


ABDELQADER EL GUERRAF

CURRICULUM VITAE || DOCTOR OF PHILOSOPHY IN PHYSICAL CHEMISTRY

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 *Date of Birth: July 3, 1994*

Passionate research scientist with over 5 years of experience in physical chemistry and electrochemistry. Exceptional expertise in electrosynthesis and electroanalytical techniques, nanomaterials, polymers and protective coatings, sensors, and spectroscopic and microscopic characterization. Skilled in translating complex scientific concepts into easily understood terms. Work well independently, as well as part of a team. Excellent communication skills.

Currently Postdoctoral fellow at J. Heyrovsky Institute of Physical Chemistry, Prague, Czech Republic.

RESEARCH IDENTIFIERS

 0000-0002-5221-8656

Scopus® 57208755641 (h-index: 9)

EDUCATION

2017-2021  Mohammed First University, Faculty of Science, Oujda – Morocco

Ph.D., Physical Chemistry

Funded by the Ministry of Higher Education, Scientific Research and Training of Managers (MESRSFC) and National Center for Scientific and Technical Research (CNRST), Morocco, under grant No. PPR/30/2015

Supervisor: Prof. Dr. El Arbi Bazzaoui

Thesis Title: “Electronically Conducting Polymers for Food and Pharmaceutical Packaging”

2015-2017  Mohammed First University, Faculty of Science, Oujda – Morocco

Master Degree, Applied Chemistry

2012-2015  Mohammed First University, Faculty of Science, Oujda – Morocco

Bachelor’s Degree, Matter Sciences – Chemistry

RESEARCH EXPERIENCES

Aug. 2022-Present Postdoctoral Fellow at J. Heyrovsky Institute of Physical Chemistry, Prague, Czech Republic

Supervisors: Dr. Shiozawa Hidetsugu

Project: “Experimental and Theoretical Research on Coordination Polymers and Metal–Organic Frameworks: Synthesis, Functionalization, Characterization, Electronic, Optical, Electrochromic and Magnetic Properties”

Jun. 2023-Present Research Associate at International Society of Engineering Science and Technology (ISEST), Nottingham, England

Oct. Nov. Dec. 2019 Internship as Visiting Ph.D. fellow in the Department of Analytical Chemistry, Faculty of Pharmacy, Ankara University, Ankara – Turkey

Supervisors: Prof. Dr. Sibel Aysil Ozkan

Project: “Synthesized Doped Conducting Polymers for Food and Pharmaceutical Packaging and Drug Electroanalysis”

- Nov. Dec. 2018** Internship as Visiting Ph.D. fellow in the Laboratory of Materials and Environment (LCM), Faculty of Sciences, Ibn Zohr University, Agadir – Morocco
Supervisor: Prof. Dr. Mohammed Bazzaoui
Project: “Chemical and Electrochemical Preparation of Conducting Polymers on the Surface of Metallic and Non-Metallic Substrate: Stability, Electroactivity, Adherence and Application as Toxic Gas Sensor”
- Apr. to July. 2017** Visiting MSc fellow in the Laboratory of Analytical Chemistry, Applied Materials and Environment, Faculty of Sciences, Mohammed First University, Oujda – Morocco
Supervisor: Prof. Dr. Belkeir Hammouti
Project: “Corrosion Inhibition of Mild Steel in 0.5 M Sulfuric Acid: Experimental and Theoretical Insights”

INTERESTS AND SKILLS

Research

Synthesis of Electronically Conducting Polymer, Coordination Polymers, and Metal complex

Electrochemical Analysis

Analysis of the Polymer/Metal Interface and Corrosion Tests

Metal Plating on Non-Conductor Substrates - Metalization for Electronic Applications

Absorption and Fluorescence Properties of Nanomaterials, Antibacterial Coatings, Food Packaging and Sensor

Adsorption and Wastewater Treatment

Familiar with Energy Storage, Ion Batteries and Fuel Cells

Electronic Structure Calculation using Density Functional Theory (DFT)

Techniques

Electrochemical: Cyclic Voltammetry (CV), Square Wave Voltammetry (SWV), Chronoamperometry and Chronopotentiometry, Electrochemical Impedance Spectroscopy (EIS), Potentiodynamic Polarization

Spectroscopic: Fourier Transform Infrared Spectroscopy (FTIR), Fluorescence Spectroscopy, Resonance Raman Spectroscopy (RRS), Surface Enhanced Raman Scattering (SERS), X-ray Photoelectron Spectroscopy (XPS), Powder X-ray Diffraction (XRD), Thermogravimetric Analysis (TGA)

Microscopic: Scanning Electron Microscopy (SEM), Atomic Force Microscopy (AFM)

Other techniques: Conductivity Measurements, Sellotape Adherence Tests, Spin Coating, Sputtering, Hydrothermal Synthesis

Hands-on

Fluorescence Spectrometer (HORIBA Scientific), Raman Spectrometer (HORIBA Scientific and WITec), TGA-MS (Netzsch), FTIR Spectrometer (Thermo Nicolet Co.), UV-visible Spectrometer (Perkin-Elmer), Potentiostat/Galvanostat (Metrohm Autolab, PalmSens, OrigaLys)

Experience with Working in Cleanroom, Glove Box and Cell Assembly for Li and Zinc Ions Batteries

Maintained with 100% adherence to the laboratory policy

Computer

Adept with Microsoft Office Suite (Word, Excel, PowerPoint), Windows and Ubuntu Server, and LaTeX

Superb Skills in Chemical Related Software: ChemDraw, X'Pert HighScore Plus, CrystalExplorer, Avogadro, Vesta, Nova, EC-Lab, ZSimpWin, Origin, ImageJ

Basic Knowledge About Materials Studio, ArgusLab, HyperChem

DFT Calculation by Gaussian and ORCA Quantum Chemistry Program Packages

PEER-REVIEWED PUBLICATIONS AND PATENT

(Total 25 Publications → Time cited: 188)

Poly(methylene blue) modified PLA-CB conductive 3D printer filament as a promising platform for electrochemical sensing of uric acid

M. El fazdoune, K. Bahend, M. Oubella, S. Ben Jadi, [A. EL Guerraf](#), E.A. Bazzaoui, F.J. Garcia-Garcia, J.I. Martins, M. Bazzaoui, *Journal of Polymers and the Environment*, (2023)

Removal of Cadmium and Lead ions from aqueous solutions by novel dolomite-quartz@Fe₃O₄ nanocomposite fabricated as nanoadsorbent

A. El Mouden, N. El Messaoudi, [A. EL Guerraf](#), Amal Bouich, Valbonë Mehmeti, A. Lacherai, Amane Jada, Juliana Heloisa Pinê Américo-Pinheiro, *Environmental Research*, 225 (2023) 115606

Multifunctional cobalt oxide nanocomposites for efficient removal of heavy metals from aqueous solutions

A. El Mouden, N. El Messaoudi, [A. EL Guerraf](#), Amal Bouich, Valbonë Mehmeti, A. Lacherai, Amane Jada, S. Farooq, *Chemosphere, Chemosphere*, 317 (2023) 137922

Electrochemical, spectroscopic and microscopic investigation of PEDOT coated nickel plate from aqueous micellar solutions and its anti-corrosion performances

Z. Aouzal, M. Bouabdallaoui, [A. EL Guerraf](#), S. Ben Jadi, M. Bazzaoui, R. Wang, E. A. Bazzaoui, *Journal of Coatings Technology and Research*, (2023)

Multifunctional smart conducting polymers silver nanocomposites modified biocellulose fibres for innovative food packaging applications

[A. EL Guerraf](#), S. Ben Jadi, I. Ziani, M. Dalli, S. Farooq, M. Bazzaoui, E. A. Bazzaoui, *Industrial & Engineering Chemistry Research*, 62 (2023) 4540-4553

Electrochemical synthesis and characterization of poly(Rhodamine B) coating on FTO

K. Bahend, M. El Fazdoune, S. Ben Jadi, A. El Guerraf, A. Asserghine, Carlos M. Sánchez-Sánchez, E. A. Bazzaoui, F. J. García-García, M. Bazzaoui, *Journal of the Electrochemical Society*, 169 (2022) 113502

Antibacterial activity and volatile organic compounds sensing property of polypyrrole coated cellulosic paper for food packaging purpose

[A. EL Guerraf](#), S. Ben Jadi, N. K. Bakirhan, M. E. Kiyimaci M. Bazzaoui, S. A. Ozkan, E. A. Bazzaoui, *Polymer Bulletin*, 79 (2022) 11543-11566

Electrodeposition of strictly α,α' -polythiophene chains on oxidizable metals in acidic concentrated aqueous media

M. Bouabdallaoui, Z. Aouzal, [A. EL Guerraf](#), M. Bazzaoui, E. A. Bazzaoui, *Journal of Electrochemical Science and Engineering*, 12 (2022) 617-638

Extremely adherent and protective polymeric coating based on polydiphenylamine electrodeposited on steel in an organic electrolytic medium

M. Bouabdallaoui, [A. EL Guerraf](#), Z. Aouzal, M. Bazzaoui, R. Wang, E. A. Bazzaoui, *Journal of Polymer Research*, 29 (2022) 357

Electrochemically synthesized poly(3, 4-ethylenedioxythiophene) as an organic coating to prevent corrosion of metallic food packaging

[A. EL Guerraf](#), S. Ben Jadi, Z. Aouzal, M. Bouabdallaoui, N. K. Bakirhan, S. A. Ozkan, M. Bazzaoui, E. A. Bazzaoui, *Journal of Applied Electrochemistry*, 52 (2022) 1383–1407

Date stone functionalized with 3-aminopropyltriethoxysilane as a potential biosorbent for heavy metal ions removal from aqueous solution

A. El Mouden, [A. EL Guerraf](#), N. El Messaoudi, R. Haounati, A. Ait El Fakir, A. Lacherai, *Chemistry Africa*, 5 (2022) 745–759

Loaded n-Hydroxyapatite/SSG 3D scaffolds as a drug delivery system of Nigella sativa fractions for the management of local antibacterial infections

M. Dalli, A. EL Guerraf, S. Azizi, K. Benataya, A. Azghar, J. Mi-Kyung, A. Maleb, K. Bonglee, N. Gseyra, *Nanomaterials*, 12 (2022) 856

Roughened gold electrode for in situ SERS analysis of structural changes accompanying the doping process of polyaniline in acidic aqueous media

A. EL Guerraf, M. Bouabdallaoui, Z. Aouzal, S. Ben Jadi, N. K. Bakirhan, M. Bazzaoui, S. A. Ozkan, E. A. Bazzaoui, *Journal of Electroanalytical Chemistry*, 882 (2021) 115034

PEDOT for Sensitive Electrochemical Detection of Trimetazidine Hydrochloride in Biological Fluids: Synthesis, Characterization and Mechanism Insights

A. EL Guerraf, N. K Bakirhan, S. Ben Jadi, M. Bazzaoui, Y. Ozkan, E. A. Bazzaoui, S. A. Ozkan, *Journal of the Electrochemical Society*, 167 (2020) 167525

Synergistic effect between Ag and Cu for the observation of huge SERS signal of photochemically prepared polypyrrole. Application to toxic volatile organic compounds sensing

A. EL Guerraf, S. Ben Jadi, M. Bouabdallaoui, Z. Aouzal, R. Wang, M. Bazzaoui, E. A. Bazzaoui, *Materials Today: Proceedings*, 31 (2020) S1-S8

Improvement of the anticorrosion resistance of nickel by polypyrrole coating electrosynthesized in salicylate medium

Z. Aouzal, M. Bouabdallaoui, A. EL Guerraf, S. Ben Jadi, R. Wang, M. Bazzaoui, E. A. Bazzaoui, *Materials Today: Proceedings*, 31 (2020) S89-S95

Influence of polythiophene overoxidation on its physicochemical properties and corrosion protection performances

M. Bouabdallaoui, Z. Aouzal, A. EL Guerraf, S. Ben Jadi, M. Bazzaoui, R. Wang, E. A. Bazzaoui, *Materials Today: Proceedings*, 31 (2020) S69-S74

Analyses of scanning electrochemical microscopy and electrochemical impedance spectroscopy in direct methanol fuel cells. Permeability resistance and proton conductivity of polyaniline modified membrane

S. Ben Jadi, A. EL Guerraf, A. Kiss, A. El Azrak, E. A. Bazzaoui, R. Wang, J. I. Martins, M. Bazzaoui, *Journal of Solid State Electrochemistry*, 24 (2020) 1551-1565

Investigation of the geometry and anchoring mode of conducting polythiophene films electrosynthesized on aluminium working electrodes

A. EL Guerraf, S. Ben Jadi, M. Bouabdallaoui, Z. Aouzal, M. Bazzaoui, J. Aubard, G. Lévi, E. A. Bazzaoui, *Materials Today: Proceedings*, 22 (2020) 73-77

Electropolymerization and corrosion resistance of polypyrrole on nickel bipolar plate for PEM fuel cell application

S. Ben Jadi, A. EL Jaouhari, Z. Aouzal, A. EL Guerraf, M. Bouabdallaoui, R. Wang, E.A. Bazzaoui, M. Bazzaoui, *Materials Today: Proceedings*, 22 (2020) 52-56

Synthesis, characterization, and transport properties of Nafion-Polypyrrole membrane for Direct Methanol Fuel Cell (DMFC) application

S. Ben Jadi, A. EL Guerraf, E. A. Bazzaoui, R. Wang, J. I. Martins, M. Bazzaoui, *Journal of Solid State Electrochemistry*, 23 (2019) 2423-2433

Electrochemically roughened silver surface versus fractal leaf-shaped silver crystals for surface-enhanced Raman scattering investigation of polypyrrole

A. EL Guerraf, Z. Aouzal, M. Bouabdallaoui, S. Ben Jadi, A. EL Jaouhari, R. Wang, M. Bazzaoui, E. A. Bazzaoui, *Journal of Solid State Electrochemistry*, 23 (2019) 1811-1827

Synthesis and spectroscopic characterization of polypyrrole PPy coating on flax fibers and its behaviour toward trimethylamine vapor

A. EL Jaouhari, S. Ben Jadi, A. EL Guerraf, M. Bouabdallaoui, Z. Aouzal, E. A. Bazzaoui, J. I. Martins, M. Bazzaoui, *Synthetic metals*, 245 (2018) 237-244

The Synergistic Effect of Chloride Ion and 1, 5-Diaminonaphthalene on the Corrosion Inhibition of Mild Steel in 0.5 M Sulfuric Acid: Experimental and Theoretical Insights
A. El Guerraf, A. Titi, K. Cherrak, N. Mechbal, M. El Azzouzi, R. Touzani, B. Hammouti, H. Lgaz, *Surfaces and Interfaces*, 13 (2018) 168-177

Experimental and Theoretical Studies on Inhibition of Carbon Steel Corrosion by 1,5-Diaminonaphthalene
A. Titi, N. Mechbal, A. El Guerraf, M. El Azzouzi, R. Touzani, B. Hammouti, I.M. Chung H. Lgaz, *Journal of Bio- and Tribo-Corrosion*, 4 (2018) 22

Nouveau procédé d'assemblage Anode/PEM/Cathode pour application à la technologie des piles à combustible
S. Ben Jadi, A. EL Jaouhari, M. Bouabdallaoui, Z. Aouzal, A. EL Guerraf, E. A. Bazzaoui, M. Bazzaoui
N° of patent: MA 41871 A1, publication date: 31/07/2019

CONFERENCE / PRESENTATIONS

(More than 25 Communications → Selected Ones ↓)

- June 2022** **Improvement of the anticorrosion resistance of nickel by polypyrrole coating electrosynthesized in aqueous medium**
Z. Aouzal, M. Bouabdallaoui, A. El Guerraf, and E. A. Bazzaoui, 2nd International Cappadocia Scientific Research Congress, Cappadocia-Nevşehir – Turkey
- June 2022** **Electrochemical characterization of trimetazidine hydrochloride on PEDOT modified glassy carbon electrode by stripping square wave voltammetry**
A. El Guerraf, S. Ben Jadi, N. K. Bakirhan, Y. Ozkan, S. A. Ozkan, M. Bazzaoui and E. A. Bazzaoui, The Fifth International Conference on Materials & Environmental Science, ICMES-2022, Saïdia, Morocco
- July 2021** **Conducting polymers-based films for corrosion prevention of metallic food packaging**
A. El Guerraf, S. Ben Jadi, M. Bouabdallaoui, Z. Aouzal, R. Wang, M. Bazzaoui and E. A. Bazzaoui, International ICONTECH SYMPOSIUM-4 on Innovative Surveys in Positive Sciences, Adana – Turkey
- March 2021** **Surface-enhanced Raman scattering investigation of Polypyrrole synthesized with two different approaches**
International Symposium on Energy and Materials, Mohammed VI Polytechnic University, Benguerir – Morocco
- January 2021** **Ex situ SERS analysis of polypyrrole using roughened Ag electrode and fractal leaf-shaped silver crystals**
A. El Guerraf, S. Ben Jadi, Z. Aouzal, M. Bouabdallaoui, M. Bazzaoui and E. A. Bazzaoui, 11th International Congress on Mathematic, Engineering and Natural Sciences, Karak – Jordan
- January 2021** **Electrochemically synthesized polypyrrole and its behavior as an organic sensor towards ammonia vapors**
A. EL Guerraf, S. Ben Jadi, N. K. Bakirhan, S. A. Ozkan, M. Bazzaoui and E. A. Bazzaoui, International ICONTECH SYMPOSIUM-3 on Innovative Surveys in Positive Sciences, Mohammed First University, Oujda – Morocco
- November 2020** **Electrochemical Procedure for Obtaining Surface-Enhanced Raman Scattering Active Polypyrrole Films on massive silver plates**
A. El Guerraf, S. Ben Jadi, Z. Aouzal, M. Bouabdallaoui, M. Bazzaoui and E. A. Bazzaoui, 4th Edition of the International Virtual Conference on Materials & Environmental Science, ICMES-2020, Mohammed First University, Oujda – Morocco
- December 2019** **SERS analysis of polypyrrole chains embedded within fractal leaf-shaped silver crystals**
A. El Guerraf, S. Ben Jadi, M. Bouabdallaoui, Z. Aouzal, R. Wang, M. Bazzaoui and E. A. Bazzaoui, International Conference on Advanced Materials, Nanosciences and Applications and Training school in Spectroscopies for Environment and Nanochemistry, Oujda – Morocco

- December 2019** **Metallic substrates, colloidal nanoparticles and fractal structures for surface-enhanced Raman scattering investigation of electronically conducting polymers**
A. El Guerraf, S. Ben Jadi, M. Bouabdallaoui, Z. Aouzal, M. Bazzaoui and E. A. Bazzaoui, International Conference on Advanced Materials, Nanosciences and Applications and Training school in Spectroscopies for Environment and Nanochemistry, Oujda – Morocco
- October 2019** **Corrosion characteristics of polypyrrole-coated nickel bipolar plate in sulfuric acid**
 S. Ben Jadi, A. El Jaouhari, A. El Guerraf, M. Bouabdallaoui, Z. Aouzal, E. A. Bazzaoui, R. Wang and M. Bazzaoui, 6th International Symposium "Environment & Sustainable Development", Rabat – Morocco
- April 2019** **Surface-enhanced Raman scattering for precise rovibrational investigation of polypyrrole inner layers**
A. El Guerraf, S. Ben Jadi, Z. Aouzal, M. Bouabdallaoui, M. Bazzaoui and E. A. Bazzaoui, 10th National Meeting of Electrochemistry RNE'10, Ifrane – Morocco
- Mach 2019** **Conducting polymers: comprehensive analysis of the coating/electrode contact zone**
 6th Edition of the DOCTORAL day VSST'2019, Abdelmalek Essadi Unversity, Al-Hoceima, Morocco
- March 2019** **Enhancement in methanol resistance of perfluorinated membrane induced by polyaniline coating for direct methanol fuel cells**
 S. Ben Jadi, A. El Jaouhari, A. El Guerraf, Z. Aouzal, M. Bouabdallaoui, E. A. Bazzaoui, R. Wang and M. Bazzaoui, 5th Edition of the International Days "Materials and Environment", Ibn Zohr University, Agadir – Morocco
- February 2019** **Elemental and structural investigation of polythiophène electrodeposited on SERS-activated working electrodes**
A. El Guerraf, S. Ben Jadi, M. Bouabdallaoui, Z. Aouzal, M. Bazzaoui and E. A. Bazzaoui, 2nd Scientific Day of Doctoral Training in Applied Chemistry and Environment, Mohammed First University, Oujda – Morocco
- December 2018** **XPS and SERS spectroscopies for the investigation of conducting polymer inner layers**
A. El Guerraf, Z. Aouzal, M. Bouabdallaoui, S. Ben Jadi, M. Bazzaoui and E. A. Bazzaoui, International Congress: Materials Applied to the Environment, Ibn Zohr University, Agadir – Morocco
- December 2018** **Investigation of the geometry and anchoring mode of conjugated polymers on the working electrode surface**
A. El Guerraf, M. Bouabdallaoui, Z. Aouzal, S. Ben Jadi, M. Bazzaoui, J. Aubard, and G. Lévi, E. A. Bazzaoui, International Congress: Materials Applied to the Environment, Ibn Zohr University, Agadir – Morocco
- June 2018** **SERS investigation of polythiophene/electrode interface**
A. El Guerraf, E. A. Bazzaoui, Z. Aouzal, M. Bouabdallaoui, S. Ben Jadi, M. Bazzaoui, J. Aubard and G. Lévi, International Symposium Science and Technology at the service of the Environment, Abdelmalek Essadi Unversity, Tétouan – Morocco

CONFERENCE ORGANIZATION

- June 2022** Organizing Committee Member: The 5th Edition of the International Conference on Materials & Environmental Science, ICMES-2022 held at Radisson Blu Resort Saïdia Beach, Saïdia, Morocco
- June 2021** Organizing Committee Member: The First International Conference in Mechanical Industrial Energy Systems and Automotive Technology, ICMIESAT-2021 held at Mohammed First University, Oujda – Morocco
- May. June. July. 2021** Organizing Committee Member: Workshops and Doctoral Days Organized by Mohammed First University, Oujda – Morocco
- November 2020** Organizing Committee Member: The 4th Edition of the International Virtual Conference on Materials & Environmental Science, ICMES-2020 held at Mohammed First University, Oujda – Morocco

- December 2018** Organizing Committee Member: The International Congress: Materials Applied to the Environment held at Ibn Zohr University Agadir – Morocco.
- February 2019** Organizing Committee Member: The 1st and the 2nd Scientific Days of Doctoral Training in Applied Chemistry and Environment held at Mohammed First University, Oujda – Morocco
- December 2017**

TEACHING ASSISTANT

- 2018-2022** Taught Laboratory Courses for Undergraduate Chemistry Classes at Mohammed First University
- Co-supervision of Master Trainees
- Maintained Productive Relationships with other Teachers and Scientists

AWARDS

- November 2020** Best Oral Presentation in the 4th Edition of the International Virtual Conference on Materials & Environmental Science, ICMES-2020, Mohammed First University, Oujda – Morocco
- February 2019** Best Oral Presentation in the 2nd Scientific Day of Doctoral Training in Applied Chemistry and Environment, Mohammed First University, Oujda – Morocco

WORKSTYLE

- Willing to perform basic tasks and move on to solve complex problems
- Able to learn new knowledge and adapt to new environments quickly
- Strong independent work style
- Extremely dependable and known for coming in early and staying late to finish important tasks and achieve results