Weiliang Bai

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EDUCATION

Civil, Architectural and Environmental Engineering, University of Texas at Austin Aug 2019 – present
Doctoral of Philosophy in Environmental and Water Resource Engineering

Civil and Environmental Engineering, Carnegie Mellon University Aug 2017 - Dec 2018
Master. in Environmental Engineering, GPA: 3.97/4.0

School of Environment, Tsinghua University Aug 2013 - Jul 2017
B.E. in Environmental Engineering, GPA: 3.38 /4.0

RESEARCH EXPERIENCE

Application of Nano material and Artificial Membrane in Environmental Engineering | UT Austin
Advisor: Navid Saleh, Associate Professor and Manish Kumar, Associate professor September 2019 - Present

- Currently working on membrane antifouling strategy in ultrafiltration and Reverse Osmosis processes.
- Looking for novel and efficiency methods for NDMA and 1,4-dioxane removal in water treatment.

Using Electrochemical to Degrade Per- /Polyfluoroalkyl Substances(PFAS) | Carnegie Mellon University
Advisor: Lowry Gregory, Professor June 2018 – Dec 2019

- Literature reviewed and compared the efficiency of different degradation method of PFAS available right now.
- Used commercial Ti/SnO_2-Sb and Ti/SnO_2-Sb/PbO_2 electrodes to oxidize the PFOS, PFOA and their alternatives PFBS, GenX controlled by electronic workstation and found the degradation efficiency.
- Identified PFAS' concentration during degradation by LC-MS and fluoride concentration by IC (ion chromatography) to find out the influence of anode material and current density and explained it by oxidation evolution potential and working area.
- Detected Sn, Sb, Ti, Pb concentration during oxidation to check the safety of industrial using of electrochemical way of PFAS.
- Made innovatively F-doped Ti/SnO_2-Sb/PbO_2 by chemical vapor deposition with different thickness of F-layer and test the PFOS degradation and defluorination rate by these new electrodes.
- Checked the characteristic of electrode by linear sweep voltammetry (LSV), accelerate life test and XRD.

Comparison of Nano Iron and two kinds of Sulfur-doped Nano iron | Carnegie Mellon University
Advisor: Lowry Gregory, Professor Feb 2018 – June 2018

- Used 1-step and 2-step methods to make sulfur-doped Nano-iron (S-nZVI) and Nano-iron (nZVI) by dropwise in glove box.
- Characterized and compared the surface properties and elements rates of three kinds of Nano-irons by SEM and XRD.
- Found the hydrophobicity of 1-step S-nZVI > 2-step S-nZVI > nZVI by water drop contact angle test.
- Used three kinds of Nano-iron to react with water, NO_3^- and TCE to check the reaction properties and found the most desired 1-step S-nZVI with specific higher reaction rate with hydrophobic contaminant like TCE.
- Detected the iron and sulfur concentration in supernatant or solution after three kinds of Nano particles reacting with NO_3^- and TCE by ICP-MS.
- Identified the influence of S/Fe rate in S-nZVI and water aging time to their reaction properties with NO_3^- and TCE.

Degradation Study of Azo Compound by Chlorine in Drinking Water | Tsinghua University
Advisor: Xiaomao Wang, Associate Professor Mar 2016 – May 2017

- Literature reviewed the pKa of Acid Red 5B, Methyl Orange, and Acid Orange and verified the data through acid-base titration.
- Conducted experiments on the degradation rate of Chlorine in the organic compounds mentioned above at different pH values.
- Identified the residual chlorine in highly concentrated organic water after the technological process of drinking water treatment.
- Wrote a paper about the formation performance and precursor property of halogenated nitromethane based on the experiment.
- Made a conclusion that using chlorination should be carefully considered since they can form DBPs, especially HNMs.

PUBLICATIONS

- Fu, Jing, Xiaomao Wang, **Weiliang Bai**, Hongwei Yang, and Yuefeng F. Xie. "Azo compound degradation kinetics and halonitromethane formation kinetics during chlorination." Chemosphere 174 (2017): 110-116.
- Xu, Jiang, Yan Wang, Cindy Weng, **Weiliang Bai**, Yang Jiao, Ralf Kaegi, and Gregory V. Lowry. "Reactivity, Selectivity, and Long-term Performance of Sulfidized Nanoscale Zerovalent Iron with Different Properties." Environmental science & technology (2019).

WORK EXPERIENCE

Guohuan Tsinghua Environment Engineering Design & Research Institute | Engineer | Beijing Mar 2014 – Jun 2014

- Resolved issues at two sewage treatment plants with excessive ammoniacal nitrogen in the effluent using breakpoint chlorination treatment and A/O process for the plant
- Designed and drew ichnographies of sewage treatment plants by auto CAD, including a coarse screen and a pumping station
- Compared the efficiency and economic effect of lime neutralization process and recovery method of villiaumite in industrial wastewater

Chinese Academy of Agricultural Sciences | Research Assistance | Beijing Mar 2019 – Jul 2019

- Detected the nitrogen, methane and carbon dioxide emission in growth of corn and oilseed rape in planting and harvest season
- Used model to calculate greenhouse gas emission in large scale for cereal and vegetables growing

LEADERSHIP AND ACTIVITIES

Future Global Leaders Summer Program | University of California San Diego | Project Leader Aug 2015

- Listened to speeches on environmental problems such as global warming and energy shortage, and gave a lecture introducing environmental conditions and issues in China
- Organized an international salon on the beach of San Diego for Chinese, Japanese, and American students

FELLOWSHIPS AND HONORS

- Fellowship of Graduated Research Assistance at Civil, Architectural and Environmental Engineering in University of Texas at Austin (2019)
- Civil Engineering Scholarship at Carnegie Mellon University (2017-2018)
- Fellowship of Graders at Carnegie Mellon University (2018)
- Literature and Art Scholarship of Tsinghua University (2015, 2016)

GRADUATE COURSEWORK :

- Numerical Method in Engineering
- Water Resource Chemistry
- Fate and Transportation in Physical and Chemical Process
- Mathematic Model in Environmental Quality System
- Estimate Methods in Engineering System
- Environmental Microbiology and Engineering System
- Air Quality Engineering
- Physical and Chemical Process in Water Treatment
- Biology Process in Water Treatment