

Dr. Syed Farid Uddin Farhad

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PROFESSIONAL PROFILE

- More than ten years of experience in thin solid film synthesis, processing and characterization
- Extensive hands-on experience in Metal oxide based electrodes 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; CBD 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 related to [Nanostructured Metal Oxides thin films for PV Applications](#); [Construction of low cost laboratory equipment](#); [Materials for self-sustained photoelectrochemical solar fuel devices](#).

- **Senior Scientific Officer:** August, **2011** – 18 Dec., **2019**
Industrial Physics Division, BCSIR Laboratories, Dhaka, Bangladesh
(Was on leave from 3 Oct. 2011 – 28 Feb. 2016 during Ph.D. (UoB) in the UK)
- **Scientific Officer:** June, **2006** – July, **2011**
Industrial Physics Division, BCSIR Laboratories, Dhaka, Bangladesh
Worked on some R&D projects involving synthesis and characterization of ceramic materials; ferrite materials, nanoparticles and thin films (for details see [publication list](#)).
- **Research Fellow:** June, **2004** – July, **2005**
NSICT Fellowship, Ministry of Science and Technology, Government of Bangladesh.
R&D Project: Development of a homemade [dispersive Raman Spectrometer](#) at the Centre for Advanced Research in Sciences (CARS), University of Dhaka, Bangladesh.

SKILLS

Electron Microscopy

More than 10 years' 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 and Dark Field images, High resolution Transmission Electron microscopy (HRTEM) during the Ph.D. studies.

Optical, Structural, Electrical, and Optoelectronic Characterization

Competent user of UV-VIS-NIR, Variable Angle Spectroscopic Ellipsometry(VASE), XRD, 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 etc.

Other Characterization tools

Trained on operation and basic 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), COMSOL Multiphysics (Basic), SCAPS, wxAMPS, and Microsoft Office.

TEACHING AND MENTORING

- 3 years of teaching first year undergraduate lab sessions, School of Physics, University of Bristol, UK including grading exam papers, lab reports, and invigilating exam 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
- Currently co-supervising/guiding 1 Ph.D. (EEE), 2 M.Phil. (Physics), 2 M.Sc. (EEE/Physics) and 2 M.Sc. (Materials Chemistry) students of 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) grants for the project entitled “Construction of Low Cost Equipment for Solar Energy Materials Synthesis and Characterization ([EAS-400](#))”

AWARDS AND SCHOLARSHIPS

- [IEEE EDS ISA fund](#) to attend the IEEE 47th 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 MEMBERSHIP

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 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: d.cherns@bristol.ac.uk ☎ +44(0)1179288702	Director BCSIR Laboratories, Dhaka Bangladesh Council of Scientific and Industrial Research (BCSIR) Dhanmondi, Dhaka 1205 Bangladesh Email: sarwar2065@yahoo.co.uk ☎ +8801715373923	Electrochemistry Group School of Chemistry University of Bristol Cantock's Close, Bristol BS8 1TS, UK Email: David.Fermin@bristol.ac.uk ☎ +44(0)117928 8981
Relation: Ph.D. Supervisor	Relation: Colleague (Research Collaborator)	Relation: Ph.D. co-supervisor

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

SELECTED RESEARCH ARTICLES (* = Corresponding author)

- [1] J.F. Tanha, **S.F.U. Farhad***, I. Ahmed* et al. "A DFT+U Look into Experimentally Synthesised Monoclinic Scheelite BiVO₄" *Journal of Applied Physics* (Accepted MS#JAP21-AR-05468R, DOI: 10.1063/5.0074148), **2021**.
- [2] M.H. Ahmad, R.B. Alam, A. Hamid, **S.F.U. Farhad**, and M.R. Islam, "Hydrothermal synthesis of Co₃O₄ nanoparticles decorated three dimensional MoS₂ nanoflower for exceptionally stable supercapacitor electrode with improved capacitive performance" *Journal of Energy Storage*, 103551, **2021**.
- [3] A.M.M. Musa, **S.F.U. Farhad***, M.A.Gafur, and A.T.M.K. Jamil, "Effects of withdrawal speeds on the structural, morphological, and optical properties of CuO thin films synthesized by dip-coating technique for gas sensing applications" *AIP Advances*, 11(11), 115004, **2021**.

- [4] 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**.
- [5] B.C. Gosh, **S.F.U. Farhad*** *et al.* “Influence of substrate, process conditions, and post-annealing temperature on the properties of nanocrystalline ZnO thin films grown by the Successive Ionic Layer Adsorption and Reaction Method” [ACS Omega](#), 6, 4, 2665–2674, **2021**.
- [6] **S.F.U. Farhad***, “The effect of substrate temperature and oxygen partial pressure on the properties of nanocrystalline copper oxide thin films grown by pulsed laser deposition” Data in Brief, ([Elsevier](#)), 106644, **2020**.
- [7] **S.F.U. Farhad***, D. Cherns, J. A. Smith, N. A. Fox, and D. J. Fermin, “Pulsed laser deposition of single-phase n- and p-type copper oxide thin films with low resistivity” [Materials & Design \(Elsevier\)](#), Vol. 193, 108884, **2020**.
- [8] N. K. Das, J. Chakrabartty, **S. F. U. Farhad**, A. K. Sen Gupta, E. M. K. Iqbal Ahmed, K. S. Rahman, A. Wafi, A. Ammar, M.A. Matin, and N. Amin, “Effect of Substrate Temperature on the Properties of RF Sputtered CdS Thin Films for Solar Cell Applications,” [Result in physics \(Elsevier\)](#), Volume 17,103132, **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**.
- [13] Aminul I. Talukder, Parvin Sultana, A.F.M. Y. Haider, M. Wahedoszamen, K.M. Abedin, and **S.F.U. Farhad**; “Power Dependence of Size of Laser Ablated Colloidal Silver Nanoparticles” [The European Physical Journal D \(Springer\)](#), 60, 295-300, **2010**.
- [14] **Syed Farid Uddin Farhad**, Kazi Monowar Abedin, Md. Rafiqul Islam, Aminul Islam Talukdar and A. F. M. Yusuf Haider, “Determination of Ratio of Unsaturated to total Fatty Acids in Edible Oils by Laser Raman Spectroscopy” [Journal of Applied Sciences \(Science Alert\)](#), 9(8),1538-1543, **2009**.

ARTICLE UNDER REVIEW/SUBMISSION

1. **S.F.U. Farhad***, D. Cherns, N. A. Fox, and D. J. Fermín, “*Bandgap engineering of pulsed laser deposited undoped and Al-doped ZnO thin films by varying Oxygen content and subsequent sensitization of doped ZnO with ultra-thin ZnS (≤ 10 nm) for light-harvesting applications*” **APL Materials** (MS# APM21-AR-01022).
2. R. B. Alam, **S.F.U. Farhad et al.** “*Significantly Improved Dielectric Performance of Bio-derived Polymer/Single walled Carbon Nanotube Nanocomposite*” **Journal of Applied Physics** (MS#JAP21-AR-06117).
3. M.R. Molla, M.H.A. Begum, **S.F.U. Farhad* et al.** “*Facile extraction and Characterization of Calcium Hydroxide from Paper Mill Waste Sludge of Bangladesh*” **Royal Society Open Science** (MS#RSOS- 211909).

CONFERENCE PRESENTATIONS

- [1] **S.F.U. Farhad**, M.Z. Baten *et al.* “*Enhanced and Tunable Absorption Characteristics of Au-nanoparticle loaded ZnO Nanorods Grown by Hydrothermal Technique*” upcoming presentation (paper ID#103) at The 4th IEEE International Conference on Telecommunications and Photonics ([ICTP](#)) Dec 22-24, **2021**.
- [2] **S.F.U. Farhad* et al.** “*Facile Synthesis and Characterization of BiVO₄ and CuBi₂O₄ 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**.
- [3] **S.F.U. Farhad* et al.** “*Bismuth based Metal Oxide Photoelectrode Materials for Photoelectrochemical Generation of Solar Fuels*” presented ([poster ID#25](#)) at International Solar Fuels Conference (RSC, UK), July 26-29, **2021**.
- [4] **S.F.U. Farhad** presented an **Invited Talk** entitled “*Semiconducting Metal Oxides for Solar Energy Conversion and Storage Devices*” organized by “[IEEE Electron Device Society\(EDS\)-BUET Student Chapter](#), April 10, **2021**.
- [5] **S.F.U. Farhad** “*Ecofriendly Metal Oxide Semiconductors for Solar Energy Conversion and Storage*” (Abstract Reference#IL-C01 page#107) presented an **Invited Talk** in "Interantional Conference on Science and Technology for Celebarating the Birth Centernary Of Bangabandhu ([ICSTB-2021](#)), March 11- 13 21, **2021**.
- [6] **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**
- [7] **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**.