.* **2014**, *79*, 720-735 (10.1021/jo402537u)
- (29) Stereoselective Synthesis of the CDE Ring System of Antitumor Saponin Scillascilloside E-1  
Akahori, Y.; Yamayoshi, H.; Hashimoto, S.\*; Nakamura, S. *Org. Lett.* in press. (ol-2014-00657f.R1)

#### 発表論文等（査読なし論文，著書，総説等の発表状況）

- (30) ピンナトキシシン A の全合成  
中村精一，橋本俊一\*，天然物全合成の最新動向，北 泰行監修，シーエムシー出版，2009，pp. 244-259.
- (31) カルシウムチャネル活性化物質ピンナトキシシン A の全合成  
中村精一，橋本俊一\*，*ファルマシア*，**2009**，*45*，427-432.
- (32) 触媒的 C-H 活性化を機軸とする天然物合成

穴田仁洋，南部寿則，橋本俊一\*，CSJ カレントレビュー05「不活性結合・不活性分子の活性化 革新的な分子変換反応の開拓」，日本化学会編，化学同人，2011，pp. 175 -191.

(33) Propanoic acid, 2-Diazo-, 2-methyl-1-(1-methylethyl) propyl ester

Anada, M.; Takeda, K.; Ito, M.; Hashimoto, S.\* In e-EROS Encyclopedia of Reagents for Organic Synthesis; Crich, D., Charette, A. B., Fuchs, P. L., Rovis, T., Eds.; John Wiley & Sons, Inc., Chichester, 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) Enantioselective Hetero-Diels–Alder Reaction between Rawal’s Diene and Aldehydes Catalyzed by Chiral Dirhodium(II) Carboxamidates

Watanabe, Y.; Washio, T.; Shimada, N.; Anada, M.; Hashimoto, S. The 11th International KYOTO Conference on New Aspects of Organic Chemistry, Kyoto, Japan, 2009.11.9-13 (ポスター発表) .

(2) Highly Enantioselective Hetero-Diels–Alder Reactions between Rawal’s Diene and Aldehydes Catalyzed by Chiral Dirhodium(II) Carboxamidates

Watanabe, Y.; Washio, T.; Shimada, N.; Anada, M.; Hashimoto, S. 21st French-Japanese Symposium on Medicinal and Fine Chemistry, Kyoto, Japan, 2010.5.9-12 (ポスター発表) .

(3) Asymmetric Syntheses of Dihydrobenzofuran Natural Products via Dirhodium(II)-Catalyzed Intramolecular C–H Insertion Process

Natori, N.; Nambu, H.; Hashimoto, S. 21st French-Japanese Symposium on Medicinal and Fine Chemistry, Kyoto, Japan, 2010.5.9-12 (ポスター発表) .

(4) Catalytic Asymmetric Reactions Using Chiral Rh(II) Complexes

Hashimoto, S. BIT's 1st World Congress of Catalytic Asymmetric Synthesis 2010, Beijing, China, 2010.5.19-21 (招待講演) .

(5) Enantioselective Aminations Catalyzed by Dirhodium(II) Carboxylates

Anada, M.; Hashimoto, S. BIT's 1st World Congress of Catalytic Asymmetric Synthesis 2010, Beijing, China, 2010.5.19-21 (ポスター発表) .

(6) Novel Strategy for Oligosaccharide Synthesis Based on Glycosidations Capitalizing on Phosphorus-Containing Leaving Groups: Application to the Synthesis of Sialyl Lewis X Derivatives

Suzuki, N.; Arihara, R.; Nakamura, S.; Hashimoto, S. Eleventh Tetrahedron Symposium, Beijing, China, 2010.6.22-25 (ポスター発表) .

- (7) Asymmetric Syntheses of Oxabicyclic Natural Products via Catalytic Enantioselective Carbonyl Ylide Cycloaddition Process  
Kurosaki, Y.; Hanari, T.; Anada, M.; Shimada, N.; Hashimoto, S. Eleventh Tetrahedron Symposium, Beijing, China, 2010.6.22-25 (ポスター発表).
- (8) Catalytic Asymmetric Reactions Using Chiral Rh(II) Complexes  
Hashimoto, S. Symposium on Molecular Chirality 2010, Sapporo, Japan, 2010.7.11-12 (招待講演).
- (9) Enantioselective Aminations Catalyzed by Dirhodium(II) Carboxylates  
Anada, M.; Tanaka, M.; Kurosaki, Y.; Hashimoto, S. 22nd International Symposium on Chirality (ISCD-22, Chirality 2010), Sapporo, Japan, 2010.7.12-15 (ポスター発表).
- (10) Catalytic Asymmetric Synthesis of Dihydrobenzofuran Natural Products via Intramolecular C–H Insertion Reaction Using Chiral Dirhodium(II) Carboxylates  
Natori, Y.; Nambu, H.; Hashimoto, S. 22nd International Symposium on Chirality (ISCD-22, Chirality 2010), Sapporo, Japan, 2010.7.12-15 (ポスター発表).
- (11) Rh(II)-Catalyzed Asymmetric Ring Forming Reactions  
Hashimoto, S. 日本プロセス化学会サマーシンポジウム, 東京, 2010.7.15-16 (招待講演).
- (12) The Polymer-Supported Dirhodium(II) Catalyst for Asymmetric Amination Reaction  
Ohara, T.; Takeda, K.; Anada, M.; Nambu, H.; Hashimoto, S. 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) Highly Enantioselective Hetero-Diels–Alder Reactions between Rawal’s Diene and Aldehydes Catalyzed by Chiral Dirhodium(II) Carboxamidates  
Watanabe, Y.; Washio, T.; Shimada, N.; Anada, M.; Hashimoto, S. 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) Asymmetric Synthesis of Dihydrobenzofuran Natural Products via Intramolecular C–H Insertion Reaction Catalyzed by Chiral Dirhodium(II) Carboxylates  
Natori, Y.; Nambu, H.; Takeda, K.; Hashimoto, S. The 2010 International Chemical Congress of Pacific Basin Societies (Pacifichem 2010), Honolulu, Hawaii, USA, 2010.12.15-20 (ポスター発表).
- (15) 高選択的合成反応の開発と生物活性物質の合成  
橋本俊一 第27回創薬セミナー, 長野, 2011.7.27 (招待講演).
- (16) 二核ロジウム(II)錯体を用いた触媒的不斉合成反応  
橋本俊一 第7回北里化学シンポジウム, 東京, 2011.12.22 (招待講演).

- (17) 二核ロジウム(II)錯体を用いた触媒的不斉合成反応  
橋本俊一 塩野義製薬株式会社 医薬研究センター講演会, 大阪, 2012.1.30(招待講演).
- (18) 二核ロジウム(II)錯体の創製を基盤とする触媒的不斉合成反応  
橋本俊一 金沢大学薬学シンポジウム 2011, 金沢, 2012.2.10 (招待講演).
- (19) Highly Durable and Recyclable Polymer-Supported Chiral Rh(II) Catalyst  
Takeda, K.; Oohara, T.; Nambu, H.; Hashimoto, S. 22nd French-Japanese Symposium of Medicinal and Fine Chemistry, Rouen, France, 2011.9.11–14 (ポスター発表).
- (20) Highly Enantioselective Cyclopropanation Reaction of 1-Alkynes with  $\alpha$ -Alkyl- $\alpha$ -diazoesters Catalyzed by Dirhodium(II) Carboxylates  
Goto, T.; Takeda, K.; Nambu, H.; Anada, M.; Ando, K.; Hashimoto, S. The 23rd International Symposium on Chiral Discrimination (ISCD23), Liverpool, United Kingdom, 2011.7.10–13 (ポスター発表).
- (21) Catalytic Asymmetric Synthesis of Oxabicyclic Natural Products via 1,3-Dipolar Cycloaddition of Carbonyl Ylides Using Chiral Dirhodium(II) Carboxylates  
Shimada, N.; Hanari, T.; Anada, M.; Nambu, H.; Hashimoto, S. The 23rd International Symposium on Chiral Discrimination (ISCD23), Liverpool, United Kingdom, 2011.7.10–13 (ポスター発表).
- (22) Continuous Flow System with a Polymer-Supported Dirhodium(II) Catalyst  
Takeda, K.; Oohara, T.; Shimada, N.; Nambu, H.; Hashimoto, S. The 2nd International Symposium on Process Chemistry (ISPC2011), Kyoto, Japan, 2011.8.10–12 (ポスター発表).
- (23) Synthetic Studies on Kopsilosine A Using Asymmetric Intermolecular 1,3-Dipolar Cycloaddition of Carbonyl Ylides  
Oohara, T.; Krishnamurthi, J.; Nambu, H.; Hashimoto, S. 22nd French-Japanese Symposium of Medicinal and Fine Chemistry, Rouen, France, 2011.9.11–14 (ポスター発表).
- (24) Continuous Flow System with a Polymer-Supported Dirhodium(II) Catalyst  
Takeda, K.; Oohara, T.; Shimada, N.; Nambu, H.; Hashimoto, S. The Seventh International Symposium on Integrated Synthesis (ISIS-7), Kobe, Japan, 2011.10.9–10 (ポスター発表).
- (25) A Stereocontrolled Construction of 1,2-*cis*- $\alpha$ -Galactosidic Linkages Utilizing Phosphate Method: Stereoselective Synthesis of Mucin Core 5 and Core 7 Structures  
Kakita, K.; Tsuda, T.; Nakamura, S.; Nambu, H.; Hashimoto, S. 8th AFMC International Medicinal Chemistry Symposium, Tokyo, Japan, 2011.11.29–12.2 (ポスター発表).

- (26) Enantioselective Intramolecular C–H Insertion Reaction of Diaryldiazomethanes Catalyzed by Rh(II) Carboxylates: Asymmetric Synthesis of Maximol A  
Natori, Y.; Namie, R.; Nambu, H.; Hashimoto, S. 8th AFMC International Medicinal Chemistry Symposium, Tokyo, Japan, 2011.11.29–12.2 (ポスター発表) .
- (27) Enantioselective Intramolecular C–H Amination of Sulfamate Esters Catalyzed by Dirhodium(II) Carboxylates  
Mizoguchi, K.; Murai, N.; Anada, M.; Hashimoto, S. 8th AFMC International Medicinal Chemistry Symposium, Tokyo, Japan, 2011.11.29–12.2 (ポスター発表) .
- (28) Studies on Catalytic Asymmetric Synthesis of (–)-Englerin A  
Hanari, T.; Shimada, N.; Anada, M.; Hashimoto, S. 8th AFMC International Medicinal Chemistry Symposium, Tokyo, Japan, 2011.11.29–12.2 (ポスター発表) .
- (29) Synthetic Studies of 18E-Lyngbyaloside  
Tanada, F.; Watanabe, Y.; Anada, M.; Hashimoto, S. 8th AFMC International Medicinal Chemistry Symposium, Tokyo, Japan, 2011.11.29–12.2 (ポスター発表) .
- (30) Highly Enantioselective Cyclopropanation Reaction of 1-Alkynes with  $\alpha$ -Alkyl- $\alpha$ -diazoesters Catalyzed by Dirhodium(II) Carboxylates  
Hashimoto, S. BIT's 3rd Annual World Congress of Catalytic Asymmetric Synthesis 2012, Beijing, China, 2012.5.12-14 (口頭発表) .
- (31) Catalytic Asymmetric Synthesis of Tetrahydropyran Natural Products Using a Hetero-Diels–Alder Strategy  
Anada, M. BIT's 3rd Annual World Congress of Catalytic Asymmetric Synthesis 2012, Beijing, China, 2012.5.12-14 (口頭発表) .
- (32) A Stereocontrolled Construction of 1,2-cis- $\alpha$ -Galactosidic Linkages Using the Phosphate Method: Stereoselective Synthesis of Mucin-type Glycopeptide Core Structures  
Kakita, K.; Tsuda, T.; Nakamura, S.; Nambu, H.; Hashimoto, S. 26th International Carbohydrate Symposium, Melia Castilla, Spain, 2012.7.22-27 (ポスター発表) .
- (33) Synthetic Studies of 18E-Lyngbyaloside C  
Tanada, F.; Watanabe, Y.; Anada, M.; Hashimoto, S. The Twelfth International Kyoto Conference on New Aspects of Organic Chemistry (IKCOC-12), Kyoto, Japan, 2012.11.12-16 (ポスター発表) .
- (34) Catalytic Enantioselective Intermolecular Cycloaddition of  $\alpha$ -Diazo- $\beta$ -ketoester-Derived Carbonyl Ylides with Phenyl Allenes Using Chiral Dirhodium(II) Carboxylates  
Krishnamurthi, J.; Nambu, H.; Hashimoto, S. The Twelfth International Kyoto Conference on New Aspects of Organic Chemistry (IKCOC-12), Kyoto, Japan, 2012.11.12-16 (ポスター発表) .



- (35) Continuous Flow System with a Polymer-supported Dirhodium(II) Complexes: Application to Enantioselective Carbonyl Ylide Cycloaddition Reactions  
Takeda, K.; Oohara, T.; Shimada, N.; Nambu, H.; Hashimoto, S. 13th Tetrahedron Symposium–Asia Edition, Taipei, Taiwan, 2012.11.27-30 (ポスター発表).
- (36) Enantioselective Intramolecular C–H Amination of Sulfamate Esters Catalyzed by Dirhodium(II) Carboxylates  
Anada, M.; Mizoguchi, K.; Hashimoto, S. 23th French-Japanese Symposium of Medicinal and Fine Chemistry, Nagasaki, Japan, 2013.5.12–15 (ポスター発表).
- (37) Catalytic Asymmetric Cycloaddition of Carbonyl Ylides with Arylallenes using  $\text{Rh}_2(\text{S-TCPTTL})_4$   
Krishnamurthi, J.; Takeda, K.; Nambu, H.; Anada, M.; Neetipalli, T.; Hashimoto, S. 10th International Symposium on Carbanion Chemistry, Kyoto, Japan, 2013.9.23–26 (ポスター発表).
- (38) Asymmetric Total Synthesis of (–)-Englerin A  
Hanari, T.; Shimada, N.; Anada, M.; Hashimoto, S. 9th AFMC International Medicinal Chemistry Symposium (AIMECS13), Taipei, Taiwan, 2013.10.15–18 (ポスター発表).
- (39) Stereoselective Synthesis of Sialyl  $\text{T}_\text{N}$ -glycoconjugates Based on Glycosyl Donors Carrying Phosphorus-containing Leaving Groups  
Kakita, K.; Gatori, N.; Anada, M.; Nambu, H.; Hashimoto, S. 9th AFMC International Medicinal Chemistry Symposium (AIMECS13), Taipei, Taiwan, 2013.10.15–18 (ポスター発表).
- (40) Dirhodium(II) Complex-Catalyzed Enantioselective Carbonyl Ylide Cycloaddition Reactions under Continuous Flow Conditions  
Takeda, K.; Hirota, A.; Hanari, T.; Anada, M.; Hashimoto, S. The Eighth International Symposium on Integrated Synthesis (ISIS-8), Nara, Japan, 2013.11.29–12.1 (ポスター発表).

### 3 . 特許

- (1) Polymer-supported metal complex catalyst.  
Hokkaido University, Hashimoto, S.; Anada, M. US 8,092,720 B2, Jan. 10, 2012

### 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」平成23年度第1回成果報告会, 北海道大学, 2011.6.20-21 (橋本俊一, 総括班班員).

## 5 . 受賞等

- (1) 鈴木規敏 (博士 1 年)  
優秀発表賞 第 133 回日本薬学会北海道支部例会、2009.11.29
- (2) 穴田仁洋 (准教授)  
平成 22 年度日本薬学会北海道支部奨励賞、2010.11.27
- (3) 渡邊雄大 (博士 1 年)  
優秀発表賞 第 134 回日本薬学会北海道支部例会、2010.5.8
- (4) 大原 格 (博士 2 年)  
ポスター賞 The 2010 International Chemical Congress of Pacific Basin Societies (Pacifichem 2010), Honolulu, Hawaii, USA, 2010.12.19
- (5) 羽成泰貴 (修士 2 年)  
ベストポスター賞 第 23 回万有札幌シンポジウム、2011.7.2
- (6) 羽成泰貴 (修士 2 年)  
第 53 回天然有機化合物討論会奨励賞、2011.12.19
- (7) 柿田浩輔 (修士 1 年)  
学生優秀発表賞 第 137 回日本薬学会北海道支部例会、2011.12.3
- (8) 戸井田明憲 (修士 2 年)  
学生優秀発表賞 日本薬学会第 132 年会、2012.3.28-31
- (9) 棚田文也 (修士 1 年)  
学生優秀発表賞 日本薬学会第 132 年会、2012.3.28-31
- (10) 羽成泰貴 (修士 2 年)  
学生優秀発表賞 日本薬学会第 132 年会、2012.3.28-31
- (11) 棚田文也 (修士 2 年)  
学生優秀発表賞 第 138 回日本薬学会北海道支部例会、2012.6.16
- (12) 波江亮介 (修士 2 年)  
学生優秀発表賞 第 139 回日本薬学会北海道支部例会、2012.12.8
- (13) 柿田浩輔 (修士 2 年)  
学生優秀発表賞 日本薬学会第 133 年会、2013.3.27-30

## 6 . 新聞報道等

- (1) **Selected by the Editorial Board of Synfacts** (*Synfacts* **2010**, 324.)  
Highly Enantioselective Hetero-Diels–Alder Reactions between Rawal's Diene and Aldehydes Catalyzed by Chiral Dirhodium(II) Carboxamidates. Watanabe, Y.; Washio, T.; Shimada, N.; Anada, M.; Hashimoto, S.\* *Chem. Commun.* **2009**, 7294.

- (2) **Selected by the Editorial Board of Synfacts** (*Synfacts* **2010**, 1329.)  
Catalytic Asymmetric Synthesis of the *endo*-6-Aryl-8-oxabicyclo[3.2.1]oct-3-en-2-one Natural Product from *Ligusticum Chuanxing* via 1,3-Dipolar Cycloaddition of a Formyl-Derived Carbonyl Ylide Using  $\text{Rh}_2(\text{S-TCPTTL})_4$ . Shimada, N.; Hanari, T.; Kurosaki, Y.; Takeda, K.; Anada, M.; Nambu, H.; Shiro, M.; Hashimoto, S.\* *J. Org. Chem.* **2010**, *75*, 6039.
- (3) **Selected by the Editorial Board of Synfacts** (*Synfacts* **2010**, 1442.)  
A Polymer-Supported Chiral Dirhodium(II) Complex: Highly Durable and Recyclable Catalyst for Asymmetric Intramolecular C–H Insertion Reactions. Takeda, K.; Oohara, T.; Anada, M.; Nambu, H.; Hashimoto, S.\* *Angew. Chem. Int. Ed.* **2010**, *49*, 6979.
- (4) **Selected by the Editorial Board of Synfacts** (*Synfacts* **2011**, 1084.)  
Highly Enantioselective Cyclopropanation Reaction of 1-Alkynes with  $\alpha$ -Alkyl- $\alpha$ -diazoesters Catalyzed by Dirhodium(II) Carboxylates. Goto, T.; Takeda, K.; Shimada, N.; Nambu, H.; Anada, M.; Shiro, M.; Ando, K.; Hashimoto, S. *Angew. Chem. Int. Ed.* **2011**, *50*, 6803.
- (5) **Selected by the Editorial Board of Synfacts** (*Synfacts* **2012**, 294.)  
Catalytic Enantioselective Intermolecular Cycloaddition of Diazodiketoester-Derived Carbonyl Ylides with Indoles Using Chiral Dirhodium(II) Carboxylates. Shimada, N.; Oohara, T.; Krishnamurthi, J.; Nambu, H.; Hashimoto, S. *Org. Lett.* **2011**, *13*, 6284.
- (6) **Selected by the Editorial Board of Synfacts** (*Synfacts* **2012**, 337.)  
Continuous Flow System with a Polymer-Supported Dirhodium(II) Catalyst: Application to Enantioselective Carbonyl Ylide Cycloaddition Reactions. Takeda, K.; Oohara, T.; Shimada, N.; Nambu, H.; Hashimoto, S. *Chem. Eur. J.* **2011**, *50*, 13992.
- (7) **Selected by the Editorial Board of Synfacts** (*Synfacts* **2012**, 1264.)  
Asymmetric Amination with a Polymer-Supported Chiral Rhodium Complex. Oohara, T.; Nambu, H.; Anada, M.; Takeda, K.; Hashimoto, S. *Adv. Synth. Catal.* **2012**, *354*, 2331.

## 7 . 国民との科学・技術対話

該当無し

## 8 . 領域内の共同研究の準備・実施状況とその成果

該当無し