Kwangmin Shin

Center for Hydrocarbon Functionalizations (CCHF), Institute for Basic Science (IBS)

Department of Chemistry, 291 Daehak-ro, Yuseong-gu, Daejeon 34141, Republic of Korea

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PROFESSIONAL EXPERIENCE

2017-present Postdoctoral Fellow, Center for Hydrocarbon Functionalization, Institute for Basic Science (IBS)

Postdoctoral Advisor: *Professor Sukbok Chang*

EDUCATION

2012-2017 Ph. D., Chemistry, Korea Advanced Institute of Science and Technology (KAIST)

Research Advisor: *Professor Sukbok Chang*

Dissertation Title: *Development of Iridium-Catalyzed Oxidative C–H Arylation Reactions.*

2008-2012 B.S., Chemistry, Korea Advanced Institute of Science and Technology (KAIST)

Graduated with summa cum laude

Research Advisor (2010-2011): *Professor Sukbok Chang*

AWARDS & HONORS

2012 Shim Hong-Ku Award, Department of Chemistry, KAIST

2018 S-OIL Outstanding Dissertation Award, The Korean Academy of Science and Technology (KAST)/S-OIL

2018 Postdoctoral Fellowship Program (Nurturing Next-generation Researchers), National Research Foundation of Korea (NRF)

2018 DOW Chemical Korea Award, Korean Chemical Society (KCS)/DOW Chemical Korea

RESEARCH EXPERIENCE

2017-present Postdoctoral Researcher, Center for Catalytic Hydrocarbon Functionalization, IBS

- Elucidated the detailed mechanistic aspects of the iridium-catalyzed direct C–H arylation reaction by isolating the key intermediate and also using various analytical techniques such as cyclic voltammetry and EPR analysis.

2012-2017 Graduate Research Assistant, KAIST

- Identified a series of transition metal (Rh, Ir, and Ru)-catalyzed direct C–H amination strategies using organic azides. Participated in the mechanistic investigations of these methodologies.

- Co-authored an *Accounts of Chemical Research* article on transition-metal catalyzed direct C–H amination using organic azides that has been cited >250 times.

- Developed the first Cp*Ir(III)-catalyzed direct C–H arylation reaction using aryldiazonium salts. This new methodology features mild reaction temperature (35 ^{o}C) and external oxidant-free reaction conditions.

2010-2011 Undergraduate Research Assistant, KAIST

- Investigated the scope of the copper catalyzed cyanation of arylboronic acids using ammonium iodide and DMF. Partially contributed to the mechanistic investigation on this reaction.

PUBLICATIONS

14. **Shin, K.**; Park, Y.; Baik, M.-H.; Chang, S. **Iridium-Catalysed Arylation of C–H Bonds Enabled by Oxidatively Induced Reductive Elimination.** *Nat. Chem.* **2018**, *10*, 218-224.

13. **Shin, K.**; Joung, S.; Kim, Y.; Chang, S. **Selective Synthesis of Silacycles by Borane-Catalyzed Domino-Hydrosilylation of Proximal Unsaturated Bonds: Tunable Approach to 1,n-Diols.** *Adv. Synth. Catal.* **2017**, *359*, 3428-3436.

12. **Shin, K.**; Park, S.-W.; Chang, S. **Cp*Ir(III)-Catalyzed Mild and Broad C–H Arylation of Arenes and Alkenes with Aryldiazonium Salts Leading to the External Oxidant-Free Approach.** *J. Am. Chem. Soc.* **2015**, *137*, 8584-8592.

11. Kim, J.; **Shin, K.**; Chang, S. **Rh(III)-and Ir(III)-Catalyzed Direct C–H Bond Transformations to Carbon-Heteroatom Bonds.** *Top. Organomet. Chem.* **2015**, *55*, 29-51.

10. **Shin, K.**; Kim, H.; Chang, S. **Transition Metal-Catalyzed C–N Bond Forming Reactions Using Organic Azides as the Nitrogen Source: A Journey for the Mild and Versatile C–H Amination.** *Acc. Chem. Res.* **2015**, *48*, 1040-1052.

9. **Shin, K.**; Chang, S. **Iridium(III)-Catalyzed Direct C-7 Amination of Indolines with Organic Azides.** *J. Org. Chem.* **2014**, *79*, 12197-12204.

8. Kim, H.; **Shin, K.**; Chang, S. **Iridium-Catalyzed C–H Amination with Anilines at Room Temperature: Compatibility of Iridacycles with External Oxidants.** *J. Am. Chem. Soc.* **2014**, *136*, 5904-5907.

7. Li, B.; Lee, S.; **Shin, K.**; Chang, S. **Chelation-Assisted Hydroesterification of Alkenes: New Ruthenium Catalyst Systems and Ligand Effects.** *Org. Lett.* **2014**, *16*, 2010-2013.

6. **Shin, K.**; Ryu, J.; Chang, S. **Orthogonal Reactivity of Acyl Azides in C–H Activation: Dichotomy Between C–C and C–N Amidations Based on Catalyst Systems.** *Org. Lett.* 2014, *16*, 2022-2025.

5. Park, S. H.; Kwak, J.; **Shin, K.**; Ryu, J.; Park, Y.; Chang, S. **Mechanistic Studies of the Rhodium-Catalyzed Direct C–H Amination Reaction Using Azides as the Nitrogen Source.** *J. Am. Chem. Soc.* **2014**, *136*, 2492-2502.

4. Ryu, J.; Kwak, J.; **Shin, K.**; Lee, D.; Chang, S. **Ir(III)-Catalyzed Mild C–H Amidation of Arenes and Alkenes: An Efficient Usage of Acyl Azides as the Nitrogen Source.** *J. Am. Chem. Soc.* 2013, *135*, 12861-12868.

3. **Shin, K.**; Baek, Y.; Chang, S. **Direct C–H Amination of Arenes with Alkyl Azides under Rhodium Catalysis.** *Angew. Chem., Int. Ed.* **2013**, *52*, 8031-8036.

2. Ryu, J.; **Shin, K.**; Park, S. H.; Kim, J. Y.; Chang, S. **Rhodium-Catalyzed Direct C–H Amination of Benzamides with Aryl Azides: A Synthetic Route to Diarylamines.** *Angew. Chem., Int. Ed.* **2012**, *51*, 9904-9908.

1. Kim, J.; Choi, J.; **Shin, K.**; Chang, S. **Copper-Mediated Sequential Cyanation of Aryl C–B and Arene C–H Bonds Using Ammonium Iodide and DMF.** *J. Am. Chem. Soc.* **2012**, *134*, 2528-2531.