

KAI LIU

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PROFILE:

- Highly motivated researcher with demonstrated expertise in environmental chemistry.
- Excellent experience in total synthesis, surface chemistry, material preparation and characterization.
- Computer skills: Windows; Materials Studio; Autodesk 3dsMax; Maxon Cinema4D, etc.

EDUCATION:

- **Tsinghua University**, Beijing, China
Ph.D. Environmental Science and Engineering, June 2016 (expected)
- **University of Houston**, Houston, TX
M.S. Chemistry, 2012
- **Louisiana State University**, Baton Rouge, LA
B.S. Chemistry, 2009

RESEARCH INTERESTS:

- Advanced oxidation/reduction processes
- Computer-assisted design of nano-materials, density Field Theory (DFT) and molecular docking simulation
- Total synthesis of organic molecules, guided synthesis of organic-inorganic hetero-structured nanomaterials
- Nano-patterning and surface functionalization

RESEARCH EXPERIENCE:

- **Tsinghua University**, School of Environment, Beijing, China
Ph.D. Candidate, 2012-present

Advanced oxidation/reduction processes

Developed a compact electro-peroxone prototype apparatus for continuous wastewater purification. First proposed electrical-peroxone membrane design. Revisited the study on electro-peroxone mechanism. Corresponding manuscript is in preparation. Lead teams to participate in 2 university and 2 nationwide competitions, won a number of awards.

Metal-organic frameworks

Invented 2 anionic exchange MOFs. First applied DFT calculation to elucidate the interaction between MOFs and guest molecules. Produced the first oxidative stress investigation of MOFs. First discovered the relationship between MOFs photoreactivity and metal nodes. First reported the photo transformation organic molecules by MOFs. First reported the cytotoxicity of

isorecticular MOFs on a human cell line. Spurred a flurry of research papers on MOFs as environment functional material.

Environmental policy

Participated in Yale-Tsinghua Environment & Sustainable Development Leadership Program. Participated in United Nations Environment Programme (UNEP) sponsored translation of Toolkit for Identification and Quantification of Releases of Dioxins, Furans and Other Unintentional POPs.

- **University of Antwerp**, Toxicological Center, Wilrijk, Belgium
Exchange Student, 2013

Environmental monitoring

Participated in EU sponsored research on environmental monitoring of flame retardants.

- **University of Houston**, Department of Chemistry, Houston, TX
M.S. Student, 2009-2012

Total synthesis of organic dye

Synthesized fluorescent dye for targeted binding of live bacteria.

Silicon-surface functionalization

Performed various reactions on the silicon substrate including hydrosilylation and “click” chemistry. Designed and assembled a 2-stage ultra-high vacuum surface passivation apparatus. Prepared anti-biofouling films with excellent stability.

Nano-patterning and characterization

Performed nano-grafting on various substrates and subsequent characterization using Atomic Force Microscope (AFM).

TEACHING EXPERIENCE:

- **Tsinghua University, School of Environment**, Beijing, China
Teaching Assistant
Social Practice, 2015
- **University of Houston, Department of Chemistry**, Houston, TX
Teaching Assistant
Department NMR analyst, 2011-2012
Organic Synthesis Lab, 2009-2011
Organic Chemistry, 2009-2011
- **Louisiana State University, Department of Chemistry**, Baton Rouge, LA
English Tutor
Buchanan Elementary School, 2005

INDUSTRIAL WORKING EXPERIENCE:

- **Turbosquid Inc.**, New Orleans, LA
3D Modeling Artist, 2005-now

- **Activision Publishing, Inc.** San Francisco, CA
Contractor, 2008
- **Boeing Integrated Defense Systems-Integrated Defense Simulation**, St. Louis, MO
Contractor, 2008

PUBLICATIONS:

1. **Liu, K.**; Zhang, K.; Zhang, S.; Yu, G. "Selective Adsorption of Pharmaceuticals and Personal Care Products onto Metal-organic Frameworks: Comparing Molecular Docking Prediction and Experimental Results" (*In Prep*)
2. **Liu, K.**; Zhang, K.; Yu, G. "Electro-fenton Oxidation of PPCPs by Metal Organic Frameworks in Aqueous Solution: Reactivity and Topology" (*In Prep*)
3. **Liu, K.**; Gao, YL; Liu, J.; Zhao, Y.; Zhang, KY; Yu, G. "Photoreactivity of Metal Organic Frameworks in Aqueous Solutions: Metal Dependency of Reactive Oxygen Species Production" *Environmental Science & Technology* 50 (7), 3634-3640, 2016.
4. **Liu, K.**; Zhang, SY; Hu, XY; Zhang, K; Yu, G. "Understanding the Adsorption of PFOA on MIL-101(Cr)-Based Anionic-Exchange Metal-Organic Frameworks: Comparing DFT Calculations with Aqueous Sorption Experiments" *Environmental Science & Technology* 49 (14), 8657-8665, 2015
5. Tang, M.; Xu, C.; Lin, N.; **Liu, K.**; Zhang, Y.; Yu, X.; Liu, W. "Lead, mercury, and cadmium in umbilical cord serum and birth outcomes in Chinese fish consumers" *Chemosphere* 148(1), 270-275, 2016.
6. Zhang, KL; Huang, J; Wang, HZ; **Liu, K.**; Yu, G; Deng, SB; Wang, B. "Mechanochemical degradation of hexabromocyclododecane and approaches for the remediation of its contaminated soil" *Chemosphere* 116(1) 40-45, 2014.
7. Wang, HZ; Huang, J; Zhang, KL; Yu, YF; **Liu, K.**; Yu, G; Deng, SB; Wang, B. "Effects of zero-valent metals together with quartz sand on the mechanochemical destruction of dechlorane plus coground in a planetary ball mill" *Journal of Hazardous Materials* 264(2) 230-235, 2014.
8. Niu, LL; Xu, C; Yao YJ; **Liu, K.**; Yang, FX; Tang, ML; Liu, WP. "Status, Influences and Risk Assessment of Hexachlorocyclohexanes in Agricultural Soils Across China" *Environmental Science & Technology* 47(21) 12140-12147, 2013.
9. Cao, ZG; Yu, G; Chen, YS; Liu, C; **Liu, K.**; Zhang, TT; Wang, B; Deng, SB; Huang, J. "Mechanisms influencing the BFR distribution patterns in office dust and implications for estimating human exposure" *Journal of Hazards Materials* 252(1) 11-18, 2013.
10. Qin, GT; Gu, JH; **Liu, K.**; Xiao, ZD; Yam, CM; Cai, CZ. "Conduction AFM Patterning on Oligo(ethylene glycol)-Terminated Alkyl Monolayers on Silicon Substrates: Proposed Mechanism and Fabrication of Avidin Patterns" *Langmuir* 27(11) 6987-6994, 2011.
11. Li, Y; Zhao, MR; Wang, J; **Liu, K.**; Cai, CZ. "Biofunctionalization of a "Clickable" Organic Layer Photochemically Grafted on Titanium Substrates" *Langmuir* 27(8) 4848-4856, 2011.
12. Brown, T; LeJeune, ZM; **Liu, K.**; Hardin, S.; Li, JR; Rupnik, K.; Gurno, JC. "Automated scanning probe lithography with n-alkanethiol self assembled monolayers on Au(III): Application for teaching undergraduate laboratories" *Assoc. Lab. Autom. (JALA)*, 16, 112-125, 2011.
13. Qin, GT; Stanto, C; Zhang, W; Li, Y; Kumar, A; Reasquin, UJ; **Liu, K.**; Muradov, P; Trauther, BW; Cai, CZ. "Biofunctionalization on Alkylated Silicon Substrate Surfaces via "Click" Chemistry" *Journal of American Chemical Society*, 132(46) 16432-16441, 2010.

14. Zhou, QY; Liu WP; Zhang, YS; **Liu, K.** “Action Mechanisms of Acetolactate Synthase Inhibiting Herbicides” *Pesticide Biochemistry & Physiology*, 89(2) 89-96, 2007.
15. Liu, WP; Zheng, W; Ma, Y; **Liu, K.** “Sorption and degradation of imidacloprid in soil and water” *Environmental Science & Health, Part B*, 41(5) 623-634, 2006.
16. Brown, T; LeJeune, ZM; **Liu, K.**; Li, JR; Gurno, JC. “Automated scanning probe lithography withalkanethiolself assembled monolayers on Au(111)” *Abstracts of Papers of the American Chemistry Society*, 238, 129-CHED, 2009.
17. **Liu, K.**; Li, JR; Gurno, JC. “Writing nanoscale patterns of self-assembled monolayers using AFMbased lithography” *Abstracts of Papers of the American Chemistry Society*, 235, 59-ANAL, 2008.

WORK STYLE:

- Strong and independent researcher.
- Responsible, Detail oriented, Dependable, Team player, Honest