

# Dr. Syed Farid Uddin Farhad

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## PROFESSIONAL PROFILE

- More than ten years of experience in ceramic materials and thin solid film synthesis, processing, and characterizations
- Extensive hands-on experience in Metal oxide electrode design and fabrication for solar energy conversion and storage applications; (Photo)Electrochemistry; Impedance Spectroscopy
- **Materials Processing:** [Pulsed laser deposition](#) (PLD); [Magnetron sputtering](#); [thermal evaporation](#); [Spin coating](#); [SILAR](#) and [Electrodeposition](#); vacuum, thermo-chemical treatment; [Ceramic powder processes](#)
- Proven success in design, [construction](#) and [modification of laboratory equipment](#), technology development; instrument maintenance, R&D project management, collaboration, mentoring and tutoring of postgraduate students

## EDUCATION

**Ph.D.** (Physics; March **2016**): HH Wills Physics Laboratory, University of Bristol (UoB), UK.

**Thesis:** *Copper Oxide thin films grown by Pulsed Laser Deposition for Photovoltaic Applications.* (click here [1](#) & [2](#))

**M.S.**(Physics; September **2007**) : University of Dhaka, Bangladesh.

**Thesis:** *Construction of a Laser Raman System and its Application in the Analysis of Chemical Products* (click here [1](#) & [2](#))

**B. Sc.** (Physics; July **2005**): University of Dhaka, Bangladesh.

## EMPLOYMENT

- **Principal Scientific Officer:** 19 Dec., **2019** – **Present**  
Industrial Physics Division, BCSIR Laboratories, Dhaka, Bangladesh  
**R&D Project:** Currently acting as a principal investigator (PI) of three [R&D projects](#)

## SKILLS

### **Electron Microscopy**

More than ten years of experience in operation, routine maintenance, and troubleshooting of Scanning Electron Microscope (SEM)/Energy Dispersive X-ray (EDX) microanalysis. Conducted Selected Area Diffraction (SAD), Bright Field & Dark Field images, High-resolution Transmission Electron microscopy (HRTEM), and Atomic Force Microscopy (AFM) during the Ph.D. studies.

### **Optical, Structural, Electrical, and Optoelectronic Characterization**

Competent user of UV-VIS-NIR, Variable Angle Spectroscopic Ellipsometry (VASE), XRD/GIXRD/XRR, Confocal Micro-Raman Spectroscopy, Photoluminescence, Hall coefficient measurement setup, AC Impedance spectroscopy, Multi-probe workstation, Laser Micromachining system for shadow mask designing, Metallization/Ohmic contact fabrication in device designing.

### **(Photo)Electrochemical Characterization**

Competent user of Electrochemical workstation with Frequency Response Analyzer, Transient surface photovoltage, Photoelectrochemical IPCE of semiconducting (metal oxide) electrodes, IMPS/IMVS, etc.

### **Other Characterization tools**

Trained on the operation and essential maintenance of Gas Chromatograph (GC); XPS/UPS; (BET) Sorptometer; Wavelength Dispersive and Energy Dispersive X-ray Fluorescence (WDXRF/EDXRF); DTA/TGA.

### **Computing**

- Programming languages: C/C++; MATLAB(Basic)
- Software: Digital Micrograph, ImageJ, OriginPro, LabVIEW (Basic), SCAPS, wxAMPS, and MS Office.

## TEACHING AND MENTORING

- Three years teaching of the first-year undergraduate lab sessions at the School of Physics, University of Bristol, UK, including grading exam papers, lab reports, invigilating exams, etc.
- Mentored 2 M.Sc.(Physics), 2 B.Sc.(Materials Chemistry) and 2 B.Sc.(Physics) students during the doctoral research at the University of Bristol, UK
- Jointly supervised/guided 2 Ph.D. (EEE), 1 Ph.D. (Physics), 2 Postgraduate Research Fellows (BCSIR), 2 M.Phil. (Physics), 8 M.Sc. (EEE/Physics) and 5 M.Sc. (Materials Chemistry) students from different public universities of Bangladesh under the scope of BCSIR-approved R&D projects. ([click here](#) for details)

## GRANTS

- [UNESCO/TWAS Research Grants Physics \(Individual\)](#): Ref.# 2020 TWAS Research Grant Award\_20-143 RG/PHYS/AS\_I (USD 15,900.00) for the R&D project entitled “Gold nanoparticle decorated ZnO Nanorod arrays for eco-friendly, highly efficient and stable perovskite solar cells”
- [Royal Society of Chemistry \(RSC\), UK Research Grant](#): Ref.# R20-3167 (GBP 4650.00) for the R&D project entitled “Facile Synthesis of Ecofriendly Perovskite Absorber Materials for Photovoltaic Applications.”
- Ministry of Science and Technology ([MoST](#)), Government of Bangladesh (GoB), Special Allocation Project (SAP) grant for the project entitled “Construction of Low-Cost Equipment for Solar Energy Materials Synthesis and Characterization ([EAS-400](#)).”
- MoST, GoB, SAP grant (FY2021-22) for the project entitled “Fabrication of Multinary Metal Oxide Photoelectrodes For Sunlight-driven Hydrogen Production ([ES-404](#)).”

## AWARDS AND SCHOLARSHIPS

- [RSC Researcher Development & Travel Grant](#) to attend the [Materials Today Conference](#), 2-5 Aug. **2023**
- [IEEE EDS ISA fund](#) to attend the IEEE 47<sup>th</sup> PVSC virtual conference 15 Jun. – 21 Aug. **2020**
- [Early Career Researchers Funds](#) to attend [MRS meeting](#), Boston, MA, USA, 25- 30 Nov. **2018**
- [Full Scholarship](#) to attend ISMES VI at Caltech, Pasadena, CA, USA 16 – 22 July, **2017**
- Kurt Hoselitz Fund, School of Physics, University of Bristol, UK. Nov., **2015** – Jan., **2016**
- Bursaries/Research Grant from The Charles Wales Bangladesh Trust, UK, Dec., **2015**
- University of Bristol Alumni Travel grant, MRS Spring Meeting & Exhibition, USA, **2014**
- University of Bristol, UK postgraduate Scholarship/studentship, Oct., **2011** – Oct., **2015**  
[[Charles Frank Bursary Fund](#) and HH porter Bursary Fund]
- Bangabandhu Fellowship in Science and ICT, Ministry of Science & Technology,  
**Government of Bangladesh** **2011 – 2015**
- Ministry of Science & Technology, NSICT Fellowship, Jun., **2004** – Jul., **2005**

## PROFESSIONAL MEMBERSHIPS

**Member:** Institute of Physics (**IOP** MInstP ID# 80055743), **UK**; Materials Research Society (**MRS**) **USA**;  
**IEEE** (R10 -Asia and Pacific, Member#96835158), American Chemical Society (**ACS**) (ID#31271446), **USA**;  
Royal Society of Chemistry (**RSC**) (MRSC ID# 660721), **UK**; Bangladesh Physical Society (**BPS**).

## REFERENCES

1. Professor David Cherns	2. Dr. Sarwar Jahan	3. Professor David J. Fermín
Materials and Devices for Energy and Communication HH Wills Physics Laboratory, University of Bristol, Tyndall Avenue Bristol BS8 1TL, UK Email: <a href="mailto:d.cherns@bristol.ac.uk">d.cherns@bristol.ac.uk</a> ☎ +44(0)1179288702	Director BCSIR Laboratories, Dhaka Bangladesh Council of Scientific and Industrial Research (BCSIR) Dhanmondi, Dhaka 1205 Bangladesh Email: <a href="mailto:sarwar2065@yahoo.co.uk">sarwar2065@yahoo.co.uk</a> ☎ +8801715373923	Electrochemistry Group School of Chemistry University of Bristol Cantock's Close, Bristol BS8 1TS, UK Email: <a href="mailto:David.Fermin@bristol.ac.uk">David.Fermin@bristol.ac.uk</a> ☎ +44(0)117928 8981
<b>Relation:</b> Ph.D. Supervisor	<b>Relation:</b> Research Supervisor	<b>Relation:</b> Ph.D. co-supervisor

PUBLICATIONS (for a full list of publications, please click [here](#) )

### SELECTED RESEARCH ARTICLES (\* = Corresponding author)

- [1] M.S. Habib, **S.F.U. Farhad\***, N.I. Tanvir, et al. “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](#), **2023**.
- [2] N. Munna, R. Abdur, R. Islam, M.S. Bashar, **S.F.U. Farhad et al.**, “Influence of Sn doping on the optoelectronic properties of ZnO nanoparticles” [Nanoscale Advances](#) **2023**.
- [3] M. N. A. Bitu, N.I. Tanvir, S. Islam, and **S.F.U. Farhad\***, “Effect of substrate surface on the wide bandgap SnO<sub>2</sub> thin films grown by spin coating” [MRS Advances](#), 8, 194 -200, **2023**.
- [4] R.B. Alam, M.H. Ahmad, **S.F.U. Farhad**, and M.R. Islam, “Significantly Improved Dielectric Performance of Bio-inspired Gelatin /Single walled Carbon Nanotube Nanocomposite” [Journal of Applied Physics](#), 131(12), 124103, **2022**.
- [5] M.H. Ahmad, R.B. Alam, A. Hamid, **S.F.U. Farhad et al.**, “Hydrothermal synthesis of Co<sub>3</sub>O<sub>4</sub> nanoparticles decorated three-dimensional MoS<sub>2</sub> nanoflower for exceptionally stable supercapacitor electrode with improved capacitive performance” [Journal of Energy Storage](#), 47, 103551, **2022**.

- [6] J.F. Tanha, **S.F.U. Farhad\***, I. Ahmed\* et al. “A DFT+U Look into Experimentally Synthesised Monoclinic Scheelite  $\text{BiVO}_4$ ” [Journal of Applied Physics](#), 130 (23),235107, **2021**.
- [7] M. R. Islam, **S.F.U. Farhad** et al. “Synthesis, characterization and visible light-responsive photocatalysis properties of Ce doped CuO nanoparticles: A combined experimental and DFT+U study” [Colloids and Surfaces A: Physicochemical and Engineering Aspects](#), 126386, **2021**.
- [8] **S.F.U. Farhad\***, D. Cherns, J. A. Smith, N. A. Fox, and D. J. Fermín, “Pulsed laser deposition of single-phase n- and p-type copper oxide thin films with low resistivity” *Materials & Design* ([Elsevier](#)), Vol. 193, 108884, **2020**.
- [9] **S.F.U. Farhad\***, Md. A. Hossain, N.I. Tanvir, R. Akter, Md. A. M. Patwary, M. Shahjahan, and M.A. Rahman, “Structural, Optical, Electrical, and Photoelectrochemical properties of Cuprous Oxide thin films grown by a modified SILAR method” *Mater. Sci. Semicond. Process.* ([Elsevier](#)), 95, 68-75, **2019**.
- [10] **S.F.U. Farhad\***, N.I.Tanvir, M.S. Bashar, and M. Sultana, “Synthesis and Characterization of c-Axis Oriented Zinc Oxide Thin films and Its use for the subsequent hydrothermal Growth of Zinc Oxide Nanorods” *MRS Advances* ([Springer](#)), 4(16), 921 – 928, **2019**.
- [11] Muhammad Rakibul Islam, Mukhlasur Rahman, **S.F.U. Farhad**, and Jiban Podder, “Structural, optical and photocatalysis properties of sol-gel deposited Al-doped ZnO thin films”, *Surfaces and Interfaces* ([Elsevier](#)), 16, 120 - 126, **2019**.
- [12] **Syed Farid Uddin Farhad\***, Richard F Webster, and David Cherns, “Electron microscopy and diffraction studies of Pulsed laser deposited cuprous oxide thin films grown at Low Substrate Temperatures” *Materialia*([Elsevier](#)), 3, 230 – 238, **2018**.

## ARTICLE ACCEPTED/UNDER REVIEW/SUBMISSION

1. **S.F.U.Farhad\***, M.I. Naher, N.I. Tanvir, et al. “A facile top-down synthesis of phase pure  $\text{CuBi}_2\text{O}_4$  photocathode materials by low-energy sequential ball milling” *ACS Materials Letters*, **2023** ([preprint](#))
2. **S.F.U.Farhad\***, N.I. Tanvir, N.A. Bitu et al. “Zinc Sulfide Nanocrystals decorated vertically aligned ZnO Nanorods on Wide bandgap seed layers for Lead-free Perovskite Solar Cells” (PA.26) presented in the *Materials Today Conference* ([Elsevier](#)), 2023, 2-5 August, Singapore.

## CONFERENCE PRESENTATIONS/PROCEEDINGS

- [1] **S.F.U. Farhad** delivered an [Invited Talk](#) entitled “Ecofriendly and Nanostructured Metal Oxide Materials for Solar Cells and Solar Fuels” hosted by Solar Energy Research Institute ([SERI](#)), Universiti Kebangsaan Malaysia ([UKM](#)), Selangor, Bangi, Malaysia, August 9, **2023**.

- [2] **S.F.U. Farhad\***, M.I. Naher *et al.* “Phase Pure  $\text{CuBi}_2\text{O}_3$  with Tunable Optical Bandgaps for Photocathodes” presented (poster ID#P51) at The 3<sup>rd</sup> Commonwealth Chemistry Posters ([Video link](#)), ([Royal Society of Chemistry, UK](#)), Sep 28 – 29, **2022**.
- [3] M.S. Alam, **S.F.U. Farhad\***, *et al.* “Spherical and Rod-shaped Gold Nanoparticles for Surface Enhanced Raman Spectroscopy” (paper ID#2393) at 2022 4<sup>th</sup> International Conference on Sustainable Technologies for Industry 4.0 (STI), Dec 17 – 18, **2022**. *IEEE Xplore* DOI: [10.1109/STI56238.2022.10103339](https://doi.org/10.1109/STI56238.2022.10103339)
- [4] M.S. Islam, **S.F.U. Farhad\***, *et al.* “A LED-based Functional Light Source for the Characterization of Thin Film Solar Cells” (paper ID#1577) at 2022 4<sup>th</sup> International Conference on Sustainable Technologies for Industry 4.0 (STI), Dec 17 – 18, **2022**. *IEEE Xplore* DOI: [10.1109/STI56238.2022.10103260](https://doi.org/10.1109/STI56238.2022.10103260)
- [5] **S.F.U. Farhad**, M.Z. Baten *et al.* “Enhanced and Tunable Absorption Characteristics of Au-nanoparticle loaded ZnO Nanorods Grown by Hydrothermal Technique” presented (paper ID#103) at 2021 IEEE International Conference on Telecommunications and Photonics ([ICTP](#)) Dec 22-24, **2021**. *IEEE Xplore* DOI: [10.1109/ICTP53732.2021.9744192](https://doi.org/10.1109/ICTP53732.2021.9744192)
- [6] **S.F.U. Farhad\*** *et al.* “Facile Synthesis and Characterization of  $\text{BiVO}_4$  and  $\text{CuBi}_2\text{O}_4$  for self-sustained photoelectrochemical water splitting devices” presented (poster ID#18) at Horizons 2021- **Energy Storage and Conversion** ([Applied Physics Reviews-Virtual Conference](#)) August 4-6, **2021**.
- [7] **S.F.U. Farhad\*** *et al.* “Bismuth based Metal Oxide Photoelectrode Materials for Photoelectrochemical Generation of Solar Fuels” presented ([poster ID#P25](#)) at the International Solar Fuels Conference (RSC, UK), July 26-29, **2021**.
- [8] **S.F.U. Farhad** presented an **Invited Talk** entitled “Semiconducting Metal Oxides for Solar Energy Conversion and Storage Devices” organized by “The [IEEE Electron Device Society\(EDS\)-BUET Student Chapter](#), April 10, **2021**.
- [9] **S.F.U. Farhad\*** *et al.* “Synthesis and Characterization of c-Axis Oriented Zinc Oxide Thin films and Its use for the subsequent hydrothermal Growth of Zinc Oxide Nanorods” oral presentation at [symposium ET11](#) in the MRS Fall Meeting and Exhibit, 25 – 30 November, **2018**, Boston, MA. **USA**
- [10] **S.F.U. Farhad\***, and D. Cherns, “Structural Studies of Pulsed laser deposited Cuprous oxide thin films grown at Low Substrate Temperatures” Poster presentation at Sixth International School for Materials for Energy and Sustainability ([ISMES VI](#)), 16 -22 July, **2017**, California Institute of Technology, Pasadena, CA, **USA**.
- [11] **S.F.U. Farhad\***, and D. Cherns, “Structural Studies of Pulsed laser deposited Cuprous oxide thin films grown at Low Substrate Temperatures” poster presentation at Symposium J: Physics of Oxide thin films ([J8.30](#)) the MRS Spring Meeting and Exhibit, 20 – 25 April, **2014**, San Francisco, CA, **USA**.