Md. Anwar Hossain

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summary

- 4.5+ years of experience in heterogeneous catalysis, battery materials (NMC, LFP, Selenium), and energy material R&D
- Knowledge of biomass/bio-oil conversion and hydrocarbon processing
- Hands-on experience in operating and troubleshooting chromatographic equipment (GC and HPLC)
- Extensive experience with catalytic reactor design and operation.
- Hands on experience in materials synthesis for energy storage.
- Vast experience in testing and troubleshooting energy storage systems.
- Energetic team player/leader, able to communicate effectively with people with diverse backgrounds
- Multidisciplinary project management with flexible and adaptable problem-solving skills

experience

University of Louisville – Louisville, KY | Aug. 2016 – Present
Research Associate/PhD. Candidate

- Led a team to conduct research in preparation and characterization of mesostructured zeolites for industrial applications, including hydrocracking, isomerization, and ketonization.
- Built a microreactor system integrated with online GC for catalyst screening and acid site determination.
- Formulated the non-flammable bio-based electrolytes for the battery applications with >10^{-3} S/cm and >1000 cycles without a drop in efficiency.
- Develop MOF functionalized separator for Li-selenium battery to achieve high-capacity retention over 500 cycle.

Crescent Chemical Complex Ltd, – Bangladesh | Sep. 2015 – Jun. 2016
Assistant Process Engineer

- Improved the process efficiency of the sulfuric acid plant
- Maximized the Linear Alkylbenzene Sulfonic Acid (LABSA) batch reactor
- Maintained the raw materials and product distribution with the sale department
- Completed second batch reactor installation, commissioning and erection for the Linear Alkylbenzene Sulfonic Acid (LABSA)

Eco Text Ltd, – Bangladesh | Sep. 2014 – Jun. 2015
Junior Maintenance Officer

- Operated the bio-chemical effluent treatment plant and maintained the treated water (bacterial growth, dissolved O_2) to meet the safety and environmental regulation
- Designed, installed, and commissioned activated carbon filter for wastewater.

research skills

Experiments:

- Experienced in operating and troubleshooting chromatographic equipment (GC and HPLC)
- Materials synthesis: zeolites, supported metal catalysts, nanoparticle metal oxides, metal-organic frameworks (MOFs)
- Materials characterization: TPD, TPO, TGA, SEM, XPS, BET, FTIR, and XRD
- Electrochemical: AC impedance, CV, LSV, chronopotentiometry
- Reactor design and operation: micro, packed bed and Parr reactors

Computation:

- Applied theoretical calculation in studies of reaction pathways, mechanism, and kinetics.

Process simulation:

- Familiar with various simulators: PRO/II, ASPEN PLUS, CHEMCAD

education

Ph.D., Chemical Engineering | Dec. 2021 (expected)
University of Louisville

M.S., Chemical Engineering | Dec. 2018
University of Louisville– USA

B.S., Chemical Engineering | Dec. 2012
Shahjalal University of Science and Technology – Bangladesh

awards & honors

- Frontier in Biorefining (FIB) Award for the 2018 Frontier in Biorefining meeting (2018)
- Graduate Student Council (GSC) travel funds (2017)

publications

Journals:

1. M.A. Hossain, T.K Phung, M.S. Rahaman, S. Tulaphol, J. Jasinski, N. Sathitsuksanoh "Catalytic cleavage of the β-O-4 aryl ether bonds of lignin model compounds by Ru/C catalyst," Appl. Catal. A, 582, 117100 (2019)
2. M. S. Rahaman, T. K. Phung, M.A. Hossain, E. Chowdhury, S. Tulaphol, M. O'Toole, G. A. Willing, J. B. Jasinski, M. Crocker, & N. Sathitsuksanoh "Hydrophobic functionalization of HY zeolites for efficient conversion of glycerol to solketal," Appl. Catal. A, 592, 117369 (2020)
3. S. Tulaphol, M.A. Hossain, M. S. Rahaman, L. Liu, T. K. Phung, S. Renneckar, N. Grisdanurak & N. Sathitsuksanoh "Direct production of levulinic acid in one pot from hemp hurd by dilute acid in ionic liquids," Energy & Fuels 34 (2), 1764-1772(2019)
4. M.A. Hossain, M.S. Rahaman, D. Lee, T.K. Phung, C.G. Canlas, B.A. Simmons, S. Renneckar, W.Reynolds, A.George, S. Tulaphol, N. Sathitsuksanoh "Enhanced Softwood Cellulose Accessibility by H3PO4 Pretreatment: High Sugar Yield without Compromising Lignin Integrity," Industrial & Engineering Chemistry Research 59 (2), 1010-1024 (2019)
5. M.A. Hossain, K.N. Mills, A.M. Molley, M.S. Rahaman, S. Tulaphol, S.B. Lalvani, J.Dong, M.K. Sunkara, N. Sathitsuksanoh ''Catalytic isomerization of dihydroxyacetone to lactic acid by heat treated zeolites," Applied Catalysis A: General 611, 117979 (2021)
6. M.A. Hossain, T.Sae-Lee, T.K. Phung, M.S. Rahaman, S. Tulaphol, S.Praserthdam, N. Sathitsuksanoh "Origin of cleavage of lignin β-O-4 over Ru/C and evidence of the Meerwein–Ponndorf–Verley reaction" **(in preparation**).
7. M.A. Hossain, M.S. Rahaman, S. Tulaphol, D. Yelle, H. Shang, Z. Sun, S. Renneckar, N. Sathitsuksanoh "Effects of polyol-based deep eutectic solvents on efficiency of rice straw enzymatic hydrolysis" Industrial Crops & Products167 (2021) 113480"
8. M.A. Hossain, S. Tulaphol, A.K. Thapa, J. Jasinski, H. Wang, M.K. Sunkara, K. Ozdemir, N. Sathitsuksanoh "Suppressing shuttling of lithium polyselenides by metal-organic framework-based separators" **(under review**)
9. M.A. Hossain, M. S. Rahaman, S. Tulaphol, J.B. Jasinski, N. Sathitsuksanoh "Reducible metal oxide catalyzed hydrogenolysis of lignin model compounds" (**in preparation**)
10. M.A. Hossain, S. Tulaphol, A.K. Thapa, J. Jasinski, H. Wang, M.K. Sunkara, N. Sathitsuksanoh: Metal-Organic framework based hybrid electrolyte for Li-ion/Li-selenium battery " (**in preparation**)
11. M.A. Hossain, A.K. Tharpa, S. Tulaphol, H. Wang, M. Sunkara, and N. Sathitsuksanoh, Eutectic electrolytes for a high-temperature lithium-ion batteries (**in preparation**)

presentations

1. 2018 Frontiers in Biorefining, St. Simons Island, Georgia, November 5 – 8, 2018, Hossain MA, Sathitsuksanoh N., 'Novel bioderived solvents for processing lignocellulose
2. 2018 Frontiers in Biorefining, St. Simons Island, Georgia, November 5 – 8, 2018, Hossain MA, Sathitsuksanoh N., 'Breaking softwood recalcitrance by an integrated thermochemical and biological pathway.
3. AIChE 2017 Annual Meeting, Minneapolis, MN, October 29-November 3, 2017. Hossain M.A., Phung T.K., Tulaphol S., Prasomsri T., Sathitsuksanoh N., "One-pot production of furans from industrial hemp"
4. AIChE 2017 Annual Meeting, Minneapolis, MN, October 29-November 3, 2017. Phung T.K., Hossain M.A., Prasomsri T., Sathitsuksanoh N., "Isosorbide production from aqueous sorbitol solution over Silica-aluminas"

5. AIChE 2017 Annual Meeting, Minneapolis, MN, October 29-November 3, 2017. Phung T.K., Hossain M.A., Tulaphol S., Prasomsri T., Sathitsuksanoh N., “Hydrophobic zeolites for solketal production from crude glycerol”
6. AIChE 2017 Annual Meeting, Minneapolis, MN, October 29-November 3, 2017. Rahaman M.S., Hossain M.A., Phung T.K., Tulaphol S., Prasomsri T., Sathitsuksanoh N., “Efficient saccharification of softwoods by an integrated thermochemical and biological process”
7. 253rd ACS National Meeting & Exposition, San Francisco, CA, April 2-6, 2017. Hossain M.A., Phung T.K., Tulaphol S., Renneckar S., Prasomsri T., and Sathitsuksanoh N., “Efficient sugar release from softwoods by an integrated thermochemical and biological process”
8. 253rd ACS National Meeting & Exposition, San Francisco, CA, April 2-6, 2017. Tulaphol S., Phung T.K., Hossain M.A., Sun N., Prasomsri T., and Sathitsuksanoh N., “Industrial hemp for fuels and chemicals: from weed to wonder”