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Department of Chemistry

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Abolhassan Noori

(Last update: July 18, 2024)

Personal details

First name: Abolhassan

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Date of birth: September 16, 1979

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Current Research Interests

Metal-Air Batteries, Water-Splitting, Electrocatalysis, Electrochemical capacitors, Electrosynthesis of Advanced Materials

Education

2005-2011 **Ph.D in Analytical Chemistry**, Shiraz University, Shiraz, Iran

Supervisor: Prof. Abdolkarim Abbaspour

Dissertation: A Cyclodextrin Host-guest Recognition Approach to an Electrochemical Sensor for Quantification of Some Biomolecules & Electrochemical Quantification of Single-nucleotide Polymorphisms Using Monobase-modified Apoferritin-encapsulated Nanoparticles

2003-2005 **M.Sc in Analytical Chemistry**, Shiraz University, Shiraz, Iran

Supervisor: Prof. Abdolkarim Abbaspour

dissertation: Development of Paptode colorimetric method as an appropriate alternative for optodes

1999-2003 **B.Sc in Chemistry**, International University of Imam Khomeini, Qazvin, Iran

Research Experiences

2018-present **Research Assistant Professor**,
Chemistry Department, Tarbiat Modares University

Advisor for:

Ph.D graduated,

1. Dr. Hamed Alijani, 2020
2. Dr. Mahrokh Nazari, 2021
3. Dr. Masoumeh Moloudi, 2021
4. Dr. Elaheh Dadashpour, 2021
5. Dr. Neda Dianat, 2021
6. Dr. Ali Khodabandehlo, 2022
7. Dr. Navid Khodayar, 2022
8. Dr. Atefeh Ashoory, 2023
9. Dr. Hajar Yousefzadeh, 2023

M.Sc. graduated,

1. Mr Ali Shakibanasab, 2020
2. Ms Abedeh-Sadat Sajjadi, 2022
3. Ms Rezvaneh Rahmani, 2022
4. Ms Kosar Labbafi, 2022
5. Mr Mohammad-Mahdi Razavi, 2023

2011-2018 **Postdoctoral fellow**, Prof. Mir F. Mousavi's group

Chemistry Department, Tarbiat Modares University

My postdoctoral research has been focused on the following topics:

- Novel SECM approaches for signal-on detection of single nucleotide polymorphisms
- SECM investigation of aptamer-based biosensors for protein and/or drug sensing
- Antibody and aptamer-based sandwich immunosensors
- Nanoparticle-conjugated proteins and nucleic acids in biosensing
- Bio-templated synthesis of metal nanoclusters
- Application of nanomaterials in electrochemical energy storage; Batteries and electrochemical capacitors.

2009 **Visiting scholar** in the Department of Chemistry, Laboratory of Sensors and Biosensors, Florence University, Firenze, Italy

Hosted by: (late) Prof. Marco Mascini

Teaching Experiences

- Analytical Electrochemistry, MSc students, Tarbiat Modares University
- Electrochemical Mechanisms, Ph.D students, Tarbiat Modares University (co-teaching)
- Analytical Chemistry to BSc students of Agriculture, Azad University
- Electrochemistry to BSc students of Chemistry, Azad University
- General Chemistry to BSc students of Chemistry, Physics, and Engineering, Azad University
- Lab. of Electrochemistry to BSc students of Chemistry, Shiraz University
- Lab. of Instrumental Analysis, including Spectrophotometry, HPLC, GC, Fluorescence, and Atomic Spectroscopies (AA, AE, and ICP) to BSc students of Chemistry, Azad University
- Lab of General Chemistry to BSc students of Engineering and Agriculture, Azad University

Services to the Academic Communities

- Guest Editor of *Advanced Materials Letters* - Special Issue - 3rd volume, 6th issue, 2012. Selected Papers from the International Conference on

Nanomaterials and Nanotechnology (ICNANO 2011) University of Delhi, India, 18-21 December 2011

- Reviewer of some *ACS*, *RSC*, *Elsevier*, *Wiley*, and *Springer* journals.
- Referee of the Iran National Science Foundation.

Fellowships, Awards, and Honors

- Iranian National Science Foundation Research Fellowship, 2015.
- Outstanding Contribution in Reviewing for *Biosensors and Bioelectronics* Award, Feb. 2018.
- The Academy of Medical Sciences of Iran Award (Dr. Hadavi's Award) Feb. 2019.
- Selected by the Elite Recruitment Working Group as a Young Elite Faculty Member of Tarbiat Modares University (2019-2021)
- Being selected as one of the Top 2% Scientists Worldwide based on the single-year impact, identified by Stanford University (2021-2023).

Membership

- Iranian Chemical Society
- Iranian Electrochemical Society

Seminars

1. Application of a Paptode Colorimetric Method to the Development of Urea Biosensor, 15th *Iranian Seminar of Analytical Chemistry*, 2007, Shiraz University, Shiraz, Iran.
2. Mesoporous Carbon Nitride as a High Performance Electrode Material for Energy Storage Application, *International E-congress on Nanosciences and Nanotechnology (ICNN)*, 2021. (International)
3. Mussel-inspired Polydopamine Film Electrodeposited on Functionalized Carbon Cloth as a High-Performance Supercapacitor, *International E-congress on Nanosciences and Nanotechnology (ICNN)*, 2021. (International)

4. Achieving Superior energy storage performances by modification of anode materials of a Ni-Cd battery, *15th Annual Electrochemistry Seminar of Iran*, 2021, Tehran, Iran.
5. Negative Electrode Materials for Supercapacitive Energy Storage: Bottlenecks and Possible Remedies, *AAAFM-UCLA 2021 International Conference*, 2021, Los Angeles, U.S.A. (International, presented by Prof. Mir F. Mousavi)
6. Negative Electrode Materials for High-Performance Supercapacitors: Advances and Challenges, *Malta X Conference*, 2022, Valletta, Malta (Invited Speaker)

Publications

Articles

(48 articles, **h-index** = 27, based on Scopus)

1. Abbaspour, A.; Mehrgardi, M. A.; **Noori, A.**; Kamyabi, M. A.; Khalafi-Nezhad, A.; Soltani Rad, M. N. Speciation of iron(II), iron(III) and full-range pH monitoring using paptode: A simple colorimetric method as an appropriate alternative for optodes. *Sensors and Actuators B: Chemical* **2006**, 113, 857-865.
2. Abbaspour, A.; Khajehzadeh, A.; **Noori, A.** A simple and selective sensor for the determination of ascorbic acid in vitamin C tablets based on paptode. *Analytical sciences: the international journal of the Japan Society for Analytical Chemistry* **2008**, 24, 721-5.
3. Abbaspour, A.; **Noori, A.** Electrochemical studies on the oxidation of guanine and adenine at cyclodextrin modified electrodes. *The Analyst* **2008**, 133, 1664-72.
4. **Noori, A.**; Centi, S.; Tombelli, S.; Mascini, M. Detection of activated protein C by an electrochemical aptamer-based sandwich assay. *Analytical and Bioanalytical Electrochemistry* **2010**, 2, 178-188. (Invited paper)
5. Abbaspour, A.; Dehghani, E.; **Noori, A.** Cyclodextrin Host-Guest Recognition Approach for Simultaneous Quantification and Voltammetric Studies of Levodopa and Carbidopa in Pharmaceutical Products. *Electroanalysis* **2011**, 23, 2878-2887.
6. Abbaspour, A.; **Noori, A.** A cyclodextrin host-guest recognition approach to an electrochemical sensor for simultaneous quantification of serotonin and dopamine. *Biosensors and Bioelectronics* **2011**, 26, 4674-4680.
7. Abbaspour, A.; **Noori, A.** Electrochemical detection of individual single nucleotide polymorphisms using monobase-modified apoferritin-encapsulated nanoparticles. *Biosensors and Bioelectronics* **2012**, 37, 11-18.

8. Abbaspour, A.; **Noori, A.** A cyclodextrin host-guest recognition approach to a label-free electrochemical DNA hybridization biosensor. *The Analyst* **2012**, 137, 1860-5.
9. Ghaffarinejad, A.; Sadeghi, N.; Kazemi, H.; Khajehzadeh, A.; Amiri, M.; **Noori, A.** Effect of metal hexacyanoferrate films on hydrogen evolution reaction. *Journal of Electroanalytical Chemistry* **2012**, 685, 103-108.
10. Moradi, N.; Mousavi, M. F.; Mehrgardi, M. A.; **Noori, A.** Preparation of a new electrochemical biosensor for single base mismatch detection in DNA. *Analytical Methods* **2013**, 5, 6531-6538.
11. Abbaspour, A.; Norouz-Sarvestani, F.; **Noori, A.**; Soltani, N. Aptamer-conjugated silver nanoparticles for electrochemical dual-aptamer-based sandwich detection of staphylococcus aureus. *Biosensors and Bioelectronics* **2015**, 68, 149-155.
12. Ilkhani, H.; Sarparast, M.; **Noori, A.**; Zahra Bathaie, S.; Mousavi, M. F. Electrochemical Aptamer/antibody based sandwich immunosensor for the detection of EGFR, a Cancer biomarker, using gold Nanoparticles as a signaling probe. *Biosensors and Bioelectronics* **2015**, 74, 491-497.
13. Moradi, N.; **Noori, A.**; Mehrgardi, M. A.; Mousavi, M. F. Scanning Electrochemical Microscopy for Electrochemical Detection of Single-base Mismatches by Tagging Ferrocenecarboxylic Acid as a Redox Probe to DNA. *Electroanalysis* **2016**, 28 (4), 823-832.
14. Bagheryan, Z.; **Noori, A.**; Bathaie, S. Z.; Yousef-Elahi, M.; Mousavi, M. F. Preparation of a new nanobiosensor for the determination of some biogenic polyamines and investigation of their interaction with DNA. *Biosensors and Bioelectronics* **2016**, 77, 767-773.
15. Beigloo, F.; **Noori, A.**; Mehrgardi, M. A.; Mousavi, M. F., Label-free and sensitive impedimetric nanosensor for the detection of cocaine based on a supramolecular complexation with β -cyclodextrin, immobilized on a nanostructured polymer film. *Journal of the Iranian Chemical Society* **2016**, 13 (4), 659-669.
16. Sarparast, M.; **Noori, A.**; Ilkhani, H.; Bathaie, S. Z.; El-Kady, M. F.; Wang, L. J.; Pham, H.; Marsh, K. L.; Kaner, R. B.; Mousavi, M. F., Cadmium nanoclusters in a protein matrix: Synthesis, characterization, and application in targeted drug delivery and cellular imaging. *Nano Research* **2016**, 9 (11), 3229-3246.
17. Mousavi, M. F.; Hashemi, M.; Rahmanifar, M. S.; **Noori, A.**, Synergistic effect between redox additive electrolyte and PANI-rGO nanocomposite electrode for high energy and high power supercapacitor. *Electrochimica Acta* **2017**, 228, 290-298.
18. Mousavi, M. F.; Mirsian, S.; **Noori, A.**; Ilkhani, H.; Sarparast, M.; Moradi, N.; Bathaie, S. Z.; Mehrgardi, M. A., BSA-templated Pb Nanocluster as a Biocompatible Signaling Probe for Electrochemical EGFR Immunosensing. *Electroanalysis* **2017**, 29 (3), 861-872.
19. Azari, S. R.; Rahmanifar, M. S.; El-Kady, M. F.; **Noori, A.**; Mousavi, M. F.; Kaner, R. B., A wide potential window aqueous supercapacitor based on LiMn₂O₄-rGO nanocomposite. *Journal of the Iranian Chemical Society* **2017**, 14(12), 2579-2590.

20. Mousavi, M. F.; Amiri, M.; **Noori, A.**; Khoshfetrat, S. M., A Prostate Specific Antigen Immunosensor Based on Biotinylated-Antibody/Cyclodextrin Inclusion Complex: Fabrication and Electrochemical Studies. *Electroanalysis* **2017**, 29 (12), 2818-2831.
21. Hashemi, M.; Rahmanifar, M. S.; El-Kady, M. F.; **Noori, A.**; Mousavi, M. F.; Kaner, R. B., The use of an electrocatalytic redox electrolyte for pushing the energy density boundary of a flexible polyaniline electrode to a new limit. *Nano Energy* **2018**, 44, 489-498.
22. Shabangoli, Y.; Rahmanifar, M. S.; El-Kady, M. F.; **Noori, A.**; Mousavi, M. F.; Kaner, R. B., An integrated electrochemical device based on earth-abundant metals for both energy storage and conversion. *Energy Storage Materials* **2018**, 11, 282-293.
23. Rahmanifar, M. S.; Hesari, H.; **Noori, A.**; Masoomi, M. Y.; Morsali, A.; Mousavi, M. F., A dual Ni/Co-MOF-reduced graphene oxide nanocomposite as a high performance supercapacitor electrode material. *Electrochimica Acta* **2018**, 275, 76-86.
24. Shabangoli, Y.; Rahmanifar, M. S.; El-Kady, M. F.; **Noori, A.**; Mousavi, M. F.; Kaner, R. B., Thionine Functionalized 3D Graphene Aerogel: Combining Simplicity and Efficiency in Fabrication of a Metal-Free Redox Supercapacitor. *Advanced Energy Materials* **2018**, 1802869.
25. Rahmanifar, M. S.; Hemmati, M.; **Noori, A.**; El-Kady, M. F.; Mousavi, M. F.; Kaner, R. B., Asymmetric supercapacitors: An alternative to activated carbon negative electrodes based on earth abundant elements. *Materials Today Energy* **2019**, 12, 26-36.
26. **Noori, A.**; El-Kady, M. F.; Rahmanifar, M. S.; Kaner, R. B.; Mousavi, M. F., Towards establishing standard performance metrics for batteries, supercapacitors and beyond *Chemical Society Reviews* **2019**, 48, 1272-1341.
27. Bishkul, H.; Khoshfetrat, S. M.; **Noori, A.**; Mehrgardi, M. A.; Mousavi, M. F., Rich-color visual genotyping of single-nucleotide polymorphisms based on platinum nanoparticle-induced etching of gold nanorods. *Emergent Materials* **2019**, 2 (3), 351-361.
28. Dai, Y.; Li, W.; Chen, Z.; Zhu, X.; Liu, J.; Zhao, R.; Wright, D. S.; **Noori, A.**; Mousavi, M. F.; Zhang, C., An air-stable electrochromic conjugated microporous polymer as an emerging electrode material for hybrid energy storage systems. *Journal of Materials Chemistry A* **2019**, 7, 16397-16405.
29. Shabangoli, Y.; Rahmanifar, M. S.; **Noori, A.**; El-Kady, M. F.; Kaner, R. B.; Mousavi, M. F., Nile Blue Functionalized Graphene Aerogel as a Pseudocapacitive Negative Electrode Material across the Full pH Range. *ACS Nano* **2019**, 13 (11), 12567-12576.
30. Alijani, H.; **Noori, A.**; Faridi, N.; Bathaie, S. Z.; Mousavi, M. F., Aptamer-functionalized Fe₃O₄@MOF nanocarrier for targeted drug delivery and fluorescence imaging of the triple-negative MDA-MB-231 breast cancer cells. *Journal of Solid State Chemistry* **2020**, 292, 121680.
31. Shabangoli, Y.; El-Kady, M. F.; Nazari, M.; Dadashpour, E.; **Noori, A.**; Rahmanifar, M. S.; Lv, X.; Zhang, C.; Kaner, R. B.; Mousavi, M. F., Exploration of Advanced Electrode Materials for Approaching High-Performance Nickel-Based Superbatteries. *Small* **2020**, 2001340.

32. Moloudi, M.; Rahmanifar, M. S.; **Noori, A.**; Chang, X.; Kaner, R. B.; Mousavi, M. F., Bioinspired polydopamine supported on oxygen-functionalized carbon cloth as a high-performance 1.2 V aqueous symmetric metal-free supercapacitor. *Journal of Materials Chemistry A* **2021**, 9 (12), 7712-7725.
33. Nazari, M.; Rahmanifar, M. S.; **Noori, A.**; Li, W.; Zhang, C.; Mousavi, M. F., The ordered mesoporous carbon nitride-graphene aerogel nanocomposite for high-performance supercapacitors. *Journal of Power Sources* **2021**, 494, 229741.
34. Mousavi, M. F.; Rahmanifar, M. S.; **Noori, A.**; Dadashpour, E.; Shabangoli, Y., In Situ Growth of Ni–Zn–Fe Layered Double Hydroxide on Graphene Aerogel: An Advanced Two-in-One Material for Both the Anode and Cathode of Supercapacitors. *Energy Technology* **2021**, 9, 2100645.
35. Dianat, N.; Rahmanifar, M. S.; **Noori, A.**; El-Kady, M. F.; Chang, X.; Kaner, R. B.; Mousavi, M. F., Polyaniline-Lignin Interpenetrating Network for Supercapacitive Energy Storage. *Nano Letters* **2021**, 21, 9485-9493.
36. Khodabandehlo, A.; **Noori, A.**; Rahmanifar, M. S.; El-Kady, M. F.; Kaner, R. B.; Mousavi, M. F. Laser-Scribed Graphene–Polyaniline Microsupercapacitor for Internet-of-Things Applications. *Advanced Functional Materials* **2022**, 32 (39), 2204555.
37. Khodayar, N.; **Noori, A.**; Rahmanifar, M. S.; Shabangoli, Y.; Baghervand, A.; El-Kady, M. F.; Hassani, N.; Chang, X.; Neek-Amal, M.; Kaner, R. B.; et al. Super-Fast and Super-Long-Life Rechargeable Zinc Battery. *Advanced Energy Materials* **2022**, 12 (43), 2202784.
38. Nazari, M.; **Noori, A.**; Rahmanifar, M. S.; El-Kady, M. F.; Hassani, N.; Neek-Amal, M.; Kaner, R. B.; Mousavi, M. F. Phase-Dependent Energy Storage Performance of the NixSey Polymorphs for Supercapacitor-Battery Hybrid Devices. *ACS Applied Materials & Interfaces* **2022**, 14, 50900–50912.
39. Shahbazi Farahani, F.; Rahmanifar, M. S.; **Noori, A.**; El-Kady, M. F.; Hassani, N.; Neek-Amal, M.; Kaner, R. B.; Mousavi, M. F., Trilayer Metal–Organic Frameworks as Multifunctional Electrocatalysts for Energy Conversion and Storage Applications. *Journal of the American Chemical Society* **2022**, 144, 3411-3428.
40. Zhang, T.; Li, C.; Wang, F.; **Noori, A.**; Mousavi, M. F.; Xia, X.; Zhang, Y. Recent Advances in Carbon Anodes for Sodium-Ion Batteries. *The Chemical Record* **2022**, 22 (10), e202200083
41. Zhang, Y.; Li, C.; Cao, F.; **Noori, A.**; Mousavi, M. F.; Xia, X. Carbon in electrochemical energy. *Materials Research Bulletin* **2022**, 152, 111852.
42. Moloudi, M.; **Noori, A.**; Rahmanifar, M. S.; Shabangoli, Y.; El-Kady, M. F.; Mohamed, N. B.; Kaner, R. B.; Mousavi, M. F. Layered Double Hydroxide Templated Synthesis of Amorphous NiCoFeB as a Multifunctional Electrocatalyst for Overall Water Splitting and Rechargeable Zinc–Air Batteries. *Advanced Energy Materials* **2023**, 13 (4), 2203002.
43. Qiu, Z.; Shen, S.; Liu, P.; Li, C.; Zhong, Y.; Su, H.; Xu, X.; Zhang, Y.; Cao, F.; **Noori, A.**; et al. Plasma Enhanced Lithium Coupled with Cobalt Fibers Arrays for Advanced Energy Storage. *Advanced Functional Materials* **2023**, 33 (16), 2214987.

44. Shen, S.; Chen, Y.; Zhou, J.; Zhang, H.; Xia, X.; Yang, Y.; Zhang, Y.; **Noori, A.**; Mousavi, M. F.; Chen, M.; et al. Microbe-Mediated Biosynthesis of Multidimensional Carbon-Based Materials for Energy Storage Applications. *Advanced Energy Materials* **2023**, *13* (19), 2204259.
45. Ashoori, A.; **Noori, A.**; Rahmanifar, M. S.; Morsali, A.; Hassani, N.; Neek-Amal, M.; Ghasempour, H.; Xia, X.; Zhang, Y.; El-Kady, M. F.; et al. Tailoring Metal-Organic Frameworks and Derived Materials for High-Performance Zinc-Air and Alkaline Batteries. *ACS Applied Materials & Interfaces* **2023**, *15* (25), 30220-30239.
46. Yousefzadeh, H.; **Noori, A.**; Rahmanifar, M. S.; Hassani, N.; Neek-Amal, M.; El-Kady, M. F.; Vinu, A.; Kaner, R. B.; Mousavi, M. F., Partial Sulfidation of the Electrochemically Exfoliated Layered Double Hydroxides toward Advanced Aqueous Zinc Batteries. *Adv. Energy Mater.* **2023**, *13* (41), 2302137.
47. Liao, H.; Zhong, W.; Li, C.; Han, J.; Sun, X.; Xia, X.; Li, T.; Noori, A.; Mousavi, M. F.; Liu, X.; Zhang, Y. An intrinsically self-healing and anti-freezing molecular chains induced polyacrylamide-based hydrogel electrolytes for zinc manganese dioxide batteries. *J. Energy Chem.* **2024**, *89*, 565-578.
48. Khodayar, N.; Noori, A.; Rahmanifar, M. S.; Moloudi, M.; Hassani, N.; Neek-Amal, M.; El-Kady, M. F.; Mohamed, N. B.; Xia, X.; Zhang, Y.; et al. An ultra-high mass-loading transition metal phosphide electrocatalyst for efficient water splitting and ultra-durable zinc–air batteries. *Energy Environ. Sci.* **2024**, *17* (14), 5200-5215.

Book Chapter

1. Leila Kashefi-Kheyraadi, **Abolhassan Noori**, Masoud A. Mehrgardi “bioconjugated-nanoporous gold films in electrochemical biosensors”. *Biosensors Nanotechnology*; Advanced Materials Series. Edited by Ashutosh Tiwari and Anthony P.F. Turner. John Wiley & Sons, Inc.: 2014; pp 345-374.