Hong Guo

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EDUCATION

Rochester Institute of Technology, Rochester, NY

PhD Candidate in Engineering 09/2016 – Expected 05/2021

Jinan University, Guangzhou, China

M.S. in Functional Metal Materials 06/2014

Zhengzhou University, Zhengzhou, China

B.E. in Metal Materials and Engineering 07/2010

SELECTED JOURNAL ARTICLES

1) **Hong Guo**, and Patricia Iglesias. Tribological behavior of ammonium-based protic ionic liquid as additive. *Friction*. 2020, 9:169-178.
2) **Hong Guo**, Fanghua Chen, Rui Liu, and Patricia Iglesias. Lubricating Ability of Magnesium Silicate Hydroxide-Based Nanopowder as Lubricant Additive in Steel-Steel and Ceramic-Steel Contacts. *Tribology Transaction*. 2020:1-12
3) **Hong Guo**, Junru Pang, Angela Rina Adukure, Patricia Iglesias. Influence of hydrogen bonding and ionicity of protic ionic liquids on lubricating steel-steel and steel-aluminum contacts: potential ecofriendly lubricants and additives. *Tribology Letters*. 2020 ,68(114).
4) J.L. Viesca, P. Oulego, R. González, **Hong Guo**, A. Hernández Battez, P. Iglesias. Miscibility, corrosión and environmental properties of six hexanoate- and sulfonate-based protic ionic liquids. *Journal of Molecular Liquids.* 2020
5) **Hong Guo**, Thomas Smith, and Patricia Iglesias. The study of hexanoate-based protic ionic liquids used as lubricants in steel-steel contact. *Journal of Molecular Liquids*. 2019, 299:1-10.
6) **Hong Guo,** Angela Rina Adukure, Patricia Iglesias. Effect of Ionicity of Three Protic Ionic Liquids as Neat Lubricants and Lubricant Additives to a Biolubricant. *Coatings*. 2019, 9(11):713-728.
7) Akshar Patel, **Hong Guo,** and Patricia Iglesias. Study of the lubricating ability of protic ionic liquid on an aluminum-steel contact. Lubricants. 2018, 6(3),66.
8) Leah Matczak, Cammie Johanning, Emmanuel Gil, **Hong Guo**, Thomas W. Smith, Michael Schertzer, and Patricia Iglesias. Effect of cation nature on the lubricating and physicochemical properties of three ionic liquids. *Tribology International*. 2018, 124:23-33.

PEER-REVIEWED CONFERENCE PROCEEDINGS

1) **Hong Guo**, and Patricia Iglesias. Tribological properties of ammonium protic ionic liquids as additives in polyalphaolefin for steel-steel contact. *Proceedings of the ASME 2019 International Mechanical Engineering Congress and Exposition*.

2) Sameer A. Magar, Hong Guo, and Patricia Iglesias. Ionic liquid as cutting fluid additive using minimum quantity lubricant (MQL) in titanium-ceramic contact. *Proceedings of the ASME 2019 International Mechanical Engineering Congress and Exposition*.
3) Hong Guo, Steven Keil, John Ackerman, Ivan Puchades, Brian Landi, and Patricia Iglesias. The effects of single-walled carbon nanotubes and ionic liquids in reduction of friction and wear. *Proceedings of the ASME 2018 International Mechanical Engineering Congress and Exposition*.
4) Sameer Magar, Hong Guo, and Patricia Iglesias. Estimation of energy conservation in internal combustion engine vehicles using ionic liquid as an additive. *Proceedings of the ASME 2018 International Mechanical Engineering Congress and Exposition*.
5) Hong Guo, Rui Liu, Alfonso Fuentes-Aznar, and Patricia Iglesias. Friction and wear properties of halogen-free and halogen-containing ionic liquids used as neat lubricants, lubricant additives and thin lubricant layers. *Proceedings of ASME 2017 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference*.

ORAL PRESENTATIONS IN CONFERENCES

1) Hong Guo and Patricia Iglesias. Investigation of Protic Ionic Liquids Used as Lubricants. *2019 STLE Tribology Frontiers Conference. October 22, 2019*
2) Hong Guo and Patricia Iglesias. The Study of Hexanoate-based Protic Ionic Liquids Used as Lubricants in Steel-steel Contact. *2019 Graduate Showcase at Rochester Institute of Technology*
3) Hong Guo and Patricia Iglesias. Tribological Behavior of Ammonium-based Protic Ionic Liquids as Additives. *2018 Graduate Showcase at Rochester Institute of Technology*

POSTER PRESENTATIONS IN CONFERENCES

1) Junru Pang, Hong Guo and Patricia Iglesias. Study of tribological properties of titanium with Laser Micro Textures under lubricating conditions. 2020 STLE Tribology Frontiers Virtual Conference. *November 9-13, 2020.*
2) Brandon Stoyanovich, Hong Guo and Patricia Iglesias. Protic ionic liquids as neat lubricants and lubricant additives. 2020 STLE Tribology Frontiers Virtual Conference. *November 9-13, 2020.*
3) Hong Guo and Patricia Iglesias. Investigation of ionic liquids as neat lubricants, additives of lubricants and thin-film lubricant layers. *21st International Conference on Wear of Materials. March 26-30, 2017*
4) Ryan Liu, Paarth Mehta, Hong Guo, Christopher Saldana and Patricia Iglesias. Tribological Properties of Textured Surfaces created using Modulation Assisted Machining for Steel-Aluminum Contact. *21st International Conference on Wear of Materials. March 26-30, 2017*
5) Hong Guo and Patricia Iglesias. Investigation of ionic liquids as neat lubricants, additives of lubricants and thin-film lubricant layers. *2017 Graduate Symposium and Showcase at Rochester Institute of Technology*

RESEARCH EXPERIENCE

Rochester Institute of Technology ----- *2016 – Present*
Research Assistant & Teaching Assistant, Tribology Laboratory
Thesis: Lubricating and Wear Mechanism of Protic Ionic Liquids as Neat Lubricants or Additives in Different Sliding Contact Modes.

The main goal of this research is to provide fundamental knowledge for the molecular design of more effective and low toxic protic ionic liquids as neat lubricants and lubricant additives:

- Synthesized different families of protic ionic liquids (PILs) and characterized their molecular structures with NMR and FTIR.
- Investigated the miscibility and stability of PILs as additives in polar and non-polar base lubricants by UV-vis spectroscopy, FTIR, and visual inspection.
- Measured the ionic conductivity, viscosity, and thermal behavior (DSC and TGA) of each PIL under different temperatures.
- Conducted frictional tests under steel-steel and steel-aluminum contacts, and analyzed the surface interactions between PILs and contact materials through SEM, EDS, and Raman Spectroscopy.

Project: Lubricating Ability of Magnesium Silicate Hydroxide-Based Nano-powder as Lubricant Additive in Steel-Steel and Ceramic-Steel Contacts.

Project: The effects of single-walled carbon nanotubes and ionic liquids in reduction of friction and wear.

Jinan University, Guangzhou, China ----- 2011 – 2014
Research Assistant, China Foundry Industry Engineering Research Center for Wear Resistant Materials
Thesis: The Study of Microstructure, Hardness, Toughness and Wear Resistance of the Medium-carbon Low-alloy Steels with Nickel.
Project: Grain Refinement Effects of New Al-Ca-C Master Alloy on AZ91 Magnesium Alloy.

Zhengzhou University, Zhengzhou, China ----- 2006 – 2010
Research Assistant, College of Materials Science and Engineering.
Thesis: The Study of Organization and Micro-hardness of Mg18Zn3Y (Mg 79%, Zn 18%, Y 3%, wt. %) in Different States.

AWARDS

1. Gleason Doctoral Fellowship, 2017-2021, USA
2. The Best Oral Presentation (Graduate Showcase) in Rochester Institute of Technology, 2019, USA
3. Top Grade Scholarship of Jinan University in 2013, 2012, P.R.C
4. Third Grade Scholarship of Zhengzhou University in 2009, P.R.C
5. Excellent Student Cadre in Jinan University in 2013, P.R.C

OTHER ACTIVITIES

- Accepted interview invitation of RIT News - Getting in Gear: Research at RIT improves gear design, materials and manufacturing operations. - 2020
- Wrote technical article for magazine “Rochester Engineering Society” - Ionic Liquids: Advanced Lubricants and Lubricant Additives - June 2020
- Served as reviewer - ASME International Mechanical Engineering Conference & Exposition (IMECE), Tribology International, and Bulletin of the Korean Chemical Society.
- Co-organized lab activity for *WE’re in Motion* and *ECCO Experience*- Summer 2019
- Organized activities to deliver knowledge about tribology to the public at *Imagine RIT 2018*

- Served as Co-Chair of Materials Processes and Characterization: *ASME International Mechanical Engineering Conference & Exposition (IMECE) 2018*
- Co-organized lab activity for K-12 Outreach Activity - 2017

SKILLSETS

- *Materials Science and Technology* - Fundamentals of Materials Science, Engineering Materials, Biomaterials, Functional Materials, Abrasion-resistant Materials and Abrasion, Fundamentals of Heat Technology of Metal, Computational Chemistry, etc.
- *Materials performance testing* - Optical microscope, 3D-Profilometer, XRD, NMR, FTIR, DSC, TGA, SEM, EDS, TEM, Raman Spectrometer etc.
- *Instrument operation* - roller mill, tube furnace, resistance furnace, wire cutting machine, impact abrasive wear testing machine, pin-on-disk tribometer, ball-on-flat reciprocating tribometer, viscometer, etc.
- *Related Theories Reserve* - General chemistry, organic chemistry, polymer chemistry, physical chemistry, physics, advanced mathematics, linear algebra, probability and statistics, etc.
- *Data Collection and Analysis* - Software including Microsoft Word, Excel, PowerPoint, MATLAB, Origin, SOLIDWORKS, Ansys, Abaqus.
- *Program* - C++, Python.