

# MOHAMMAD SAJJAD HOSSAIN

SENIOR SCIENTIFIC OFFICER  
INDUSTRIAL PHYSICS DIVISION  
BANGLADESH COUNCIL OF SCIENTIFIC &  
INDUSTRIAL RESEARCH (BCSIR)  
DHAKA, BANGLADESH

EMAIL: sajjadbcsir@gmail.com  
sajjadipd@bcsir.gov.bd  
MOBILE: +880-1678071517  
WEBSITE: [Research Group](#)

## EDUCATION

### Master of Science in Physics

Jahangirnagar University

CGPA: 4.00/4.00

Courses: *Advanced Solid-State Physics, Advanced Nuclear Physics, Advanced Nuclear Physics, Advanced Electronics and Electronic Communication, Advanced Plasma Physics, Health and Radiation Physics*

Thesis: Study of Diffraction Pattern of Two and Three beam Case for Both Ge and Si Crystals by Using the Dynamic Theory of X-Ray

2010

Dhaka, Bangladesh

### Bachelor of Science in Physics

Jahangirnagar University

CGPA: 3.64/4.00

Courses: *Quantum Mechanics, Electrodynamics, Classical Mechanics and Relativity, Solid-State Physics, Nuclear Physics, Astronomy and Cosmology, Thermodynamics and Radiation, Optics, Atomic and Molecular Physics, Electricity and Magnetism, Mechanics, Mathematical Physics*

2009

Dhaka, Bangladesh

## CURRENT RESEARCH INTERESTS

Materials Science, Photovoltaic/Solar Cells, Thin Film, Coatings, Energy Conversion and Storage, Dielectric and Ferrite Materials, Nano-technology, Biomaterials

## RESEARCH EXPERIENCE

### PROJECTS (R&D)

#### ● Low-cost and Eco-friendly Semiconducting Materials Synthesis and Property Optimization for Solar Cell Applications

- Fabrication of all oxide based solar cell (e.g. n-type ZnO Nano-rods/p-type  $Cu_2O$ )
- Replacing CdTe based solar cell due to carcinogenic effect of Cd.
- Avoiding the sophisticated techniques (e.g. any sort of physical vapor technique like ALD, MBE, PLD, etc.)

Ongoing  
Project Associate

#### ● Synthesis and Property Optimization of Wide Band-gap Semiconducting Materials

- Deposition of ZnS thin film on both Soda Lime Glass (SLG) and Transparent Conducting Substrate (TCS) such as ITO and FTO.
- Using as a buffer layer in all oxide based solar cell.

2019- 2020  
Project Leader

#### ● Doping Effect of Transitional/Rare Earth (RE) Materials on Spinel Ferrite

- Approached both physical and wet chemical technique for the synthesis of nano-sized ferrite powder production.
- Study of doping effect on spinel ferrites in case of its structural, morphological, dielectric and optical properties.

2021- Present  
Project Associate

– Possible findings of their application in electronics industry.

● **Material Development for Ceramic Capacitor by co-doping Technique**

2015- 2018  
Project Associate

- Preparing dielectric materials with different compositions and sintering conditions.
- Frequency response analysis against dielectric constant (real and imaginary part), dielectric loss factor, conductance, etc.
- Preparing locally dielectric material as import substitute.

PUBLICATIONS ([Google Scholar Profile](#))

1. Nazia Khatun, Md. Osman Goni, Md.Saidul Islam, Md. Aftab Ali Shaikh, Syed Farid Uddin Farhad, Md. Al-Mamun, Md.Saiful Alam, Nazmul Islam Tanvir, **Md. Sajjad Hossain**, Trisha Paul, Suravi Islam, “Impact of lanthanum ions on structural, morphological, magnetic, optical and electrical properties of Cobalt-Zinc ferrites”, Journal of Magnetism and Magnetic Materials, Vol 614, 2025. [[Link](#)]
2. Md. Shehan Habib, Syed Farid Uddin Farhad, Nazmul Islam Tanvir, Md. Sha Alam, Md. Nur Amin Bitu, Md. Saidul Islam, Suravi Islam, Nazia Khatun, **Mohammad Sajjad Hossain** and Md. Aftab Ali Shaikh, “Fabrication and Characterization of Graphene-Barium Titanate-Graphene Layered Capacitors by Spin Coating at Low Processing Temperatures”, [ECS Journal of Solid State Science and Technology](#), Vol 12, 2023. [[Link](#)]
3. Nazia Khatun, Sajib Ahmed, **Mohammad Sajjad Hossain**, Syed Farid Uddin Farhad, Md Al-Mamun, Mohammad Saiful Alam, Most. Hosney Ara Begum, Nazmul Islam Tanvir, Mahmuda Hakim, Suravi Islam, “Influence of Y<sup>3+</sup> and La<sup>3+</sup> ions on the structural, magnetic, electrical, and optical properties of cobalt ferrite nanoparticles”, Heliyon 9 (2023). [[Link](#)]
4. Suravi Islam, Nazia Khatun, Md. Shehan Habib, Syed Farid Uddin Farhad, Nazmul Islam Tanvir, Md. Aftab Ali Shaikh, Samia Tabassum, Dipa Islam, **Md. Sajjad Hossain**, Ayesha Siddika, “Effect of yttrium doping on structural, electrical and optical properties of barium titanate ceramics”, Heliyon, Vol (9), 2022. [[Link](#)]
5. Mohammad Robel Molla, Most Hosney Ara Begum, Syed Farid Uddin Farhad, ASM Asadur Rahman, Nazmul Islam Tanvir, Muhammad Shahriar Bashar, Riyadh Hossen Bhuiyan, Md Sha Alam, **Mohammad Sajjad Hossain**, Mir Tamzid Rahman, “Facile Extraction and Characterization of Calcium Hydroxide From Paper Mill Waste Sludge of Bangladesh”, Royal Society Open Science, Vol 9, (2022), <https://doi.org/10.1098/rsos.220681>. [[Link](#)]
6. **Mohammad Sajjad Hossain**, Md Moazzem Hossain, “Structural, mechanical, thermodynamic, electronic and optical characteristics of LaPtBi half-Heusler compound from first principles analyses”, Ferroelectrics, Vol. 585, Issue 1 (2021). [[Link](#)]
7. Nazia Khatun, **Mohammad Sajjad Hossain**, Most Hosney Ara Begum, Suravi Islam, Nazmul Islam Tanvir, Riyadh Hossen Bhuiyan, Md Al-Mamun, “Effect of sintering temperature on structural, magnetic, dielectric and optical properties of Ni–Mn–Zn ferrites”, Journal of Advanced Dielectrics, Vol. 11, No. 6, 2150028 (2021). [[Link](#)]
8. **M.S. Hossain**, Y. Akter, M. Shahjahan, M.S. Bashar, M.H.A. Begum, M.M. Hossain, S. Islam, Khatun and M. Al-Mamun, “Influence of Ni substitution on structural, morphological, dielectric, magnetic and optical properties of Cu-Zn ferrite by double sintering sol-gel technique”, Journal of Advanced Dielectrics, Vol. 9, No. 2 (2019). [[Link](#)]

9. **M.S. Hossain**, M.B. Alam, M. Shahjahan, M.H.A. Begum, M.M. Hossain, S. Islam, Nazia Khatun, M. Hossain, M.S. Alam and M. Al-Mamun, “Synthesis, structural investigation, dielectric and magnetic properties of Zn<sup>2+</sup>-doped cobalt ferrite by the sol–gel technique”, Journal of Advanced Dielectrics”, Vol. 8, No.4, 1850030, 2018. [\[Link\]](#)
10. M. Shahjahan, S.M. Talukder, **M. S. Hossain**, M. H. A. Begum, R. L. Warnock, M. A. Haque M. Hossain, N.A. Ahmed, “Study and characterization of Mg<sub>(0.25x)</sub>Cu<sub>(0.25x)</sub>Zn<sub>(1-0.5x)</sub>Fe<sub>2</sub>O<sub>4</sub> ferrites by sol-gel method”, Ukrainian Journal of Physics, Vol. 64, No. 9, 861- 869, 2019. [\[Link\]](#)
11. S. Islam, S. A. Satter, N. Khatun, M. S. Hossain, S. F. U. Farhad, P. Bala, S. Tabassum and A. Siddika “Investigation of structural, dielectric and electrical properties of Barium Titanate ceramics co-doped with Bismuth and Yttrium”, Journal of Molecular and Engineering Materials, Vol. 07, No. 03. [\[Link\]](#)
12. Suravi Islam, Ayesha Siddika, Nazia Khatun, Mohammad Sajjad Hossain, Most Hosney Ara Begum and Nurzamn Ara Ahmed, “Structural, Dielectric and Electric Properties of Manganese- Doped Barium Titanate”, International Journal of Nanoelectronics and Materials, Volume 11, No.4, Oct 2018 [419-426]. [\[Link\]](#)
13. Mozammel Mia, Prithbey R. Dey, **Mohammad S. Hossain**, Md T. Arafat, Md Asaduzzaman, Md. Shoriat Ullah, S.M. Tareq Zobaer, “Taguchi S/N based optimization of machining parameters for surface roughness, tool wear and material removal rate in hard turning under MQL cutting condition”, Measurement, Vol 122, 380-391, 2018. [\[Link\]](#)
14. S. F. U. Farhad, N. I. Tanvir, M. S. Bashar, **M. S. Hossain**, M. Sultana and N. Khatun, “Facile synthesis of oriented zinc oxide seed layer for the hydrothermal growth of zinc oxide nanorods”, Bangladesh J. Sci. Ind. Res. 53(4), 233-244, 2018. [\[Link\]](#)
15. H. A. Begum, N. Khatun, S. Islam, N. A. Ahmed, **M. S. Hossain**, M. A. Gafur, A. Siddika “Synthesis and Characterization of Structural, Magnetic and Electrical Properties of Ni-Mn-Zn Ferrites”, International Journal of Nanoelectronics and Materials, Vol. 11, Issue 1, 15-24, 2018. [\[Link\]](#)
16. M. Shahjahan, M. H. Rahman, **M. S. Hossain**, M. A. Khatun, A. Islam, M. H. A. Begum “Synthesis and Characterization of Silver Nano Particles by Sol-Gel Technique”, Nanoscience and Nanometrology, Vol. 3, Issue 1, 34-39, 2017. [\[Link\]](#)
17. M. Shahjahan, N.A. Ahmed, S. N. Rahman, S. Islam, N. Khatun, **M.S. Hossain** “Structural and Electrical Characterization of Li-Zn Ferrites”, International Journal of Innovative Technology and Exploring Engineering (IJITEE), Vol. 3, Issue 8, 2014. [\[Link\]](#)

#### CONFERENCE ATTENDED

1. Oral presentation at “ICEPSD 2022”, on September 02-04, 2022 organized by Bangladesh Awami League, Dhaka, Bangladesh.
2. Poster presentation at “ICSTB 2021”, on March 11-13, 2021 organized by Bangladesh Council of Scientific & Industrial Research, Dhaka, Bangladesh.
3. Oral presentation at “BCSIR Congress 2019”, on December 12-14, 2019 organized by Bangladesh Council of Scientific & Industrial Research, Dhaka, Bangladesh.
4. Attended national Conference on “Physics for Sustainable Development”, on March 08-10, 2018 organized by Bangladesh Physical Society, Dhaka.

5. Attended 4<sup>th</sup> International Conference on “Structure, Processing and Properties of Materials”, on March 01-03, 2018 organized by Department of Materials and Metallurgical Engineering, BUET, Dhaka.
6. Poster presentation at International Conference on “Nanotechnology and Condensed Matter Physics”, on January 11-12, 2018 organized by Department of Physics, BUET, Dhaka, Bangladesh.
7. Attended “National Conference on Physics” with theme Physics in 21<sup>st</sup> Century: Prospects and Perspectives”, held on 05-07 January 2017 at Atomic Energy Centre, organized by Bangladesh Physical Society, Bangladesh.
8. Attended “International Conference on Physics” with theme Physics: Truth, Beauty and Relevance, held on 10-12 March 2016 at Atomic Energy Centre, organized by Bangladesh Physical Society, Bangladesh.
9. Attended “National Conference on Physics for Research and Education in Bangladesh”, held on 24-25 April 2015 at Atomic Energy Centre, organized by Bangladesh Physical Society, Bangladesh.
10. Attended “2<sup>nd</sup> International Bose Conference”, organized by Bose Centre of Advanced Study and Research in Natural Sciences, University of Dhaka, held on 3-4 December 2015, Bangladesh.
11. Attended First National Conference of Bangladesh Crystallographic Association “Theme Crystallography in Bangladesh” held on 05 December 2013, organized by Bangladesh Crystallographic Association, Bangladesh.

## TECHNICAL EXPERIENCES

- **Scanning Electron Microscopy (SEM, Hitachi S-3400N)/ Field Emission Electron MICROSCOPE (FE-SEM, Sigma 300) with Energy Dispersive X-Ray Spectrometer (EDS)**  
*Examination and analysis of micro- and nanoparticle imaging characterization of solid objects with the variation of working distance (WD), accelerating voltage, aperture size, etc. Obtain elemental compositions (wt.% and at%) through point shoot or, area selection from where data were generated by EDS analysis consisting of spectra showing peaks corresponding to the elements and elemental mapping as well.*
- **X-Ray Diffractometry (XRD, Bruker D8 and PANalytical)**  
*Perform the identification of crystalline phase and orientation of prepared sample (powder and thin film) in lab.*
- **UV-Vis-NIR Spectrometer (Shimadzu UV-2600)**  
*Determine the bandgap of thin film (transmission and diffuse reflection mode), powder materials (diffuse reflection mode) and liquid sample (absorption) from this equipment within the wavelength range from 200-1400 nm.*
- **Impedance Analyzer (Agilent 4294A, Wayne Kerr 6500B)**  
*Perform the dielectric properties (real and imaginary dielectric constant, dielectric loss tangent, quality factor, resistance) of ferrite and BaTiO<sub>3</sub> (pellet form) as a function of frequency ranging from 40 Hz to 110 MHz. Also, perform these tests by varying temperatures at a fixed frequency (WK 6500B).*
- **RAMAN Spectrometer (MacroRAM, HORIBA)**  
*Perform the identification of synthesized solid materials from the characteristics phonon modes.*
- **Photoluminescence Spectroscopy (Mini PL/RAMAN)**  
*Determine the bandgap, Near Band Energy (NBE) of thin film from photoluminescence (PL) spectra.*
- Hands-on experience of nano Particle size analyzer, FTIR.

## TECHNICAL TRAININGS

- **Wavelength Dispersive X-Ray Fluorescence (WD-XRF)**  
*Machine operation principles, Geochemical analysis (Qualitative and Quantitative analysis of powder sample), General troubleshoot and Maintenance.*
- **Optical Emission Spectrometers (OES)**

Institute of Mining, Mineralogy and Metallurgy (IMMM)  
Joypurhat, Bangladesh  
Pilot Plant and Process Development Centre (PP &PDC)  
Dhaka, Bangladesh

*Machine operation principles, Chemical analysis (PPM to percentage) of alloys, General troubleshoot and Maintenance.*

- **Thermogravimetric Analysis (TG/DTA)**

*Machine operation principles, Thermal analysis (i.e., change in mass of a sample with temperature in inert condition), General troubleshoot and Maintenance.*

Pilot Plant and Process Development  
Centre (PP &PDC)  
Dhaka, Bangladesh

- **Micro Plasma Emission Spectroscopy (MP-AES)**

*Machine operation principles, analysis of trace elements (in soils, water, metals, biological specimens, clinical specimens, food, physical evidence such as glass, and other solids) in ppm to weight percentage, General troubleshoot and Maintenance.*

Institute of Glass Ceramics and  
Research (IGCRT)  
Dhaka, Bangladesh

- **Elemental Analyzer**

*Machine operation principles, CHNS analysis (determination of the fractions of the mass of Carbon, Hydrogen, Nitrogen and Sulfur), General troubleshoot and Maintenance.*

Institute of National Analytical Research  
and Service (INARS)  
Dhaka, Bangladesh

- **Nuclear Magnetic Resonance (NMR)**

*Machine operation principles, analysis of organic compounds, General troubleshoot and Maintenance.*

Institute of National Analytical Research  
and Service (INARS)  
Dhaka, Bangladesh

## TRAININGS ABROAD

- **Nano-technology Training Course**

*Synthesis of Silver and Gold nanoparticles via chemical route and their characterizations (e.g. optical, morphological and structural, etc.), spin printing scaffold for developing wounded tissue.*

June 18-July 08, 2018  
Indian Institute of Engineering Science  
and Technology (IEST)  
Kolkata, India

- **Solar Energy Technologies and Applications**

*Solar Cell Fabrication Technology – Thin Film and Silicon Cells; Manufacturing Technology of Solar PV modules; Facilities, Standards & Testing Procedures of PV module for qualification; Types of Solar PV system and its components, Rooftop PV system design details and Conceptual Framework, etc.*

August 27-September 14  
National Institute of Solar Energy  
Haryana, India

- **Training Workshop on Pulping and Paper Making Technology of Non-Wood Fiber**

*Nano-crystalline cellulose production from non-wood fiber, special kind of paper making like conducting paper sheet.*

August 11-September 01, 2019  
CNPPRI, Beijing, China

## REFERENCES

Dr. S.F. U. Farhad  
Principal Scientific Officer  
Industrial Physics Division  
BCSIR Laboratories, Dhaka  
Contact No.: +880-1881755767  
sf1878@my.bristol.ac.uk

Dr. Jahirul Islam Khandaker  
Professor  
Department of Physics  
Jahangirnagar University  
Contact No.: +880-1752928866  
jikphy\_ju@yahoo.com  
jahir-nanophysics@juniv.edu

Dr. Sarwar Jahan  
Chief Scientific Officer and Member  
(Science & Technology)  
Bangladesh Council of Scientific &  
Industrial Research (BCSIR)  
Contact No.: +880-1715078023  
Sarwar2065@yahoo.co.uk