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Education

1989-1993 *B.S. Seoul National University, Korea*
1993-1995 *M.S. Seoul National University, Korea (Professor. Eun Lee)*
1996-2001 *Ph.D. MIT, USA (Professor Stephen L. Buchwald)*

Academic Careers

2001-2002 *Postdoctoral Fellow, Department of Chemistry, California Institute of Technology, USA (Professor Robert H. Grubbs)*
2002-2005 *Assistant Professor, Department of Chemistry, Ajou University, Korea*
2005-2012 *Assistant, Associate Professor, Department of Chemistry, Sungkyunkwan University, Korea*
2012-present *Professor, Department of Chemistry, Sungkyunkwan University, Korea*

Awards

2008 SKKU-Fellowship
2010 Thieme Chemistry Journals Award
2010 Solvias Ligand Contest Award
2015 KSOS Young Scientist Award

Representative Publications

1. *Lee, S.; Yun, J. Asymmetric Catalytic Borylation of α,β-Unsaturated Acceptors, Topics in Organomet. Chem.* ***2015****, 49, 73–92.*
2. *Lee, H.; Lee, B. Y.; Yun, J. Copper(I)-Taniaphos Catalyzed Enantiodivergent Hydroboration of Bicyclic Alkenes, Org. Lett.* ***2015****, 17, 764–766.*
3. *Zhang, C.; Yun, J. Rh-catalyzed Addition of β-Carbonyl Pinacol Alkylboronates to Aldehydes: Asymmetric Synthesis of γ-Butyrolactones, Org. Lett.* ***2013****, 15, 3416–3419.*
4. *Feng, X.; Jeon, H.; Yun, J. Regio- and Enantioselective Copper(I)-catalyzed Hydroboration of Borylalkenes: Asymmetric Synthesis of 1,1-Diborylalkanes, Angew. Chem. Int. Ed.* ***2013****, 52, 3989–3992.*
5. *Kim, H. R.; Yun, J. Highly Regio- and Stereoselective Synthesis of Alkenylboronic Esters by Copper-catalyzed Boron Additions to Disubstituted Alkynes, Chem. Commun.* ***2011****, 47, 2943–2945.*

Development of Copper-Catalyzed Asymmetric Additions: Stereodivergent Synthesis of Organoboron Compounds

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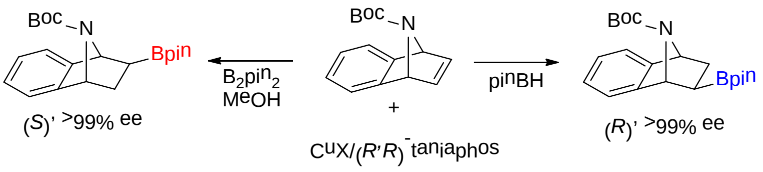
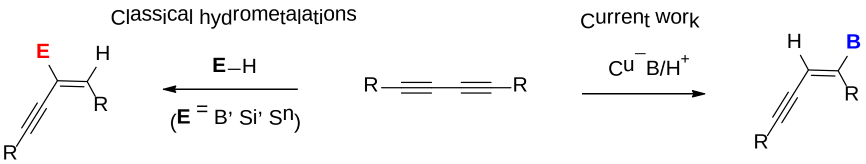
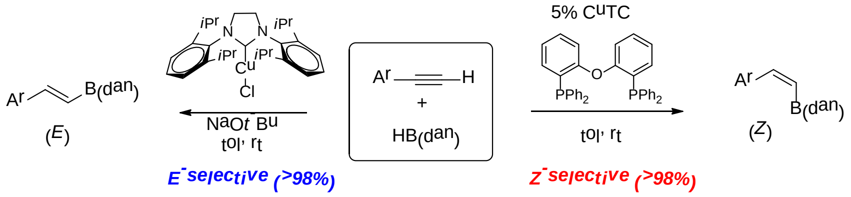
Organoboron compounds are versatile intermediates in synthetic organic chemistry. Transition-metal catalyzed additions of boron reagents to carbon–carbon multiple bonds have become important tools for the synthesis of organoboron derivatives. My research group has developed catalytic asymmetric reactions using copper catalysts with high levels of regio- and enantioselectivity; asymmetric conjugate reduction, asymmetric borylation[1] and hydroboration.[2] In this symposium, I will present 1) highly enantioselective copper(I)-catalyzed hydroboration of bicyclic alkenes, which also constitutes enantiodivergent hydroboration with the same chiral ligand-copper sources based on alternative mechanistic pathways.[3] 2) A mild copper-catalyzed regio- and stereoselective monoborylation of conjugate diynes with bis(pinacolato)diboron to yield enynylboronates with high and complementary regioselectivity to classical hydrometallation reactions.[4] 3) highly selective, copper-catalyzed stereodivergent hydroboration of terminal alkynes to produce either (*Z*)- or (*E*)-alkenylboron compounds, using 1,8-naphthalenediaminatoborane as the hydroborating reagent.[5]







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1. Lee, J.-E.; Yun, J. *Angew. Chem. Int. Ed.* **2008**, *47*, 145–147.
2. Noh, D.; Chea, H.; Ju, J.; Yun, J. *Angew. Chem. Int. Ed.* **2009**, *48*, 6062–6064.
3. Lee, H.; Lee, B. Y.; Yun, J. *Org. Lett.* **2015**, *17*, 764–766.
4. Li, D.; Kim, Y. E.; Yun, J. *Org. Lett.* **2015**, *17*, 860–863.
5. Jang, W. J.; Lee, W. L.; Moon, J. H.; Lee, J. Y.; Yun, J. *Org. Lett.* **2016**, *18*, 1390–1393.

Tae-Lim Choi

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Education

1996-1999	*B.S. KAIST*
1999-2003	*Ph.D. Caltech, USA (Professor R.H. Grubbs)*

Academic Careers

2003-2004	*Postdoctoral Associate, Department of Chemistry, UC Berkeley, USA (Professor J.M.J. Fréchet)*
2004-2008	*Principal Researcher, Cheil Industries Inc.*
2008-present	*Associate Professor, Department of Chemistry, SNU, Seoul, Korea*
2013-present	Editor, *Journal of Polymer Science, Part A: Polymer Chemistry* (Wiley)

Awards

2016	*Outstanding Teaching Award, College of Natural Science, SNU*
2015	*Young Organic Chemist Award, KCS*
2014	*Young Scientist Award, KAST*
2013	*Distinguished Lectureship Award, The Chemical Society of Japan*
2012	*IUPAC, Conference on Polymers and Organic Chemistry (14th POC)* *-Young Investigator Lectureship Award*
2011	*Asian Core Program Lectureship Award*
2011	*Outstanding Teaching Award, College of Natural Science, SNU*
2010	*Chungam Young Investigator Fellowship (POSCO Foundation)*
2004	*Herbert Newby McCoy Award, department of Chemistry, Caltech*

Representative Publications

1. Lee, H.-K., Bang, K.-T. Hess, A. Grubbs, R.H., Choi, T.-L.* *J. Am. Chem. Soc.* **2015**, *137*, 9262

2. Kang, E.-H., Yu, S., Lee, I. S.,Park, S, Choi, T.-L.* *J. Am. Chem. Soc.* **2014**, *136*, 101508

3. Lee, I.-H., *et al*, Choi, T.-L.* *J. Am. Chem. Soc*. **2013**, *135*, 17695

4. Park, H., Lee, H.-K., Choi, T.-L.* *J. Am. Chem. Soc*. **2013**, *135*, 10769

5. Lee, I.-H., Kim, H.S., Choi, T.-L.* *J. Am. Chem. Soc*. **2013**, *135*, 3760

The 1st Nobel Grubbs Center Symposium on Polymers and Catalysis

Cyclopolymerization of diynes

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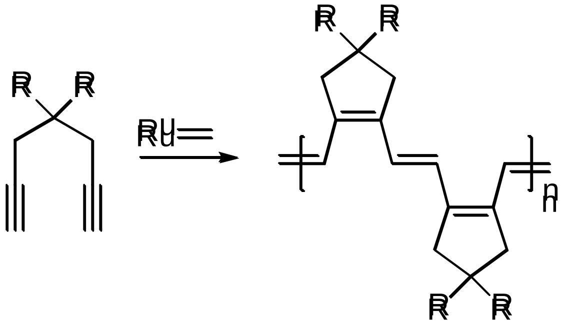
Olefin metathesis reaction is a powerful tool to prepare various small to large molecules very efficiently. Ru-based Grubbs catalysts have popularized the reaction because the catalysts are not just highly active but also very easy to handle with good functional group tolerance. So far especially in polymerization, olefins are the main functional group for the monomer. Here, we will describe alkyne polymerization of various monomers containing diynes by olefin metathesis using Grubbs catalysts. The first example is cyclopolymerization of 1,6-hepatadiyne derivatives. Also, our strategy to achieve controlled polymerization to prepare polymers with desired molecular weights and narrow polydispersity indices will be discussed. Finally, application to synthesize various block copolymers, dendronized and graft polymers will be presented.



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[1] Jeongeun Kim, Eun-Hye Kang, and Tae-Lim Choi *ACS Macro Lett.*, **2012**, *1*, 1090
[2] Kang, E.-H., Lee, I. S., Choi, T.-L. *J. Am. Chem. Soc.* **2011**, *133*, 11904
[3] Kang, E.-H., Yu S. Y., Lee, I. S., Park, S. E., Choi, T.-L. *J. Am. Chem. Soc.* **2014**, *136*, 10508.

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Education

1992-1996 *B.S. Seoul National University, Korea*
1997-1999 *M.S. Seoul National University, Korea (Professor Young Keun Chung)*
2002-2007 *Ph.D. California Institute of Technology, USA (Professor Robert H. Grubbs)*

Academic Careers

2007-2007 *Postdoctoral Associate, Department of Chemistry, University of California, Los Angeles, USA (Professor J. Fraser Stoddart)*
2009-2011 *Nanyang Assistant Professor, Department of Chemistry, Nanyang Technological University, Singapore*
2011-present *Assistant and Associate Professor, Department of Chemistry, Seoul National University, Korea*

Awards

2008 National Research Foundation Fellowship, Singapore Government
2011 Thieme Chemistry Journal Award
2015 Asian Core Program/Advanced Research Network Lectureship Award

Representative Publications

1. Kim, S. H.; Hong, S. H. *Ruthenium-Catalyzed Urea Synthesis Using Methanol as the C1 Source, Org. Lett.* **2016**, *18*, 212-215.
2. Xu, X.; Pooi, B.; Hirao, H.; Hong, S. H. *CH–π and CF–π Interactions Lead to Structural Changes of N-Heterocyclic Carbene Palladium Complexes, Angew. Chem. Int. Ed.* **2014**, *53*, 1283-1287.
3. Kim, S. H.; Kim, K. H.; Hong, S. H. *Carbon Dioxide Capture and Use: Organic Synthesis Using Carbon Dioxide from Exhaust Gas, Angew. Chem. Int. Ed.* **2014**, *53*, 771-774.
4. Kang, B.; Fu, Z.; Hong, S. H. *Ruthenium-Catalyzed Redox-Neutral and Single-Step Amide Synthesis from Alcohol and Nitrile with Complete Atom Economy, J. Am. Chem. Soc.* **2013**, *135*, 11704-11707.
5. Zhang, J.; Muthaiah, S.; Ghosh, S. C.; Hong, S. H. *Synthesis of Cyclic Imides from Simple Diols, Angew. Chem. Int. Ed.* **2010**, *49*, 6391-6395.

Catalyst and Reaction Development for Sustainable Chemical Synthesis

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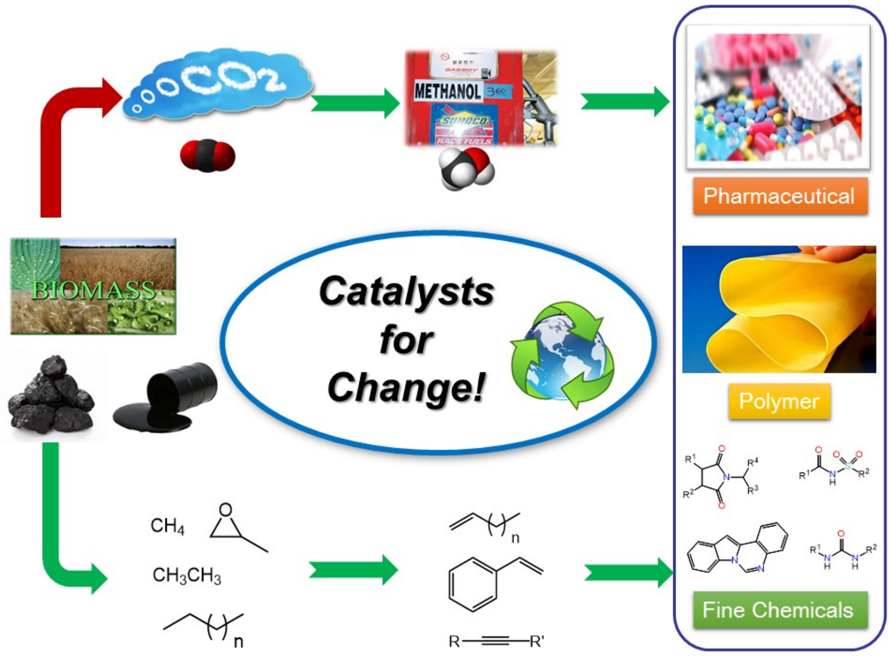
Development of useful, practical, and selective synthetic methods that generate minimal by-product is of critical importance in both academic and industrial research. The research of our group seeks to develop practical and environmentally friendly synthetic methodology using transition metal catalysts. Specifically, we have explored novel C–N formation reactions from primary alcohols and various N-sources, chemical synthesis using CO_2 and methanol as C1 sources, and development of organometallic catalysts based on N-heterocyclic carbene ligands.

Direct C–N formation reactions from alcohols and N-containing molecules is a highly atom economical transformation producing hydrogen as the sole byproduct. Well-defined N-heterocyclic carbene based Ru complexes were developed as highly active precatalysts based on the mechanistic insight suggesting a Ru hydride species as an active catalytic intermediate. With the developed catalysts, various novel C–N formation reactions for the synthesis of amides, imides, ureas, and amines were achieved.

The developed catalytic systems involving hydrogen transfer have been also applied to CO_2 reduction and methanol activation. With these sustainable C1 sources, our recent efforts on reaction and catalyst developments will be presented.



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1. Kim, S.; Kim, K. H.; Hong, S. H. *Angew. Chem. Int. Ed.* **2014**, *53*, 771.
2. Kim, S.; Hong, S. H. *ACS Catal.* **2014**, *4*, 3630.
3. Kang, B.; Fu, Z.; Hong, S. H. *J. Am. Chem. Soc.* **2013**, *135*, 11704.
4. Kang, B.; Hong, S. H. *Adv. Synth. Catal.* **2015**, *357*, 834.