

Kiyoung Park

Affiliation

Department of Chemistry

Korea Advanced Institute of Science and Technology (KAIST)



Education

2000 - 2004 B.S. Seoul National University (Chemistry)

2005 - 2010 Ph.D, University of Wisconsin-Madison (Bioinorganic Physical Chemistry; PI: Prof. Thomas C. Brunold)

Professional Career

2010 - 2014 Postdoctoral Fellow, Stanford University (PI: Prof. Edward I. Solomon)

2014 - present Assistant Professor, KAIST

Academic Activity

2017 - present Editorial Advisory Board; *J. Biol. Inorg. Chem.* (Springer)

Awards and Honors

POSCP-TJ Park Chung-Am Science Fellowship, 2016-2017

Recent publications

- "Peroxide activation for electrophilic reactivity by the binuclear non-heme iron enzyme AurF"
K. Park, N. Li, Y. Kwak, M. Srnec, C. Bell, L. Liu, S. Wong, Y. Yoda, S. Kitao, M. Seto, M. Hu, J. Zhao, C. Krebs, J. M. Bollinger, Jr., E. I. Solomon, *J. Am. Chem. Soc.* **2017**, 139, 7062-7070.
- "σ-Complexation as a strategy for designing copper-based light emitters"
Y. Kim, J. Kim, J. W. Park, K. Park, Y. Lee, *Chem. Commun.* **2017**, 53, 2858-2861.
- "Mechanistic Insights into Tunable Metal-Mediated Hydrolysis of Amyloid-beta Peptides"
J. S. Derrick, J. Lee, S. J. C. Lee, Y. Kim, E. Nam, H. Tak, J. Kang, M. Lee, S. H. Kim, K. Park, J. Cho, M. H. Lim, *J. Am. Chem. Soc.* **2017**, 139, 2234-2244.
- "Design Strategy toward Recyclable and Highly Efficient Heterogeneous Catalysts for the Hydrogenation of CO₂ to formate"
G. H. Gunasekar, J. Shin, K. Jung, K. Park, S. Yoon, *ACS Catal.* **2018**, 8, 4346-4353.

Research Interests

- Mechanisms of transition-metal catalysts
- Electronic and geometric structure/function correlation in transition-metal catalysts
- Development and design of catalysts based on structure/function correlation

Charge transfer as key principles of C-H bond activation and cross coupling

Kiyoung Park

*Department of Chemistry, Korea Advanced Institute of Science and Technology (KAIST),
Daejeon 34141, Republic of Korea*

Metalloenzymes and metallocofactors in nature often demonstrate uniquely high efficiency that cannot be observed elsewhere. One example is C-H bond activation by non-heme iron enzymes; mononuclear and binuclear iron sites can utilize O₂ to form high-valent intermediates that abstract H atom from strong bonds such as the C-H bond of methane. The principle of these reactions has been elucidated on the basis of intermediate structures established by nuclear resonance vibrational spectroscopy, revealing that spin-polarized charge transfer from oxo ligand to Fe center determines intrinsic barrier for the reaction.

A series of high-valent organometallic complexes that show different rates of reductive elimination process have been spectroscopically and computationally studied. A good correlation amongst the energy level of redox-active metal d orbitals, the type of supporting ligands, and cross coupling reaction rate demonstrate that the activity and selectivity of C-C bond cross coupling reaction can be understood in parallel with enzyme's strategy to raise the reduction potential of a metal center by dissociating or exchanging ligands.