



RAIHANA BEGUM

RESEARCH FELLOW

AI Mankhool, Bur Dubai, UAE

+971 507605159

raihanayashin@gmail.com

<https://www.linkedin.com/in/raihana-begum-a8079119/>

WORK EXPERIENCE AND ACCOMPLISHMENTS

NTU-SCARCE

SINGAPORE
FEB 2020- Present

Research Fellow

- Upcycling e-waste from photovoltaic panels and silicon wafers
- Synthesis of Silicon nanocrystals and their bio-applications
- Fluorescence detection of microbes using Si nanocrystals

ENERGY RESEARCH INSTITUTE@NTU

SINGAPORE
SEPT 2016- FEB 2020

Research Fellow

- Demonstrated a new phenomenon i.e. multiple electron-hole pair generation in low band gap formamidinium lead iodide nanocrystals, as 1st author, the results are published in Nature communication, 2018, 9, 4197
- Fabricated near-infra red (NIR) light emitting diodes (LED), work published in a Royal Society Journal, Chemical Communication 2019. 55. 5451

KAUST SOLAR CENTRE

SAUDI ARABIA
MAY 2015- JULY 2016

Postdoctoral Fellow

- Optimized a synthesis method to dope heterovalent metal ions in semiconducting nanocrystals of lead bromide perovskite, published in Journal of American Chemical Society 2017, 139, 731-737.
- Fabrication of solar cells using perovskite lead halide as absorber layer
- Developed crystallization methods for lead halide perovskite, co-authored 2 articles

CENTRE FOR NANOTECH.

IIT GUWAHATI
INDIA
JULY 2014- MAY 2015

Project Scientist

- Coordinated a Govt. of India, Department of Electronics and Information Technology sponsored project on "Development of Nanoelectronic Theranostic Devices"
- Project management, procurement of high-end instruments and established research laboratories in the newly initiated Centre for Excellence, IIT Guwahati
- Microwave synthesis of carbon dots, composite of quantum dot and carbon dot and sensing applications, results are published in ChemPhysChem 2017, 18, 610-616

EDUCATION

IIT GUWAHATI

ASSAM, INDIA

Ph.D. in Chemistry

Topic: Engineering Optical Properties of Doped Quantum Dots by Chemical Reactions
Thesis Supervisor: Arun Chattopadhyay, Professor of Chemistry, IIT Guwahati

GAUHATI UNIVERSITY

ASSAM, INDIA

M.Sc. (with specialization in Physical Chemistry)

COTTON COLLEGE

ASSAM, INDIA

B.Sc. (major in Chemistry, along with Physics and Mathematics)

JNV SIBSAGAR

ASSAM, INDIA

10+2 (Physics, Chemistry, Mathematics, Biology)

AWARDS

Materials Research Society of India (MRSI) Kolkata, India

MRSI Young Scientists' Award 2012

Council of Scientific and Industrial Research (CSIR) India

Junior Research Fellowship (JRF 2008) through National Eligibility Test (NET)

ABOUT ME

Having background in chemistry and more than eight years of research experience in the field of material synthesis, characterization, surface modification of semiconductor nanocrystals, particularly of chalcogenides and lead halide perovskites, which find potential applications in biology and energy-efficient devices like solar cells, LEDs, displays, etc.

Number of publications: 18

Citations: > 1600

h-index: 15

i-10 index: 17

TECHNICAL SKILLS

- Synthesis of air-sensitive materials using Schlenk-line
- Cleanroom fabrication: thermal evaporation, Argon/Nitrogen glovebox operation
- Comprehensive knowledge of ALD (atomic layer deposition)
- Performed spin coating for thin film deposition, UV curing, polymer encapsulation

ANALYTICAL SKILLS

- Differential scanning calorimetry (DSC) and Thermogravimetric analysis (TGA)
- Inductively coupled plasma optical emission spectrometry (ICP-OES)
- Transmission electron microscopy (TEM), Scanning electron microscopy (SEM) and fluorescent microscopy
- Powder X-ray diffractometer (XRD)
- Spectroscopy: UV-Visible, fluorescence and Fourier transform infrared (FTIR)

TRANSFERRABLE SKILLS

- Good oral and written English communication skills
- Organizational skill- organization of data, experiments, overseeing research project
- Skilled in working in different interdisciplinary collaborative projects

OTHER SKILLS

- Chemical formulation
- Inorganic synthesis
- Recycling of e-waste
- Upcycling of waste silicon wafer
- Physical chemistry
- Inorganic chemistry
- Polymer chemistry
- Hazardous Materials Training
- Bioimaging
- Wet chemistry
- Nanotechnology
- Material chemistry
- Microsoft Office
- ChemDraw
- Adobe Illustrator

REFERENCES

NRIPAN MATHEWS
Associate Professor
School of Material Sci. and Eng.
NTU Singapore
Email: nripan@ntu.edu.sg

SUBODH G. MHAISALKAR
Professor, School of Materials
Science & Engineering
NTU Singapore
Email: subodh@ntu.edu.sg

OSMAN M. BAKR
Professor, Material Science and
Engineering, King Abdullah
University of Sci. and Tech.
Kingdom of Saudi Arabia
Email: osman.bakr@kaust.edu.sa

ARUN CHATTOPADHYAY
Professor, Dept. of Chemistry
IIT Guwahati, India
Email: arun@iitg.ac.in

PUBLICATIONS (as first author, 08 of 18)

Cesium Lead Halide Perovskite Nanocrystals Prepared by Anion Exchange for Light-Emitting Diodes. *ACS Appl. Nano Mater.* 2020, 3, 2, 1766-1774. Cited by 16, Impact factor: 5.09

Stable Sn²⁺ doped FAPbI₃ nanocrystals for near-infrared LEDs. *Chem. Commun.* 2019, 55, 5451 -5454, Cited by 15, Impact factor: 6.290

Low Threshold and Efficient Multiple Exciton Generation in Halide Perovskite Nanocrystals. *Nature Communication* 2018, 9, 4197, Cited by: 79, Impact factor: 11.88

Engineering Interfacial Charge Transfer in CsPbBr₃ Perovskite Nanocrystals by Heterovalent Doping. *J. Am. Chem. Soc.* 2017, 139, 731–737, Cited by:351, Impact factor: 14.695

Redox Tuned Three-color Emission in Double (Mn and Cu) Doped ZnS Quantum Dots. *J. Phys. Chem. Lett.* 2014, 5, 126–130, Cited by: 35, Impact factor: 8.709

Recovering Hidden Quanta of Cu²⁺-doped ZnS Quantum Dots in Reductive Environment. *Nanoscale* 2014, 6, 953–961, Cited by: 11, Impact factor:7.23

Surface Ion Engineering of Mn²⁺-Doped ZnS Quantum Dots Using Ion-Exchange Resins. *Langmuir* 2012, 28, 9722–9728, Cited by: 27, Impact factor: 3.789

In Situ Reversible Tuning of Photoluminescence of Mn²⁺-doped ZnS Quantum Dots by Redox Chemistry. *Langmuir* 2011, 27, 6433–6439, Cited by: 27, Impact factor: 3.789

INVITED SPEAKER & CONTRIBUTED TALKS

Invited speaker in International Webinar “Green Approaches in Medicines, Chemicals, and Energy” organized by Riau University, Indonesia, October 2020

Contributed talk in International Conference on Materials for Advanced Technologies (ICMAT) 2019, organized by The Materials Research Society of Singapore (MRS-S), 23 – 28 June 2019 at Marina Bay Sands, Singapore

Contributed talk in ICMAT2017, organized by Materials Research Society of Singapore (MRS-S), 18 – 23 June 2017 at Suntec Singapore

PAPER PRESENTATIONS

CleanEnviro Summit Singapore 2022, 17-20 April Organised by the National Environment Agency at the Sands Expo and Convention Centre, Marina Bay Sands with the theme, “Towards Sustainable and Climate-Resilient Cities”

Chemistry National Meeting Singapore (ChnmSG) 2020, 9-10 September organized by Singapore National Institute of Chemistry (SNIC)

Gordon Research Conference on “Colloidal Semiconductor Nanocrystals”, July 20-25, 2014 in Bryant University, Smithfield, Rhode Island, USA

International Conference on Hybrid and Organic Photovoltaics 2017 (HOPV17), 21- 24 May 2017 in Lausanne, Switzerland

LINKS & DIGITAL IDENTIFIER IDs

Google Scholar
https://scholar.google.co.in/citations?hl=en&user=8c2fQLMAAAAJ&view_op=list_works&sortby=pubdate

Orchid ID: <https://orcid.org/0000-0002-1312-4227>

Scopus Author ID: 55390595500