



1. Full name and date

El-Nagar, Gumaa (male)

Date of the CV - 11 Mar. 18

2. Date and place of birth, nationality, current residence

Date and place of birth: June 6, 1987 in Cairo, Egypt

Citizenship: Egyptian

Current residence: Freie Universität Berlin, Institute of Chemistry and Biochemistry-Physical and Theoretical Chemistry, Takustr. 3, D-14195, Berlin, Germany

E-mails: Gumaa.elnagar@fu-berlin.de & Gumaa@sci.cu.edu.eg

3. Education and degrees awarded

Ph.D. (Physical Chemistry), “Fabrication and Characterization of a Binary Metal/Metal oxide Nanostructured Anodes for Fuel Cells Applications”, Chemistry Department, Faculty of Science, Cairo University (**February 22, 2015**).

M.Sc. (Physical Chemistry), “Tailored of a Binary and Ternary Nanostructure Electrodes for Fuel Cells Applications: DFT Calculations”, Cairo University (November 13, **2011**)

B.Sc. (Distinction with honors), Major Chemistry, Faculty of Science, Cairo University (May, **2008**)

4. Other education and training, qualifications and skills

My research skills and interests cover the following fields **1) Nanostructures Fabrication and Characterization**, **2) Renewable Energy (Fuel cells, Batteries, solar cells, etc)**, **3) Electrocatalysis**, **4) Quantum Calculations (DFT)** **5) Redox Flow Batteries**, **6) CO₂ Reduction**, and **7) Electrosensing**.

Computer skills: Excellent dealing with several application and programming software including Microsoft office, Origin, Photoshop, Gaussian calculations, Mathematica, MathCAD, Grapher, Sigma Plot, Thermocalc, Igor, Chemistry programs.

Attending and successfully passing 16 training courses organized by the Center of Development of Skills of Staff and Leaders in Cairo University and Dahlem Research School at Free Berlin University including *Time Management and Work Stresses, Modern Trends in Teaching, Conferences Organization, Effective Presentations Skills, Scientific Publications, Skillful Communications, Performance-Convincing with Body and Voice, Modern Teaching Techniques, Writing of Scientific Proposal, Scientific Supervision*.

Attending and successfully passing many workshops about the using of different ex- and in-situ characterization techniques including AFM, XPS, XRD, FTIR, DRIFTS, UV, GC/MS, Atomic Force Microscope, TEM, Raman, TGA, XAS, DEMS, Realistic Fuel cells and Redox Flow Batteries measurements, and SEM-EDs at Free Berlin University, BESSY, Cairo University and Ulm University(2017)

5. Linguistic skills

Mother tongue: **Arabic**

Other languages:

English: Fluent speaking, listening and writing (IELTs Score 7.0)

German: Good (B1)

6. Current position

November 2015-April 2018 Georg Forster HERMES Research Fellowship funded by the Alexander von Humboldt Foundation, Institute of Chemistry and Biochemistry-Physical and Theoretical Chemistry, Freie Universität Berlin, Berlin, Germany.

<http://www.fu-berlin.de/en/international/news-events/newsletter/2016/201602/201602-el-nagar-fuel-cells-catalysts.html>

April 2015-To date **Permanent Position: Lecturer of Physical Chemistry**, Chemistry Department, Faculty of Science, Cairo University, Cairo, Egypt. Teach Physical and Quantum Chemistry courses such as Reaction Kinetics, Applied Electrochemistry, and General Quantum chemistry. <http://scholar.cu.edu.eg/?q=elnagar/>

7. Previous work experience

Feb. 2012-Mar.2015 **Assistant Lecturer**, Chemistry Department, Faculty of Science, Cairo University, Egypt. Teach some Physical Chemistry courses for undergraduate students such as General Chemistry, Thermodynamics, Electrochemistry, and Applied Science.

Mar. 2010-Jan.2012 **Instructor**, Chemistry Department, Faculty of Science, Cairo University, Egypt. Teach Physical Chemistry Tutorial for the undergraduate students.

Sept.-Dec. 2012, **Researcher visit** via DAAD to study *ORR at N-Doped TiO₂ using RRDE, XRD, DEMS and SEM*, Prof. Jurgen Behm Research Group, Institute of Surface and catalysis, Ulm University, Germany.

8. Research funding as well as leadership and supervision

Research funding

Georg Forster Postdoc Research Fellowships for young researchers via Alexander von Humboldt Foundation under the title of “*Impurities Contributing to Catalysis: Enhanced Electro-Oxidation of Small Organic Molecules for more Efficient Fuel Cells*”-Principle investigator for 2 years, besides 4 months German language intensive courses.

Supervision

Co-Advisor of M. Sc. student Mohamed Eissa, Thesis topic is “*Synthesis of Nanostructured-Based Catalysts for Fuel Cell applications*”, Cairo University, Egypt. (On-going)

Co-Advisor of M.Sc. student Doha Mahmoud Mohammad, Thesis topic is “*Development of Nanostructured-Based Electrodes for Energy Conversion Applications*”, Cairo University, Egypt (2017).

9. Merits in teaching and pedagogical competence

Awarded as the **best lecturer of physical chemistry at Cairo University**. 2015.

Teaching and supervising several **Experimental Physical Chemistry classes** (freshmen to B.Sc.-level students) at the Department of Chemistry, Cairo University (2010-2016).

Teaching several **Computer-assisted Chemistry courses** for the undergraduate students (2010-2015).

Teaching several **Physical Chemistry courses** for Undergraduate and B.Sc. students at the Department of Chemistry, Cairo University including (2015-2016):

General Physical Chemistry (Chem102),

Chemical Thermodynamics (Chem211),

Introduction to Electrocatalysis (Chem 334),

Electrochemistry of Reversible and Irreversible Systems (317),

Environmental and Organic Electrochemistry (Chem 415)

10. Awards, prizes and honours

Alexander von Humboldt Research Fellowship, Institute of Chemistry and Biochemistry-Physical and Theoretical Chemistry, Freie Universität Berlin, Berlin, Germany (2016)

GRESS Research-Fellow, Institute of Surface Chemistry and Catalysis, Ulm University, Ulm, Germany (2012)

Award of **Shlumberger Scholarship** for two years 2007 and 2008.

My M.Sc. and Ph.D. were awarded as **the best M.Sc. and Ph.D. Thesis in Cairo University**, 2013 and 2015, respectively.

Awarded the **Best Lecturer Prize** at Faculty of Science from Cairo University, 2015

11. Other academic merits

Member of the organizing committee, International conference in Chemistry, Chem05, Cairo University, Egypt, March, 2008. <http://chemconf.cu.edu.eg/>

Reviewer at several scientific international journals such as Chemistry Select (Reviewed 3 papers), Nano Energy (Reviewed 1 article), Electrochimica Acta (Reviewed 2 articles) and Journal of Hazardous Materials (Reviewed 3 articles).

Member of Quality Control and Assurance Unit, Chemistry Department, Faculty of Science, Cairo University.

Member of International Association of Hydrogen Energy (IAHE) since 2013. <http://www.iahe.org/>

Member of The Electrochemical Society (ECS) since 2017. <https://www.electrochem.org/>

12. Scientific and societal impact of research

Total Publications: **33** h-index (ResearcherID): **9.0** Total citations (ResearcherID): **244**

Of the total publications

25 Original research articles

4.0 Book chapters

2.0 conference contribution

2.0 theses

Conferences Contributions: **21 (Germany, USA, Turkey, Egypt)**

Scopus Author ID: [55600273200](https://orcid.org/0000-0001-8209-4597)

ORCID: [0000-0001-8209-4597](https://orcid.org/0000-0001-8209-4597)

Researcher ID: [N-2838-2017](https://orcid.org/0000-0001-8209-4597)

LIST OF PUBLICATIONS

A Peer-reviewed scientific articles

1. Fetyan, A.; **El-Nagar, G. A.**; Roth, C., A Neodymium Oxide Nanoparticle-Doped Carbon Felt as Promising Electrode for Vanadium Redox Flow Batteries, *Electrochimica Acta* 2018, *Article in press*. [Doi:10.1016/j.electacta.2018.02.104](https://doi.org/10.1016/j.electacta.2018.02.104).
2. El-Nagar, G. A.; Sarhan, R. M.; Lauermann, I.; Roth, C., Hierarchically Structured Iron-Doped Silver (Ag-Fe) Lotus Flowers for Efficient Oxygen Reduction Reaction, *Nanoscale* 2018, *Accepted Manuscript*. [Doi: 10.1039/C8NR00020D](https://doi.org/10.1039/C8NR00020D)
3. **El-Nagar, G. A.**; Mohamed, A. H.; Lauermann, I.; Roth, C., Efficient Direct Formic Acid Fuel Cells (DFAFCs) Anode Derived from Seafood waste: Migration Mechanism. *Scientific Reports* 2017, 7, 17818. [Doi:10.1038/s41598-017-17978-8](https://doi.org/10.1038/s41598-017-17978-8).
4. **El-Nagar, G. A.**; Sarhan, R. M.; Abouserie, A.; Bargheer, M.; Roth, C., Efficient 3D-Silver Flower-like Microstructures for Non-Enzymatic Hydrogen Peroxide (H₂O₂) Detection. *Scientific Reports* 2017, 7, 12181-12189. Doi: [10.1038/s41598-017-11965-9](https://doi.org/10.1038/s41598-017-11965-9).
5. **El-Nagar, G. A.**; Derr, I.; Kottakkat, T.; Roth, C., Auspicious Metal-Doped-Cu₂O/Cu Dendrite Catalysts for Direct Alkaline Fuel Cells: Effect of Dopants, *ECS Transactions* 2017, *Accepted*. [Doi:10.0000/ma.ecsdl.org/ma/MA2017-02/36/1607](https://doi.org/10.0000/ma.ecsdl.org/ma/MA2017-02/36/1607)
6. **El-Nagar, G. A.**; Roth, C., Enhanced electrooxidation of glucose at nano-chitosan-NiOOH modified GC electrode: fuel blends and hydrocarbon impurities. *Physical Chemistry Chemical Physics* 2017, 19, 2537-2548. Doi: [10.1039/C6CP08360A](https://doi.org/10.1039/C6CP08360A)
7. **El-Nagar, G. A.**; Mohammad, A. M.; El-Deab, M. S.; El-Anadouli, B. E., Propitious Dendritic Cu₂O–Pt Nanostructured Anodes for Direct Formic Acid Fuel Cells. *ACS Applied Materials & Interfaces* 2017, 9, 19766–19772. Doi: [10.1021/acsami.7b01565](https://doi.org/10.1021/acsami.7b01565)
8. **El-Nagar, G. A.**; Hassan, M. A.; Fetyan, A.; Kayarkatte, M. K.; Lauermann, I.; Roth, C., A promising N- doped carbon-metal oxide hybrid electrocatalyst derived from crustacean's shells: Oxygen reduction and oxygen evolution. *Applied Catalysis B: Environmental* 2017, 214, 137-147. Doi: [10.1016/j.apcatb.2017.05.030](https://doi.org/10.1016/j.apcatb.2017.05.030)
9. **El-Nagar, G. A.**; Derr, I.; Fetyan, A.; Roth, C., One-pot synthesis of a high performance chitosan-nickel oxyhydroxide nanocomposite for glucose fuel cell and electro-sensing applications. *Applied Catalysis B: Environmental* 2017, 204, 185-199. Doi: [10.1016/j.apcatb.2016.11.031](https://doi.org/10.1016/j.apcatb.2016.11.031)
10. **El-Nagar, G. A.**; Dawood, K. M.; El-Deab, M. S.; Al-Andouli, B. E., Efficient direct formic acid fuel cell (DFAFC) anode of nano-sized palladium complex: High durability and activity origin. *Applied Catalysis B: Environmental* 2017, 213, 118-126. doi: [10.1016/j.apcatb.2017.05.006](https://doi.org/10.1016/j.apcatb.2017.05.006)
11. **El-Nagar, G. A.**; Darweesh, A. F.; Sadiq, I., A novel nano-palladium complex anode for formic acid electro-oxidation. *Electrochimica Acta* 2016, 215, 334-338. Doi: [10.1016/j.electacta.2016.08.127](https://doi.org/10.1016/j.electacta.2016.08.127)
12. **El-Nagar, G. A.**; Roth, C., Impurity-Induced Electrocatalysis: Unpredicted Enhancement Effect of Ammonia Impurity towards Formic Acid Electro-Oxidation. *ChemistrySelect* 2016, 1, 5706-5711. Doi: [10.1002/slct.201601149](https://doi.org/10.1002/slct.201601149)
13. **El-Nagar, G. A.**; Mohammad, A. M.; El-Deab, M. S.; El-Anadouli, B. E., Novel fuel blends facilitating the electro-oxidation of formic acid at a nano-Pt/GC electrode. *RSC Advances* 2016, 6, 29099-29105. Doi: [10.1039/C6RA00118A](https://doi.org/10.1039/C6RA00118A)
14. Mohammad, A. M.; **El-Nagar, G. A.**; Al-Akraa, I. M.; El-Deab, M. S.; El-Anadouli, B. E., Towards improving the catalytic activity and stability of platinum-based anodes in direct formic acid fuel cells. *International Journal of Hydrogen Energy* 2015, 40, 7808-7816. Doi: [10.1016/j.ijhydene.2014.11.108](https://doi.org/10.1016/j.ijhydene.2014.11.108)
15. **El-Nagar, G. A.**; El-Deab, M. S.; Mohammad, A. M.; El-Anadouli, B. E., Promoting Effect of

Date 11 March 2018

- Hydrocarbon Impurities on the Electro-Oxidation of Formic Acid at Pt Nanoparticles Modified GC Electrodes. *Electrochimica Acta* 2015, 180, 268-279. Doi: [10.1016/j.electacta.2015.08.119](https://doi.org/10.1016/j.electacta.2015.08.119)
16. El-Deab, M. S.; **El-Nagar, G. A.**; Mohammad, A. M.; El-Anadouli, B. E., Fuel blends: Enhanced electro-oxidation of formic acid in its blend with methanol at platinum nanoparticles modified glassy carbon electrodes. *Journal of Power Sources* 2015, 286, 504-509. Doi: [10.1016/j.jpowsour.2015.04.004](https://doi.org/10.1016/j.jpowsour.2015.04.004)
 17. **El-Nagar, G. A.**; Mohammad, A. M.; Mohamed, M.; El-Anadouli, B. E., Electro-oxidation of formic acid at binary platinum and gold nanoparticle-modified electrodes: effect of chloride ions. *International Journal of Electrochemical Science* 2014, 9, 4523-4534.
 18. **El-Nagar, G. A.**; Mohammad, A. M.; El-Deab, M. S.; Ohsaka, T.; El-Anadouli, B. E., Acrylonitrile- contamination induced enhancement of formic acid electro-oxidation at platinum nanoparticles modified glassy carbon electrodes. *Journal of Power Sources* 2014, 265, 57-61. Doi: [10.1016/j.jpowsour.2014.04.116](https://doi.org/10.1016/j.jpowsour.2014.04.116)
 19. **El-Nagar, G. A.**; Mohammad, A. M., Enhanced electrocatalytic activity and stability of platinum, gold, and nickel oxide nanoparticles-based ternary catalyst for formic acid electro-oxidation. *International Journal of Hydrogen Energy* 2014, 39, 11955-11962. Doi: [10.1016/j.ijhydene.2014.06.028](https://doi.org/10.1016/j.ijhydene.2014.06.028)
 20. El-Deab, M. S.; Mohammad, A. M.; **El-Nagar, G. A.**; El-Anadouli, B. E., Impurities Contributing to Catalysis: Enhanced Electro-Oxidation of Formic Acid at Pt/GC Electrodes in the Presence of Vinyl Acetate. *The Journal of Physical Chemistry C* 2014, 118, 22457-22464. Doi: [10.1021/jp507240r](https://doi.org/10.1021/jp507240r)
 21. **El-Nagar, G. A.**; Mohammad, A. M.; El-Deab, M. S.; El-Anadouli, B. E., Electrocatalysis by design: Enhanced electrooxidation of formic acid at platinum nanoparticles–nickel oxide nanoparticles binary catalysts. *Electrochimica Acta* 2013, 94, 62-71. Doi: [10.1016/j.electacta.2013.01.133](https://doi.org/10.1016/j.electacta.2013.01.133)
 22. **El-Nagar, G. A.**; Mohammad, A. M.; El-Deab, M. S.; El-Anadouli, B. E., Facilitated Electro- Oxidation of Formic Acid at Nickel Oxide Nanoparticles Modified Electrodes. *Journal of the Electrochemical Society* 2012, 159, F249-F254. Doi: [10.1149/2.043207jes](https://doi.org/10.1149/2.043207jes)

Scientific Book Chapters

23. El-Refaei, S. M., **El-Nagar, G. A.**, Mohammad, El-Anadouli, B. E. (2015): Electrooxidation of small organic molecules at PT-based electrodes modified with nickel oxide nanostructured. In: Progress in Clean Energy, I. Dincer et al (eds.), volume 1 analysis and modeling. Doi: [10.1007/978-3-319-16709-1_43](https://doi.org/10.1007/978-3-319-16709-1_43)
24. El-Refaei, S. M., **El-Nagar, G. A.**, Mohammad, El-Anadouli, B. E. (2015): Electro-Oxidation of Formic Acid, Glucose, and Methanol at Nickel Oxide Nanoparticle Modified Platinum Electrodes In: Progress in Clean Energy, I. Dincer et al (eds.), volume 1 analysis and modeling: pp 595-604. ISBN:978-3-319-16709-1. Doi: [10.1007/978-3-319-16709-1_43](https://doi.org/10.1007/978-3-319-16709-1_43)
25. **El-Nagar, G. A.**, Mohammad, A. M., El-Deab, M. S., El-Anadouli, B. E. (2015): Electrocatalysis of Formic Acid Electro-Oxidation at Platinum Nanoparticles Modified Surfaces with Nickel and Cobalt Oxides Nanostructures. In: Progress in Clean Energy, I. Dincer et al (eds.), volume 1 analysis and modeling: pp 577- 594. ISBN: 978-3-319-16709-1. Doi: [10.1007/978-3-319-16709-1_42](https://doi.org/10.1007/978-3-319-16709-1_42)
26. El-Refaei, S. M., **El-Nagar, G. A.**, Mohammad, A. M., El-Deab, M. S., El-Anadouli, B. E. (2014): Electrocatalytic Activity of NiOx Modified Electrodes towards Oxidation of Small Organic Molecules. In: 2nd international congress on Energy Efficiency and Energy Related Materials (ENEFM2014), Eds., A. Y. Oral et al (Springer International Publishing Switzerland 2015) Series title: springer proceeding in Energy: pp. 397- 403: ISBN: 978-3-319-16901-9. Doi: [10.1007/978-3-319-16901-9_48](https://doi.org/10.1007/978-3-319-16901-9_48).

Date 11 March 2018

27. **El-Nagar, G. A.**, Mohammad, A. M., El-Deab, M. S., El-Anadouli, B. E. (2014): The Origin of Electrocatalytic Activity Of Gold Nanoparticles Modified Pt-Based Surfaces Towards Formic Acid Oxidation. In: 2nd international congress on Energy Efficiency and Energy Related Materials (ENEFM2014), Eds., A. Y. Oral et al (Springer International Publishing Switzerland 2015) Series title: springer proceeding in Energy: pp 379- 387: ISBN: 978-3-319-16901-9. Doi: [10.1007/978-3-319-16901-9_46](https://doi.org/10.1007/978-3-319-16901-9_46).
28. **El-Nagar, G. A.**, Mohammad, A. M., El-Deab, M. S., El-Anadouli, B. E. (2014): The Origin of Electrocatalytic Activity Of Gold Nanoparticles Modified Pt-Based Surfaces Towards Formic Acid Oxidation. In: 2nd international congress on Energy Efficiency and Energy Related Materials (ENEFM2014), Eds., A. Y. Oral et al (Springer International Publishing Switzerland 2015) Series title: springer proceeding in Energy. Doi: [10.1007/978-3-319-16901-9_46](https://doi.org/10.1007/978-3-319-16901-9_46).

B Non-refereed scientific articles

1. Mohammad, A. M., **El-Nagar, G. A.**, Al-Akraa, I. M., El-Deab, M. S., El-Anadouli, B. E. (2014): A stable Nickel Oxide Nanoparticles Ternary-based Anodic Catalyst for the Direct Formic Acid Fuel Cells. International Conference on Industry Academia Collaboration (IAC2014) (paper no. 46), Fairmont Hotel, Cairo, Egypt, March 3-5, 2014.
<https://www.academia.edu/19835172>