ANWAR HUSSAIN

Harmony | Restorative | Connectedness | Analytical | Deliberative
Gallup ClinftonStrengths Assessment

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Seven years of experience with organic and organometallic synthesis and analysis with standard operating procedures using analytical instruments. Skilled in operating Single Crystal X-ray Crystallography, Powder XRD, GC-MS, IR, Fluorescence, UV/Vis, ESI-MS, and NMR spectroscopy. Familiar with OSHA, GMP, and other regulatory agencies with skills in maintaining inventories, lab reports, and laboratory cleaning.

PROFESSIONAL EXPERIENCE

Graduate Research Assistant August 2017 – July 2022
Department of Chemistry, University of South Dakota Vermillion, SD

- Responsible for lab maintenance and safety practices, handling hazardous chemicals, maintaining inventories, purchasing chemicals, and so on.
- Expertise in chemistry with specialization in multi-step organic and organo-metallic synthesis, chromatography purification, and spectroscopic characterization.
- Designed and developed several novel organic and organometallic materials for live-cell imaging, catalysis, and photosensitizers application.
- Developed an electrochemical method for deoxygenation reactions and analyzed the products with several analytical techniques such as atomic absorption spectroscopy (AAS), Single-Crystal XRD, NMR, IR, UV-Vis, Fluorescence, GC-MS, and ESI-MS spectroscopy.
- Voluntarily served as a teaching assistant to teach in organic chemistry laboratories.

Chemistry and Math Tutor September 2014 – July 2017

- Several online platforms such as Got-It Al, Yup.com, and Socratic.org.
- NAME Institute, MBBS Entrance preparation – Kathmandu, Nepal.

EDUCATION

Ph.D. University of South Dakota, Material Chemistry July 2022
Dissertation: "Photophysical, Electrochemical, and Catalytic Studies of Anthraquinone and Pyridoxyl-based Sensors and Development of Ruthenium Photosensitizers."
Advisor: Dr. Andrew G. Sykes

MS University of South Dakota, Chemistry December 2019
Thesis: "The Fluorometric Detection of Metal Cations Using Internal Imine Derivatives of Anthraquinone-18-crown-5."
Advisor: Dr. Andrew G. Sykes

MS Tribhuvan University, Organic Chemistry July 2014
Thesis: "Phytochemical and antimicrobial screening of *Rauvolfia serpentina* (Linn.) Benth. *ex* Kurz and *Tamarindus indica* Linn., and chemical investigation of the root of *Rauvolfia serpentina* by GC-MS analysis."
Advisor: Dr. Pradeep Bahadur Neupane and Dr. Ram Narayan Jha

RESEARCH PROJECTS

Development of the ruthenium-based photosensitizer Running Project
Advisor: Dr. Andrew Sykes and Dr. Kadarkaraisamy Mariappan

- Designed, developed, characterized, and studied the photophysical properties of the novel Ruthenium complexes for the application in water-splitting reactions and dye-sensitized solar cells (DSSCs) using NMR, XRD single-crystal, UV-Vis, Fluorescence, and ESI-MS spectroscopy.

Characterization and catalytical study of Pd/Pt complexes Dec 2021 – Mar 2022
Advisor: Dr. Andrew Sykes and Dr. Kadarkaraisamy Mariappan

- Characterized several Pd or Pt complexes with Single-crystal XRD.
- Studied the catalytic efficiency for coupling reactions such as Suzuki Coupling and Heck reaction using GC-MS.

Electrochemical deoxygenation reaction via bulk electrolysis Aug 2021 – May 2022
Advisor: Dr. Andrew Sykes

- Designed and developed the techniques for the three-electrode bulk electrochemistry for deoxygenation reaction.
- Bulk electrolysis products were analyzed with several analytical techniques such as atomic absorption spectroscopy (AAS), Single-Crystal XRD, NMR, IR, GC-MS and ESI-MS spectroscopy.

Development of the chemosensors to detect metal cations Aug 2017 – Aug 2021
Advisor: Dr. Andrew Sykes

- Designed, developed, and characterized the chemosensors on anthraquinone crown ether and pyridine platform to detect metal cations and studied the application in bio-imaging.
- Two first-author peer-reviewed scientific journals and three conference presentations.

HONORS AND AWARDS

Graduate Research and Creative Scholarship Grant Fall 2022
Presented in the Idea Fest 2022

1st Place Graduate Award Sept 2019
American Chemical Society's 2019 Symposium & Poster Session

PUBLICATIONS

Mariappan, K., Shrestha, P. K., **Hussain, A.**, & Sykes, A. G. (2022). A chemodosimeter for the detection of hydroxide using an anthraquinone-based receptor: Photophysical properties and X-ray crystallography. *Journal of Molecular Structure*, 133585.

Dhungana, P., Nandy, P. K., **Hussain, A.**, & Hoefelmeyer, J. D. (2021). Coordination complexes featuring bidentate κN, κI-8-iodoquinoline. *Journal of Coordination Chemistry*, 1-12.

Hussain, A., Mariappan, K., Cork, D. C., Lewandowski, L. D., Shrestha, P. K., Giri, S., ... & Sykes, A. G. (2021). A highly selective pyridoxal-based chemosensor for the detection of Zn (II) and application in live-cell imaging; X-ray crystallography of pyridoxal-TRIS Schiff-base Zn (II) and Cu (II) complexes. *RSC Advances*, *11*(54), 34181-34192.

Hussain, A., Lewandowski, L., Cork, D. C., Mariappan, K., & Sykes, A. G. (2021). Synthesis, crystallography, spectroscopy, and kinetics involving the fluorimetric detection of metal ions by internal imine derivatives of anthraquinone-18-crown-5 in aqueous media. *Polyhedron*, *200*, 115120.
Sereda, G., Sarkar, A. M., **Hussain, A.**, & Zefirov, N. (2020). Solvent-Free and Liquid-Phase Iodination of Thiophene Derivatives with Potassium Dichloroiodate Monohydrate. *Synthesis*, *52*(07), 1140-1146.

Lamichhane, S., **Hussain, A.**, Paudel, M., & Jha, R. N. (2016). Phytochemical, antimicrobial and GC-MS analysis of Juglans regia Linn. *Chem. Sci. Rev. Lett*, *5*(20), 147-156.

Hussain, A., Neupane, P. B., & Jha, R. N. (2015). Phytochemical and GC-MS Analysis of n-Hexane Extract of Rauvolfia serpentina L. Benth. ex Kurz. *Chem Sci Rev Lett*, *4*, 223-229.

CONFERENCES

Virtual oral presentation in ACS National Spring 2021: Macromolecular Chemistry: The Second Century, hosted by the American Chemical Society.

An oral presentation at the 2019 Midwest Regional Meeting, hosted by the American Chemical Society Wichita Section.

Poster presentation in the 2019 Symposium & Poster Session for Sioux Valley Local Section, hosted by the American Chemical Society.

PROFESSIONAL TRAINING

President's Senior Leadership Institute	University of South Dakota	Mar 2022
Programming Foundations: Beyond the Fundamentals		May 2020
Environmental Health and Safety Chemical Hygiene Certification		Apr 2019

INSTRUMENT SKILLS

- Bruker AXS Smart Apex CCD
- Bruker D8 Venture
- Bruker Alpha FT-IR spectrometer
- Bruker Ascend™ 400 MHz
- Shimadzu GCMS-QP2010 SE
- Rigaku Ultima IV X-ray Diffractometer
- Varian Cary 50 Bio UV-Vis spectrometer
- Varian 500-MS Ion Trap Mass spectrometer
- Horiba Fluoromax-4
- Photon Technology International (PTI) steady-state spectrofluorometer

SOFTWARE SKILLS

- Crystallography: APEX II/APEX III, SHELXL, Olex2, WinGX, Ortep3, Platon, and Mercury.
- Sci-Finder, ChemDraw, OriginPro, MS Office, Adobe Photoshop, Illustrator, etc.
- Web design and development, HTML, CSS, SSL, and WordPress.