Muhammad Abdelshakour Muhammad Youssef, PhD

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SUMMARY OF QUALIFICATIONS

- Looking for a position at academic institutions or research centers where I can develop my technical and academic expertise in the fields of solar energy materials, optoelectronics and solar cell research.
- Ph.D. in Materials Science with extensive experience in fabrication and characterization of new generations of solar cells
- More than 10 years of experience in solar cells research
- Competent in synthesis and characterization of organic and inorganic photosensitizers
- Accomplished several research projects, published and co-published **15 journal papers**

EDUCATION

2019-2022 University of Tsukuba-National Institute for Materials Science (NIMS), Tsukuba, Japan

Ph.D. in Materials Science (Egypt-Japan Education partnership (EJEP) 3rd call)

- **Thesis**: Effects of N and O-based Lewis base additives on crystallinity, carrier recombination and performance of perovskite solar cells
- **Advisors**: Prof. Ashraful ISLAM (NIMS, Japan)
  Prof. Kiyoto Matsuishi (University of Tsukuba, Japan)

2018 Polymer and Color Chemistry Textile Engineering, Chemistry and Science, North Carolina State University, USA

Visiting researcher (Science and Technology Development Fund Fellowship)

- **Advisors**: Prof. Ahmed El-Shafei (NC State University, USA)

2014-2016 Chemistry Department, Faculty of Science, Assiut University, Assiut, Egypt

M.Sc. of Science in Chemistry

- **Thesis**: Synthesis and characterization of some new Ruthenium complexes and their applications in dye-sensitized solar cells
- **Advisors**: Prof. Waleed Ahmed El-Said/ Prof. Ahmed Hassan Osman (Assiut University, Egypt)

2013-2014 Chemistry Department, Faculty of Science, Assiut University, Assiut, Egypt

Postgraduate courses of master's degree, (GPA: 88.29 %, Excellent with Honors, Ranked First)

2007-2011 Chemistry Department, Faculty of Science, Assiut University, Assiut, Egypt

B.Sc. of Science in Chemistry, (GPA: 82.98 %, Very Good with Honors, Ranked 2nd of 100)

PROFESSIONAL EXPERIENCE

2019- 2022 **Ph.D. researcher**, Photovoltaic Materials Group, NIMS, Japan (Prof. Ashraful Islam Research Group)

- Enhancing the efficiency and stability of perovskite solar cells using Lewis bas additives.
- Fabrication and characterization of high efficiency and stable Pb and Pb-free perovskite solar cells Developed automatic control tools for automated synthesis of semiconductor thin films

Jan.- May 2018 **Visiting researcher**, NC State University, USA (Prof. Ahmed El-Shafei's Research Group)

- Molecular design, organic synthesis and characterization of organic and inorganic Donor-π- Acceptor photosensitizers for high efficiency Dye-Sensitized Solar Cells
- Fabrication and characterization of Dye-Sensitized Solar Cells

2014.- 2016 **M.Sc. Researcher**, Chemistry Department, Faculty of Science, Assiut University, Assiut, Egypt

- Synthesis and characterization of new ruthenium complexes as photosensitizers for Dye-Sensitized Solar Cells (DSSCs)
- Fabrication and characterization of Dye-Sensitized Solar Cells.
- Participate in building the first lab. for fabrication and characterization of DSSCs in Assiut University

July-Aug. 2010 **Industrial Trainee**, Assiut Cement Company, Assiut, Egypt

- Received training on cement raw materials, roasting, manufacturing, and packing.

TECHNICAL SKILLS

I am competent in synthesis and characterization of organic and inorganic Donor-π- Acceptor photosensitizers for solar cells application. In addition to Fabrication and characterization of Pb and Pb free perovskite solar cells:

- Synthesis of organic and inorganic photosensitizers.
- Thin-film fabrication (Physical Vapor Deposition, Thermal Evaporation, Spin-coating and Screen Printing)
- X-ray diffraction (XRD)
- Scanning electron microscopy (SEM)
- Water contact angle Measurements.
- Characterization of performance for solar cell (I-V curve, IPCE, EIS)
- Stability measurements of perovskite solar cells
- Spectroscopic measurements (UV-Vis, IR, AC-3E)
- Nuclear magnetic resonance (NMR)
- Mass spectroscopy

- Electrochemical measurement (cyclic voltammetry)
- Glovebox manipulation

ADMINISTRATIVE AND MENTORING EXPERIENCE

2022–present **Lecturer at Chemistry Department, Faculty of Science, Assiut University**

- Teaching the Lectures and practical courses to the undergraduate students

2012–2019 **Assistant Teaching staff at Chemistry Department, Assiut University**

- Teaching the practical courses to the undergraduate students

AWARDS AND RECOGNITIONS

2022 **Dean's Award**, University of Tsukuba, Japan

- Prestigious Award given to the Best Doctoral Theses at the Graduate School of Pure and Applied Sciences, University of Tsukuba, Japan

2019-2022 **Egypt-Japan Education partnership (EJEP) 3rd call**_ Egyptian Ministry of Higher Education and Scientific Research (2019-2022).

- Awarded for the top prospective PhD students in the whole Egyptian universities and research institutes

Jan.-May 2018 **Science and Technology Development Fund (STDF)**_Short Term Fellowship at NC State University, USA

2007-2011 Award of **high ranked** undergraduate students, chemistry program, faculty of science, Assiut University, Assiut, Egypt

List of Publications

Journal Publications

1) **Muhammad Abdel-Shakour**, Kiyoto Matsuishi, Towhid H. Chowdhury and Ashraful Islam. "Regulated oxidation and moisture permeation via sulfinic acid based additive enables highly efficient and stable Tin-based perovskite solar cells". ***Sol. Energy Mater. Sol. Cells*** **2023**, 254, 112241.
2) **Muhammad Abdel-Shakour**, Towhid H. Chowdhury, Kiyoto Matsuishi, Md. Abdul Karim, Yulu He, Yutaka Moritomo, and Ashraful Islam. "Diaminomaleonitrile Lewis Base Additive for Push-Pull Electron Extraction for Efficient and Stable Tin-Based Perovskite Solar Cells". ***ACS Appl. Energy Mater.*** **2021**, 4, 11, 12515– 12524.
3) **Muhammad Abdel-Shakour**, Towhid H. Chowdhury, Kiyoto Matsuishi, Yutaka Moritomo and Ashraful Islam. "Chemical passivation of the undercoordinated Pb^{2+} defects in inverted planar perovskite solar cells via β-diketone lewis base additives". ***Photochem. Photobiol. Sci.*** **2021**, 20, 357- 367.
4) **Muhammad Abdel-Shakour**, Towhid H. Chowdhury, Kiyoto Matsuishi, Idriss. Bedja, Yutaka Moritomo and Ashraful Islam. "High-Efficiency Tin Halide Perovskite Solar Cells: The Chemistry of

Tin (II) Compounds and Their Interaction with Lewis Base Additives during Perovskite Film Formation". ***Sol. RRL* 2021**, 5, 2000606, 1-24.

5) **Muhammad Abdel-Shakour**, Waleed A. El-Said, Islam M. Abdellah, Rui Su and Ahmed ElShafei. "Low-cost Schiff bases chromophores as efficient co-sensitizers for MH-13 in dye sensitized solar cells". ***J. Mater. Sci. Mater. Electron.* 2019**, 30, 5081–5091.
6) Waleed A. El-Said, **Muhammad Abdelshakour**, Jin-Ha Choi and Jeong-Woo Choi. "Application of Conducting Polymer Nanostructures to Electrochemical Biosensors". ***Molecules*, 2020**, 25(2), 307.
7) Waleed A. El-Said, **M. Abdel-Shakour**, Alaa Abd-Elnaiem "An efficient and low-cost photoanode for backside illuminated dye-sensitized solar cell using 3D porous alumina". ***Mater. Lett.* 2018**, 222, 126-130.
8) Abdalrhman G. Al-Gamal, Ahmed Mourtada Elseman, **Muhammad Abdel-Shakour**, Towhid Hossain Chowdhury, Khalid I. Kabel, Ahmed A. Farag, Nour E.A. Abd El-Sattar, Abdelrahman M. Rabie, Naoki Fukata, Ashraful Islam. "Synergistic Effect of Integrating N-Functionalized Graphene and PEDOT:PSS as Hole Transporter Bilayer for High-Performance Perovskite Solar Cells". ***Adv. Compos. Hybrid Mater.* 2023**, 6, 103
9) Yulu He, Imane Abdellaoui, **Muhammad Abdel-Shakour**, Towhid Hossain Chowdhury, Muhammad Akmal Kamarudin, Ana Flávia Nogueira, Qing Shen, Shuzi Hayase, Ashraful Islam, Takeaki Sakurai. "Study of open circuit voltage loss mechanism in perovskite solar cells". ***Jpn. J. Appl. Phys.* 2021**, 60 SBBF13.
10) Praveen Naik, Islam M. Abdellah, **M. Abdel-Shakour**, Madhukara Acharaya, Naveenchandra Pilicode, Airody Vasudeva Adhikari, Ahmed El-Shafei "An efficient aniline based co-sensitizer for high performance N_3 sensitized solar cells". ***Chemistry Select*, 2018**, 3(43):12297-12302.
11) Praveen Naik, Islam M. Abdellah, **M. Abdel-Shakour**, Rui Su, Kavya S. Keremane, Airody Vasudeva Adhikari, Ahmed El-Shafei, "Improvement in performance of N_3 sensitized DSSCs with structurally simple aniline based organic co-sensitizers", ***Solar Energy.* 2018**, 174, 999-1007.
12) Md Abdul Karim, Kiyoto Matsuishi, Towhid H Chowdhury, **Muhammad Abdel-Shakour**, Yulu He and Ashraful Islam." Additive-Assisted Electronic Defect Passivation in Lead-Free Tin Perovskite Solar Cells: Suppression of Sn^{2+} Oxidation and I^- Losses". ***ACS Appl. Energy Mater.* 2022**, XXXX.
13) Md. Abdul Karim, Kiyoto Matsuishi, Towhid H. Chowdhury, Wasif Islam Chowdhury, **Muhammad Abdel-shakour** and Ashraful Islam." Bathocuproine interfacial layer leads to solid improvement of reproducibility and stability of Pb-free $CsBi_3I_{10}$ based perovskite solar cells". ***J. Mater. Sci.: Mater. Electron.* 2022**, 33, 8114–8126.
14) Md Faiz Shah, Antoine Mirloup, Towhid H. Chowdhury, Alexandra Sutter, Abdulkader S. Hanbazazah, Anas Ahmed, Jae-Joon Lee, **Muhammad Abdel-Shakour**, Nicolas Leclerc, Ryuji Kaneko and Ashraful Islam. "Cross-Conjugated BODIPY Pigment for Highly Efficient Dye Sensitized Solar Cells". ***Sustain. Energy Fuels*, 2020**,4, 1908-1914
15) Md Faiz Shah, Antoine Mirloup, Towhid H. Chowdhury, Sutter Alexandra, Abdulkader S. Hanbazazah, Anas Ahmed, Jae-Joon Lee, Nicolas Leclerc, **Muhammad Abdel-Shakour** and

Ashraful Islam. "A near-Infrared Thienyl-Bodipy Co-Sensitizer for High-Efficiency Dye-Sensitized Solar Cells". ***Sustain. Energy Fuels***, **2019**, 3, 2983-2989.

16) Ahmed H. Osman, Waleed A. El-Said and **M. Abd El-Shakour**. "Synthesis and characterization of some new ruthenium (II) complexes as photosensitizers in dye-sensitized solar cells". ***Journal of Advances in Chemistry*****. 2017**, 12,4413-4426, 2017.

Conferences

1) **Muhammad. Abdel-Shakour**, Towhid H. Chowdhury, Kiyoto Matsuishi, Ashraful Islam. "Suppression of the Pb^{2+} defects in the perovskite films using Lewis- base additives in perovskite solar cells". *International online conference on Hybrid materials and optoelectronic devices, NanoGe,* **2020.**
2) Ahmed H. Osman, Waleed A. El-Said and **M. Abd El-Shakour** "Synthesis and photovoltaic properties of new ruthenium (II) sensitizers for dye-sensitized solar cells"**.** *First international conference on applied chemistry*. *Chemistry for sustainable world"-Chemistry Department -King Abdulaziz University, Jeddah-Saudi Arabia 18-19 November* ***2015***. *(Poster presentation)*
3) Ahmed H. Osman, Waleed A. El-Said and **M. Abd El-Shakour**, "Number of bipyridine units as a function of the efficiency of Dye-Sensitized Solar Cells". *First international conference on multidisciplinary research – Porto Sokhna-Ain Sokhna-Egypt 28-31 October* ***2015****. (Poster presentation).*
4) Hassan A. K., **M. Abd El-Shakour**, "biodegradable polymers for drug delivery systems". *Third conference for the young researchers, basic science, and technology***,** Assuit University, April **2011**. *(Oral presentation).*