

Guikuan Yue

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Research Interest

- **Extractive metallurgy (mainly copper hydrometallurgy to determine the optimum parameters)**
 - Heap leaching of chalcopyrite: optimize parameters ($\text{Fe}^{3+}/\text{Fe}^{2+}/\text{SO}_4^{2-}/\text{pH}/\text{T}/\text{O}_2$) to increase recovery and kinetics
 - Solution chemistry and thermodynamics of industrial electrolyte: species distribution, ORP, solubility, pH
 - Cu electrowinning(energy intensive)/refining: alternative anodic material/reaction, impurities control, additives
 - Potentially extend to other non-ferrous metals such as gold, zinc, etc.
- **Electrochemistry for materials preparation and processing**
 - Materials preparation: electrolyte/additives, functional properties (nanoscale catalysts, corrosion)
 - Surface treatment: property development, electropolishing/cleaning, etc.
 - Biomaterials: surface modification, corrosion, electroplating/electroforming
 - Electrosynthesis in ILs: electrode materials, electrolyte
 - Ionic liquids potentially used in renewable energy, battery, supercapacitor, reduction of CO_2
- **Solution chemistry, thermodynamics and environmental topics**
 - Acidic mine drainage: control the process, utilization
 - Waste water/gas treatment in metallurgy or coating industry

Education

- **Sep.2010-Oct.2014 Department of Materials Engineering, The University of British Columbia, Canada**
Degree: Doctor of Philosophy in Materials Engineering (Hydrometallurgy Group at UBC)
- **Sep.2005- Jul.2008 Institute of Process Engineering, Chinese Academy of Sciences, Beijing, China**
Degree: Master of Engineering in Applied Chemistry (Chemical Engineering)
- **Sep.2001-Jul.2005 Department of Chemistry and Chemical Engineering, Henan University, China**
Degree: Bachelor of Engineering in Chemical Engineering and Technology

Experience

- **Sep.2016-present Department of Metallurgical, Materials and Biomedical Engineering, UTEP, USA**
Assistant Professor at The University of Texas at El Paso
- **Nov.2014-Aug.2016 Department of Materials Engineering, The University of British Columbia, Canada**
Post-Doctoral Research Fellow in the Hydrometallurgy Group at UBC
 - *Project 1: Understanding/Studying Leach Chemistry in Chemical/Bioleaching of PCBs to Extract Copper*
 - **Research program that was in collaboration with the BRGM in France:** in charge of literature review, data analysis, manuscript preparation and research communication.
 - This work are done for the extended validation of the developed equation during my PhD work, in order to predict the ORP and iron chemistry of the complicated solution generated during the acidic leaching or bioleaching of PCBs in order to recover copper.
 - The solution chemistry involved in this study is very similar to that at mines (such as acidic mine drainage) and that used in copper heap leaching. The study is thus very useful for related waste water treatment and environmental operations at mines.

- *Project 2: Develop a New Method to Make Aluminium Plated Through Holes (PTHs) for PCBs Manufacturing*
- **Research program that was cooperated with Omni Circuit Boards Ltd. and supported by the Natural Sciences and Engineering Research Council of Canada (NSERC):** in charge of literature review, research design and experiments, technical reports.
- This work is currently being carried out to support the development of a special kind of PCBs.
- **Sep.2010-Oct.2014 Department of Materials Engineering, The University of British Columbia, Canada
Research Assistant in the Hydrometallurgy Group at UBC**
 - Thermodynamic modeling of aqueous system, HTHP ORP measurement and chalcopyrite leaching
 - **Research program supported by SNC Lavalin, Xstrata (Glencore), HudBay and NSERC:** in charge of experimental design, experimentation, manuscript preparation and research communication.
 - Including: Complete a detailed literature review for various topics involved in the project; Design and establish electrochemical experiments from 25 °C-150 °C; Develop a model to simulate the speciation of quaternary acidic iron sulfate system up to 150 °C; Develop a novel expression to easily and accurately calculate the redox potential; Study reduction kinetics of ferric on chalcopyrite by electrochemical methods up to 150 °C; Investigate the temperature dependence of various electrochemical kinetics parameters; Analyze the mechanism involved in chalcopyrite leaching system by mixed potential theory; Determine the influence of cathodic ferric reduction reaction on overall leaching process.
 - The findings in this project provide the basis for mechanistic analyses and attendant optimization studies of industrial leaching processes of chalcopyrite and other sulfide minerals.
 - Several journal or conference papers, and presentations have been accomplished (See details below).
- **Jul.2008-Aug.2010 Patent Examination Cooperation Center of State Intellectual Property Office, China
Patent Examiner in Electrolytic & Electrophoretic Fields**
 - Duty: taking charge of the substantive examination of an application for a patent for invention and deciding whether it should be granted (about **150 applications** were examined)
 - Specific Examination Fields: Electrolytic production of inorganic compounds or non-metals; Electrolytic production of organic compounds; Electrophoretic production of compounds or non-metals; Electrolytic production, recovery or refining of metals by electrolysis of solutions or melt; Electrolytic or electrophoretic production of coatings; Electroforming; Electrolytic removal (cleaning, degreasing, pickling, descaling, etching, polishing or stripping) of materials from objects
 - Be familiar with most metal production processes and solution chemistry involved (very helpful for the related water treatment and environmental operations).
- **Jul.2006-Apr.2008 Institute of Process Engineering, Chinese Academy of Sciences, Beijing, China
Research Assistant in the Ionic Liquid (Room Temperature Molten Salt) Group**
 - Electrodeposition of aluminium on steels in ionic liquids
 - **Research project with NV BEKAERT SA (Belgium):** as the principal, taking charge of the preparation (including the literature review), research design, experiments, the research report and paper writing.
 - Including: Design and establish the experiments; Synthesize ILs and characterize the electrochemical properties; Determine solubility of AlCl₃ in synthesized ILs and choose the optimum electrolyte; Carry out electro-deposition and obtain optimum operating conditions; Investigate electrocrystallization mechanism by chronoamperometry; Characterize/analyze surface morphology and crystal orientation of aluminium coating.
 - Three journal papers and two technical reports were accomplished.
 - Co-supervisory experience on a research assistant (1 year) and an undergraduate student (3 months).
- **Oct.2004-May.2005 Department of Chemistry and Chemical Engineering, Henan University, China**

Research Assistant for the Preparation and Characterization of 1D NiS Nano-materials

- Spindle-shaped NiS nanorods were synthesized via thermolysis route using ionic liquid and then characterized, and the growth mechanism was studied.

- **Jun.2004-Jul.2004** **Department of Chemistry and Chemical Engineering, Henan University, China**
On-site Learning and Testing
 - Performing industrial probation in 3rd Tap Water Plant of Kaifeng City, Henan Maodun Daily Chemicals Industry Stock Co. LTD, and Lipin Chemical Plant of Kaifeng.
 - Interacted with highly experienced engineers to gain extensive knowledge and experience on the operating process of the above mentioned plants, including the whole treatment process from river water to tap water.
 - Presented detailed report about different operation units to the supervisor along with suggestions to improve efficiency of the water treatment unit.
- **Aug.2003-Oct.2003** **Department of Chemistry and Chemical Engineering, Henan University, China**
Research Assistant for the Extraction of Nonivamide and Capsanthin from Capsicum
- **Jun.2003-Jul.2003** **Department of Chemistry and Chemical Engineering, Henan University, China**
Research Assistant for the Designing and Improving Fluidized Bed Dryers

Honors & Awards

- Aug.2014-Dec.2014: Top 18/17/10/9 paper most downloaded, **Hydrometallurgy** (Aug.6 2014-Dec.30 2014)
- Jun.2014: An invitation sent by Associate Editor Dr. Ethan Prather to publish the methodology in my Ph.D. research for **Journal of Visualized Experiments** (a leading peer-reviewed video methods journal)
- 2010-2014: Graduate Research Assistant Scholarship, International Tuition Award and Faculty of Applied Science Graduate Award at UBC
- 2007-2008: **Excellent dissertation for master's degree**
- 2005-2006: 3rd class Director Scholarship for Institute of Process Engineering, Chinese Academy of Sciences
- Sep.2005: Be admitted into the graduate program directly in Institute of Process Engineering, Chinese Academy of Sciences (**the usually required entrance examinations were waived**)
- Jun.2005: Ranking **No.1** (1/85) in my class for the four year's study in the field of Chemical Engineering and Technology in the Department of Chemistry and Chemical Engineering at Henan University
- 2004-2005: 1st class scholarship, excellent students and excellent students' leader for the university, **Excellent dissertation for bachelor's degree**
- 2003-2004: **2nd class prize of Chinese National Scholarship**, 2nd class scholarship and excellent students for the university, **3rd class prize award for the National English Contest for College Students**
- 2002-2003: 2nd class scholarship and excellent students for the university, **Excellent award for the National English Contest for College Students**, Excellent individual for summer social practice
- 2001-2002: 2nd class scholarship and excellent students for the university

Teaching Experience & Social Practice & Intern Experience

- Jan.2012-May.2014 **Teaching Assistant** for Hydrometallurgy I and Hydrometallurgy II at UBC (4 terms)
- Sep.2003-Jun.2005 **Office Assistant** in Department of Chemistry and Chemical Engineering, Henan University
- Apr.2005-May.2005 **Co-sessional Instructor** in Henan Technology Institute of Chemical Engineering
- Sep.2004-Oct.2004 Intern in Hua County Active Carbon Plant (**excellent intern for bachelor's degree**)
- Apr.2002-May.2002 Conducting metalworking in Kaifeng Instrument Co. LTD.

Professional Society and Campus Activities Involvement

- Invited reviewer for **Hydrometallurgy** (Elsevier)
- Member of CIM (Canadian Institute of Mining, Metallurgy and Petroleum) and MetSoc
- Took charge of academic activities organizing work in the student council of IPE, CAS during 2006-2007
- Help organize the 143th Youth Scientists' forum on Ionic Liquid and Green Chemistry held in 2007
- Selected as the president of my cohort during bachelors, responsible for taking care of public affairs (3.5 years)

Comprehensive Skills

- **Speciality skills**
More than 9 years of hands-on experience with laboratory techniques including sample preparation, interpretation of the results and preparation of reports for characterization methods such as: ICP-MS, AAS, OM, SEM/EDX, XRD, electrochemical testing, HTHP ORP measurements, leaching, electrodeposition, electroless plating.
- **Professional literature retrieval training**
Attending the training classes at Patent Examination Cooperation Center of SIPO, July 2008–October 2008
- **Professional electrochemistry training (Hold a Certificate)**
Annual Workshop on Electrochemical Measurements-Theory and Hands-on Experiments, ECS Sponsored Meetings, Case Western Reserve University, Cleveland, Ohio, August 6-10, 2012
- **Short course on gold and platinum group metals extraction (Hold a Certificate)**
Attending the short course on extraction methods of gold and platinum group metals from ores and e-wastes, Department of Mining Engineering at UBC, Vancouver, BC, December 7-8, 2015
- **Language skills**
Chinese: Native
English: Proficient at professional English, effective oral English skills and excellent ability to write in English
- **Computer skills**
Skilled at MS office; Good at professional software, such as AutoCAD, Visio, Origin, OLI, EndNote.

References

- 1 Professor Edouard Asselin: Department of Materials Engineering, The University of British Columbia
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- 3 Professor Suojiang Zhang: Institute of Process Engineering, Chinese Academy of Sciences
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Publications

Peer-reviewed Journal Papers

1. **Guikuan Yue***, Anne-Gwénaëlle Guezennec, Edouard Asselin. Extended Validation of an Expression to Predict ORP and Iron Chemistry: Application to Complex Solutions Generated during the Acidic Leaching or Bioleaching of Printed Circuit Boards. *Hydrometallurgy*, 2016, Volumes 164, 334–342.
2. Liming Zhao, **Guikuan Yue**, Yunsong Zhou. Effect of the Pump Depletion on the Quasi-Phase-Matching for $\chi^{(2)}$

Nonlinearities. *Optics Communications*, 2015, Volume 347, 92-97.

- Liming Zhao, **Guikuan Yue**, Yunsong Zhou, Fuhe Wang. A Promising Nonlinear Conjugate-Gradient Method Proposed to Design Nonlinear Domains with a Disordered Distribution. *Modern Physics Letters B*, 2015, 29 (9), Article Number 1550030 (10 pages).
- Guikuan Yue***, Liming Zhao, Oscar G. Olvera, Edouard Asselin. Speciation of the $\text{H}_2\text{SO}_4\text{-Fe}_2(\text{SO}_4)_3\text{-FeSO}_4\text{-H}_2\text{O}$ System and Development of an Expression to Predict the Redox Potential of the $\text{Fe}^{3+}/\text{Fe}^{2+}$ Couple up to 150 °C. *Hydrometallurgy*, 2014, Volumes 147-148, 196-209.
- Guikuan Yue***, Edouard Asselin. Kinetics of Ferric Ion Reduction on Chalcopyrite and its Influence on Leaching up to 150 °C. *Electrochimica Acta*, 2014, Volume 146, 307-321.
- Liming Zhao, **Guikuan Yue**, Yunsong Zhou, Fuhe Wang. Effect of Pump Depletion on Second Harmonic Generation in Multiple Quasi-Phase-Matching Gratings. *Optics Express*, 2013, 21 (15), 17592-17601.
- Liming Zhao, **Guikuan Yue**, Yunsong Zhou. Effect of the Pump Depletion itself on the Quasi-Phase-Matching for Second-Harmonic Generation. *EPL(Europhysics Letters)*, 2012, 99 (3), Article Number 34002 (5 pages).
- Guikuan Yue**, Suojiang Zhang, Yanli Zhu, Xingmei Lu, Shucui Li, Zengxi Li. A Promising Method for Electrodeposition of Aluminium on Stainless Steel in Ionic Liquid. *AIChE Journal*, 2009, 55 (3), 783-796.
- Guikuan Yue**, Xingmei Lu, Yanli Zhu, Xiangping Zhang, Suojiang Zhang. Surface Morphology, Crystal Structure and Orientation of Aluminium Coatings Electrodeposited on Mild Steel in Ionic Liquid. *Chemical Engineering Journal*, 2009, 147 (1), 79-86.
- Guikuan Yue**, Xingmei Lu, Yanli Zhu, Hui Wang, Xiangping Zhang, Suojiang Zhang. Conductivities of $\text{AlCl}_3/\text{Ionic Liquid}$ Systems and Their Application in Electrodeposition of Aluminium. *The Chinese Journal of Process Engineering*, 2008, 8 (4), 814-819. (EI, in English)

Peer-reviewed Conference Proceedings with Presentation

- Guikuan Yue***, Edouard Asselin. Reduction Kinetics of Fe(III) on Chalcopyrite up to 110 °C. In M.J. Collins, D. Filippou, J.R. Harlamovs, E. Peek (Eds.), *42nd Annual Hydrometallurgy Meeting, Pressure Hydrometallurgy 2012* (pp. 241-255), September 30-October 3, 2012. Niagara Falls, ON: Canadian Institute of Mining, Metallurgy and Petroleum. (Conference paper & Oral presentation)
- Guikuan Yue***, Edouard Asselin. Fundamental Reduction Kinetics of Fe(III) on Chalcopyrite Surface. In M. Free, M. Moats, G. Houlachi, E. Asselin, A. Allanore, J. Yurko, & S. Wang (Eds.), *TMS (The Minerals, Metals & Materials Society) 2012 Annual Meeting, Electrometallurgy 2012* (pp. 183-198), March 11-15, 2012. Orlando, FL: John Wiley & Sons, Inc. (Conference paper & Oral presentation)

Conference Presentations

- Guikuan Yue***, Edouard Asselin. Analysis of Chalcopyrite Leaching Behavior by Mixed Potential Theory in Acidic Iron Sulfate Solution from 25 °C to 150 °C. *The 6th International Conference of Hydrometallurgy*, Beijing, China, October 16-19, 2014. (Poster presentation)
- Guikuan Yue***, Edouard Asselin. Speciation of Acidic Iron Sulfate Solutions and its Application to the Study of the Reduction Kinetics of Fe(III) on Chalcopyrite up to 150 °C. *Hydrometallurgy 2014*, Victoria, British Columbia, June 22-25, 2014. (Poster presentation)
- Guikuan Yue***, Edouard Asselin. Speciation of the $\text{H}_2\text{SO}_4\text{-Fe}_2(\text{SO}_4)_3\text{-FeSO}_4\text{-H}_2\text{O}$ System and its Application to Chalcopyrite Leaching from 25 °C to 150 °C. *CQU-UBC Research Workshop on Materials Science and Engineering*, Chongqing, China, May 13-15, 2014. (Oral presentation)
- Guikuan Yue***, Edouard Asselin. Fundamental Reduction Kinetics of Fe(III) or O_2 on Chalcopyrite Surface. *23rd Canadian Materials Science Conference*, Kelowna, British Columbia, June 22-24, 2011. (Oral presentation)
- Guikuan Yue**, Yanli Zhu, Xingmei Lu, Suojiang Zhang. Ionic Liquid-A Promising Electrolyte. *8th World Congress on Recovery, Recycling & Re-integration, R'07*, Davos, Switzerland, September 3-5, 2007. (Poster presentation)
- Guikuan Yue**, Yanli Zhu, Xingmei Lu, Hongyan He, Suojiang Zhang. Electrodeposition of Aluminium on Stainless

Steel from $\text{AlCl}_3/[\text{bmim}]\text{Cl}$ (1-butyl-3-methylimidazolium chloride). *The 8th International Symposium on Green Chemistry in China*, Beijing, China, May 21-24, 2007. (**Poster presentation**)

Book Chapters

1. Suojiang Zhang, Xingmei Lu, Yanqiang Zhang, Qing Zhou, Jian Sun, Lijun Han, **Guikuan Yue**, Xiaomin Liu, Weiguo Cheng, Shuca Li. Ionic Liquids and Relative Process Design. *Molecular Thermodynamics of Complex Systems(book name)*, Structure and Bonding, Vol. 131, Springer-Verlag Berlin/Heidelberg, 2009, Pages 143-191. (Specific part: **Ionic Liquids in Electrochemistry, p. 176-179**) (in English, can be searched in **Web of Science**)
2. **Guikuan Yue**, Xingmei Lu, Suojiang Zhang. Research on Electrodeposition of Metals from Ionic Liquids (Section 5 of Chapter 4). *Ionic Liquid and Green Chemistry (book name)*, edited by Suojiang Zhang, Chunming Xu, Xingmei Lu, Qing Zhou et al. Science Press (China), 2009, Pages 524-544. (in Chinese)