Behrooz Eftekharinia

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Personal Information Nationality: Iranian, Gender: Male, Date of Birth: 21/03/1988

Current Position **Assistant Professor at Babol Noshirvani University of Technology**

Research Interests **Optical/Electrochemical Biosensors**: plasamonic biosensors, 2D Materials
Renewable Energy: Photoelectrochemical Materials, PV-PEC Energy Conversion, Metal Organic Frameworks, Conductive Polymers for water splitting
Thin Films: Physical Vapor Deposition, Photochemical Synthesis, Characterization, Charge Transfer Analysis
Light management simulations: Light Trapping, Plasmonics, COMSOL

Education

Institute for Research in Fundamental Sciences (IPM), Tehran, Iran.
Postdoctoral Researcher. 2017-Present,

- **Project:** Optimization of PV-modules in combination with transition metal electrocatalysts for unassisted water splitting:

(1) Encapsulation and PEC water splitting characterization of Si solar cell
(2) Layered double hydroxide (LDH) catalysts as electrodes for water splitting
(3) Stabilizing Si solar cells with LDH electrocatalysts in alkaline solution

Tarbiat Modares University (TMU), Tehran, Iran
Ph.D., Atomic and Molecular Physics, 2012–2017.

- **Thesis:** Improvement of water oxidation performance in e-beam deposited hematite photoanodes based on oxygen evolution catalyst modification and light management

Amirkabir University of Technology (AUT), Tehran, Iran
M.Sc., Atomic and Molecular Physics, 2009–2011.

- **Thesis:** Modelling of amplification properties of a Yb:doped photonic crystal fiber.

Shahid Madani University of Tabriz, Iran, B.Sc., Solid State Physics, 2005–2009.

Publication

1. *K Kaveh, SK Hassaninejad-Darzi, B Eftekharinia "Development of a Newly Designed Electrochemical Sensor Based on NiFe Layered Double Hydroxide/Graphitic Carbon Nitride Nanocomposites for the Determination of Anti-pneumonia Linezolid Drug", Journal of Inorganic and Organometallic Polymers and Materials (2026).*

2. Behrooz Eftekharinia*, "Stepwise optimization of a WO3/BiVO4 heterojunction modified with a ternary NiFeCo co-catalyst as a stable and efficient photoanode for water oxidation*", Journal of Applied Physics D (2026).
3. Behrooz Eftekharinia, "*Highly Sensitive Tantalum-Mediated Plasmonic Sensor based on a D-shaped Photonic Crystal Fiber Incorporating Open-Air Hole", Iranian Journal of Applied Physics (2025).*
4. *A Ramzannezhad, S Ghasemi, B Eftekharinia, S Safari, "Development of electrochemical sensor for vanillin determination using carbon spheres–LaFe0.9Ni0.1O3 nanohybrid", Scientific Reports (2025).*
5. Behrooz Eftekharinia, Nader Sobhkhizy Vayghan, "*Refractive index sensor based on surface plasmon resonance excitation in a D-Shaped optical fiber coated by tantalum*", *Plasmonics (2022).*
6. Behrooz Eftekharinia, Nader Sobhkhizy Vayghan, Ali Esfandiar, Ali Dabirian, "*Effect of film morphology on water oxidation improvement in NiFeCo modified hematite photoanodes*", Surface and Coatings Technology (2021).
7. Behrooz Eftekharinia, Hossein Pezeshki, Ali Dabirian, "*Unassisted Water Splitting Using Standard Silicon Solar Cells Stabilized with Copper and Bi-functional NiFe Electrocatalysts*", ACS Applied & Materials Interfaces (2020).
8. Shima Farhoosh, Behrooz Eftekharinia, Meysam Tayebi, Byeong-Kyu Lee, Naimeh Naseri,"*Ternary Ti-Fe_2O_3/Fe_2TiO_5/FeOOH Heterojunction Designed for PEC Water Splitting*", under Review.
9. Behrooz Eftekharinia, Davoud Danaei, Ali Dabirian, "*Computational study of film morphology impact on light absorption in particulate Ta_3N_5/Si photoanodes for water splitting*", Journal of Applied Physics D (2020).
10. B. Eftekharinia, A. Moshaii, N.Sobhkhizy Vayghan, A. Dabirian, "*Efficient nanoporous hematite photoanodes prepared by electron beam evaporation and Au modification*", ChemCatChem (2018).
11. B. Eftekharinia, A. Moshaii, A. Dabirian, N.Sobhkhizy Vayghan "*Optimization of charge transport in a Co–Pi modified hematite thin film produced by scalable electron beam evaporation for photoelectrochemical water oxidation*", Journal of Material Chemistry A (2017).
12. B. Eftekharinia, A. Moshaii, A. Dabirian, "*Design rules of nanostructured transparent conductive electrodes for light trapping in hematite photoanodes*", Journal of photonics for energy (2017).
13. B. Eftekharinia, A. Moshaii, A. Dabirian, "*Design of a slit-groove coupler for unidirectional excitation of the guided surface plasmon polaritons through a plasmonic slot waveguide*", Plasmonics (2016).
14. B. Eftekharinia, "*Highly confined long range transmission of a surface Plasmon polariton mode in a novel design of metallic slit-groove nanostructures*", Optik, 2019.
15. B. Eftekharinia, A. Moshaii, S. H. Nabavi, A. Dabirian, *''High intensity enhancement of unidirectional propagation of a surface plasmon polariton beam in a metallic slit-groove nanostructure* '', Scientia Iranica (2014).
16. B. Eftekharinia, P. Parvin, H. Habibiyan, and H. Hoseinzadeh, "*Analysis of amplification properties of a photonic crystal fiber*", Optik (2013).

Conferences

1. N. Naseri, Sh. Farhoosh, B. Eftekharinia, “Solar water splitting on Ti-doped hematite nanostructured photoanode modified with FeOOH electro-catalysts’’, (NanoGe-2019).
2. N. Naseri, Sh. Farhoosh, B. Eftekharinia, “The effect of Ti dopant level and pseudobrookite top layer on PEC performance of hematite photoanodes”, (15thecsi.iranecs.ir-2019)
3. B. Eftekharinia, A. Moshaii, N.Sobhkhizy, A. Dabirian, “Highly efficient Co-Pi modified hematite thin film produced by a scalable electron beam evaporation for photoelectrochemical water oxidation”, (ICNS7-2017).
4. B. Eftekharinia, A. Moshaii, A. Dabirian, “Light management in a transparent conductive nanostructured for light harvesting improvement in hematite photoanodes”, (ICNS7-2017).
5. B. Eftekhariniaa, S. H. Nabavia, A. Moshaii, “Enhancement of current density amplitude of localised propagation of a surface plasmon polariton beam in a metallic slit- groove nanostructure”, (ICNN-2014).
6. B. Eftekharinia, A. Moshaii, N.Sobhkhizy, A. Dabirian, “Physical vapor deposition of α-Fe_2O_3 thin films for photoelectrochemical water splitting”, (ICNS6-2016)
7. A.Naderirad, B.Eftekarinia, A.Moshaii, A.Bakouei, “Hydrothermal synthesis of hematite nanostructures for photoelectrochemical water splitting”, (ICNS6-2016)
8. H. Norouzi, B.Eftekarinia, A.Moshaii, A.Bakouei, “Investigation of photoelectrochemical properties of WO_3 thin films for water splitting”, (ICNS6-2016)
9. B. Eftekharinia, A. Moshaii, N. Sobhkhiz, “Simulation of absorption properties of a hematite/ metallic nanohole array nanostructure for water splitting applications”, (2^{nd} Iran-Belarus international conference on modern applications of nanotechnology-2015).
10. B. Eftekharinia, S. H. Nabavi, A. Moshaii, “High intensity enhancement of unidirectional propagation of a surface plasmonpolariton beam in a metallic slit-groove nanostructure”, (ICNS5-2014).

Teaching Experiences

- Babol Noshirvani University of Technology, Fundamental physics, Modern Physics, Applied Optics, advanced optics, Electromagnetics, Electrodynamics, Thermodynamics, Solid State Physics (2021-now).
- Amirkabir University of Technology, Fundamental physics, (2010-2012).
- Teacher at Farhangian University of Tehran, Fundamental physics, Modern Physics, Fundamentals of Optics (2012-2015).
- Kermanshah University of Technology, Fundamental physics, Modern Physics, Applied Optics (2016-2017).
- Babol Noshirvani University of Technology, Fundamental physics, Modern Physics, Applied Optics (2021-2022).
- Conducted COMSOL simulation workshops at Kermanshah University of Technology (2016-2017)
- Conducted COMSOL simulation workshops at IMP Institute (2018)

Work Experiences

Postdoctoral Researcher at IPM Institute 2017-2020:

- Encapsulation and PEC water splitting characterization of Si solar cell

- Layered double hydroxide electrocatalysts synthesis as electrodes for water splitting
- Stabilizing Si solar cells with LDH electrocatalysts in alkaline electrolyte
- Optimization of PV modules in combination with electrocatalysts for unassisted water splitting

Skills

- Physical vapor deposition: Sputtering, Thermal, and e-beam evaporation
- Photo/electrochemical characterizations (CV, LSV, EIS, IPCE)
- Thin film characterization (XPS, XRD, TEM, AFM, SEM, EDX, FTIR, UV-VIS, Raman, GC-MS)
- Chemical vapor deposition
- Chemical solution synthesis (hydrothermal, photochemical, electrodeposition)
- Solar cell characterization
- Simulation (Comsol Multiphysics, DDScat, Origin software)

Honors Member of National Talents Foundation.
First Rank M.Sc. Student in Physics Department of AUT, 2012.
Received Talented Student Award of National Talents Foundation in 2016.

Languages English, Farsi, Kurdish

References

1. Dr. Ali Dabirian, IPM institute, (Postdoc supervisor), Email: dabirian@ipm.ir, Phone: +98 9128188961.
2. Dr. Ahmad Moshaii, Tarbiat Modares University, (Phd-Thesis supervisor), Email: moshaii@modares.ac.ir, Phone: +98 9125476878.
3. Dr. Naimeh Naseri, Departments of Physics, Sharif University of Technology, Tehran, Iran, (collogue) Email: naseri@sharif.edu, Phone: +98 21 6616 4556.
4. Dr. Ali Esfandiar, Departments of Physics, Sharif University of Technology, Tehran, Iran, (collogue) Email: Esfandiar@physics.sharif.ir, Phone: +98 21 6616 4557.