



ERHAN KARACA, Lecturer PhD.

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Education:

B.S.	in Chemistry, Faculty of Science	Hacettepe University Ankara, Turkey	3.15/4.00	2006-2011
M.Sc.	Institute of Graduate Studies in Science	Hacettepe University Ankara, Turkey	3.93/4.00	2011-2013
Ph.D.	Institute of Graduate Studies in Science	Hacettepe University Ankara, Turkey	3.98/4.00	2013-2019

RESEARCH AREAS

Supercapacitors and their applications, Conducting Polymers, Characterization studies, Corrosion Studies, Thin Section & Sample Preparation for Microscopy Analysis, Vanadium redox flow batteries and their integration with photovoltaic systems

Master of Science Thesis: Electrochemical Synthesis of Supercapacitor Materials Based on Tartaric Acid Doped Polypyrrole In Acetonitrile for Energy Storage

pHd Thesis: Electrochemical Synthesis of Composite Materials Based on Polypyrrole Containing Nano-Sized Metal Oxide for Supercapacitor Energy Storage Applications

WORK EXPERIENCE:

Lecturer, Hacettepe University – Faculty of Science, Chemistry, Department of Analytical Chemistry, Ankara, **October 2018** –

Specialist Operator, Dumlupınar University – Advanced Technology Center, Kütahya, **October 2013** – **October 2018**

I was responsible for:

*Scanning electron microscope (FE-SEM) with EDX, WDX and EBSD, MonoCL4 Cathodoluminescence, ETD, TLD, DBS, FSD, LVD, Helix, GAD and STEM imaging, and Ion Milling Devices for SEM/TEM samples, and Metalography and ceramography devices

* XRD and XRF spectroscopy, Particle size analyzer.

*HPLC, Q-TOF LC-MS GC-MS, FTIR

*Flame, Graphite and Hydride System Atomic absorption spectroscopy.

Research and Development Personnel, Teknologis Teknoloji Yönetimi ve Danışmanlık Ltd. Şti., Ankara, **March 2013** – **September 2013**.

Scope of R&D studies includes designing and constructing of large scale energy storage systems and their integration with photovoltaic systems.

Internship, General Directorate of Mineral Research and Exploration, Ankara, **June 2009** – **July 2009**

During the 6-week internship, I worked on sample preparation (weighing, digestion and solution preparation) and elemental analysis by using Atomic Absorption and Emission Spectroscopy Instruments of the soil from the various regions of Turkey.

FELLOWSHIPS / AWARDS and MEMBERSHIPS:

* TÜBİTAK (The Scientific and Technological Research Council Of Turkey) BİDEB 2211 Scholarship Programme for PhD Students, 2013-2018

* Premiership Scholarship, 2006-2011

* Member of International Society of Electrochemistry (ID: 19075)

PAPERS PUBLISHED IN INTERNATIONAL PUBLICATIONS

1. Karaca E., Pekmez N.Ö., Pekmez K., Galvanostatic deposition of polypyrrole in the presence of tartaric acid for electrochemical supercapacitor, **Electrochimica Acta (Q1, Impact Factor: 6.432)**, 147: 545-556, 2014.
2. Karaca E., Can H.K., Bozkaya U., Pekmez NO., "Charge Transfer Complex of p-aminodiphenyldiamine with Maleic Anhydride: spectroscopic, electrochemical and physical properties" **ChemPhysChem (Q2, Impact Factor: 3.434)**,4;17(13):2056-65, 2016.
3. Karaca E., Pekmez N.Ö., Pekmez K., Electrosynthesis of polypyrrole-vanadium oxide composites on graphite electrode in acetonitrile in the presence of carboxymethyl cellulose for electrochemical supercapacitors, **Electrochimica Acta (Q1, Impact Factor: 6.432)**, 273: 379-391, 2018
4. Karaca E., Gokcen, D., Pekmez N.Ö., Pekmez K., One-step electrosynthesis of polypyrrole/PbOx composite in acetonitrile as supercapacitor electrode material, **Synthetic Metals (Q2, Impact Factor: 3.374)**, 247: 255-267, 2019
5. Gokcen, D., Sentürk O., Karaca E., Pekmez N.Ö., Pekmez K., Memristive behavior of TiO_x obtained via Pb (II)-assisted anodic oxidation process, **Journal of Materials Science: Materials in Electronics (Q2, Impact Factor: 2.779)**, 1-11, 2019
6. Teker M.Ş., Karaca E., Pekmez N.Ö., Tamer U., Pekmez K., An Enzyme-free H₂O₂ Sensor Based on Poly(2-Aminophenylbenzimidazole)/Gold Nanoparticles Coated Pencil Graphite Electrode, **Electroanalysis (Q2, Impact Factor: 2.932)**, 31 (1): 75-82, 2019
7. Karaca E., Gokcen, D., Pekmez N.Ö., Pekmez K., Electrochemical synthesis of PPy composites with nanostructured MnOx, CoOx, NiOx, and FeOx in acetonitrile for supercapacitor applications, **Electrochimica Acta (Q1, Impact Factor: 6.432)**, 305, 502-513, 2019
8. Karaca E., Gokcen, D., Pekmez N.Ö., Pekmez K., Galvanostatic synthesis of Nanostructured Ag-Ag₂O dispersed PPy Composite on Graphite Electrode for Supercapacitor Applications, **International Journal of Energy Research (Q1, Impact Factor: 4.533)**, 44, 158-170, 2020.
9. Tuna S.H., Karaca E., Aslan İ., Pekkan G., Pekmez N.Ö., Evaluation of corrosion resistance of Co-Cr alloys fabricated with different metal laser sintering systems, **Journal of Advanced Prosthodontics (Q3, Impact Factor: 2.562)**, 12 (3), 114-123, 2020.
10. Sariarslan H., Karaca E., Şahin M., Pekmez Özçiçek N., Electrochemical synthesis and corrosion protection of poly(3-aminophenylboronic acid-co-pyrrole) on mild steel, **RSC Advances (Q2, Impact Factor: 3.748)**, 10, 38548-38560, 2020.
11. Karaca E., Gokcen, D., Pekmez N.Ö., Pekmez K., Uğur M., Aksu N.D., 4.2 V Stack of metal oxide-polypyrrole-based composite electrodes and their power management, **International Journal of Energy Research (Q1, Impact Factor: 4.533)**, 44 (11), 8666-8680, 2020.
12. Pekmez N.Ö., Uğur M., Karaca E., Ertekin Z., Pekmez K., Room temperature electrosynthesis of TinO₂n-1 film and its bilayer with PNMPy on mild steel for corrosion protection in sulphuric acid, **Electrochimica Acta (Q1, Impact Factor: 6.432)**, 376, 137996, 2021.
13. Karaca E., Özgenç G., Pekmez N.Ö., Pekmez K., Nano MnO₂ encapsulated p(Py-co-Cz)- and PVC/carbon- coated flexible electrodes for solid-state supercapacitor cell, **Submitted to Journal of Energy Storage (Q1, Impact Factor: 8.14)**, 55, Part D, 105794, 2022.
14. Karaca E., Pekmez N.Ö., Pekmez K., The use of some sulfonic acids for improving aluminum current collector resistance, **Materials Today Communications (Q2, Impact Factor: 3.64)**, 2022.

PAPERS PUBLISHED IN NATIONAL PUBLICATIONS

1. Karaca E., Alkan E., Investigation of surface and corrosion behavior of AA5754 in acid solutions commonly used in industry, **BSEU Journal of Science**, 8, 2, 978 - 989 2021.

ORAL PRESENTATIONS AT INTERNATIONAL SCIENTIFIC MEETINGS

1. Karaca E., Kaplan Can H., Pekmez Özçiçek N., A New Charge Transfer Complex of p-Aminodiphenyldiamine with Maleic Anhydride, **10th Aegean Analytical Chemistry Days (AACD2016)**, Çanakkale, Turkey, 29 Sept 29- 2 October, 2016.

2. Karaca E., Pekmez Özçiçek N., Pekmez K., “Galvanostatic Deposition of Polypyrrole-Cobalt Perchlorate on pencil graphite electrode in the presence of graphene for Electrochemical Supercapacitor”, **3rd Emerging 2D Materials & Graphene Conference from Laboratory to Industry 2016**, İstanbul, Turkey, October 2016.
3. Karaca E., Pekmez Özçiçek N., Pekmez K., “The Synthesis and Supercapacitor Applications of Polypyrrole-Nickel Oxide Composite on Carbon Electrode”, **VII. Polymer Science & Technology Congress with International Participation**, Eskişehir, Turkey, September 2018.
4. Karaca E., Pekmez Özçiçek N., Pekmez K., Electrodeposition of polypyrrole containing silver oxide on carbon electrode in acetonitrile for electrochemical supercapacitors, **International Conference on Materials Science and Nanotechnology For Next Generation (MSNG2018)**, Kapadokya, Turkey, October 2018.
5. Karaca E., Gokcen, D., Pekmez N.Ö., Pekmez K., One-step electrosynthesis of polypyrrole/PbO_x composite in acetonitrile as supercapacitor electrode material, **Electrochemistry Conference 2019**, İstanbul, Turkey, September 2019.
6. Ertekin Z., Karaca E., Uğur M., Pekmez K., Özçicek N., Room Temperature Electrodeposition of Titanium sub-oxides on Mild Steel Electrode towards Corrosion Protection, **71st Annual Meeting of the International Society of Electrochemistry**, Belgrade, September 2020.
7. Karaca E., Teker Şen M., Özçicek N., Pekmez K., Tamer U., An enzyme-free H₂O₂ sensor based on poly(2-aminophenylbenzimidazole)/gold nanoparticles coated pencil graphite electrode, **71st Annual Meeting of the International Society of Electrochemistry**, Belgrade, September 2020.
8. Karaca E., Saka K., Gökçen D., Pekmez N.Ö., Pekmez K., Schottky Contact of Nanostructured Bi₂O₃ Deposited Electrochemically on Stainless Steel, **Oral Presentation, 72nd Annual ISE Meeting**, Jeju Island, Korea, September 2021.
9. Karaca E., Electro-synthesis and Characterization of Nano-sized SbO_x Dispersed Polypyrrole Composit, **8th Polymer Science and Technology Congress**, Malatya, Turkey, June 2022.
10. Karaca E., Electrodeposition of Nanosized PbO_x-doped poly(pyrrole-co-carbazole) in Acetonitrile on Stainless-steel Electrode for Supercapacitor Application, **16th Nanoscience and Nanotechnology Conference**, Ankara, Turkey. September 2022.

POSTER PRESENTATIONS AT INTERNATIONAL SCIENTIFIC MEETINGS

1. Karaca E., Pekmez Özçiçek N., Pekmez K., “Electrochemical Synthesis of Supercapacitor Materials Based on Tartaric Acid Doped Polypyrrole in Acetonitrile for Energy Storage”, **When China Meets Turkey: Energy Matters**, İstanbul, December, 2012.
2. Karaca E., Pekmez Özçiçek N., Alkan E., Karaca E., Pekmez Özçiçek N., Pekmez K., Corrosion Behavior of Aluminum in Aqueous Acidic Solutions, **Electrochemistry Basic Science and Key Technology for Future Applications**, Mainz, Germany, 22–24 September, 2014
3. Karaca E., Pekmez Özçiçek N., Pekmez K., Galvanostatic Deposition Of Polypyrrole On Pencil Graphite Electrode In The Presence Of Tartaric Acid For Electrochemical Supercapacitor, **Electrochemistry Basic Science and Key Technology for Future Applications**, Mainz, Germany, 22–24 September 2014.
4. Sariarslan H., Karaca E., Pekmez Özçiçek N., Electropolymerization of Boronic Acid Pyrrole Copolymer on Mild Steel, **EuroAnalysis 2015**, Bordeaux, France, 6-10 September, 2015.
5. Karaca E., Pekmez Özçiçek N., Pekmez K., Electrodeposition of polypyrrole containing manganous ions in acetonitrile solution on pencil graphite electrode for electrochemical supercapacitor, **5th International Symposium on Enhanced Electrochemical Capacitors**, Jena, Germany, 10-14 July 2017.
6. Karaca E., Pekmez Özçiçek N., Pekmez K., Galvanostatic deposition of polypyrrole on pencil graphite electrode in the presence of vanadyl tetrafluoroborate and Triton-x100 for

- electrochemical supercapacitor, **5th International Symposium on Enhanced Electrochemical Capacitors**, Jena, Germany, 10-14 July 2017.
7. D. Özge Çolak, Karaca E., M. Ugur, K. Pekmez, N. Ö. Pekmez, "Corrosion Inhibition of Copper and Brass Alloy in 1% NaCl and 3% HCl Solutions by Bis- Benzimidazole", **XV International Corrosion Symposium (KORSEM'18)**, Hatay, 26 September 2018.
 8. Karaca E., Z. Ertekin, M. Ugur, N. Ö. Pekmez, K. Pekmez, "Impedance Spectroscopy Characterisation of Titanium Sub-oxide Films on Different Electrode Materials", **International Materials Science and Nanotechnology For Next Generation conference (MSNG2018)**, Cappadocia, 4-8 October 2018.
 9. Karaca E., Z. Ertekin, M. Ugur, N. Ö. Pekmez, K. Pekmez, "Characterization of Magnéli phase titanium suboxides thin films prepared by electrodeposition technique", **International Materials Science and Nanotechnology For Next Generation conference (MSNG2018)**, Cappadocia, 4-8 October 2018.
 10. E. Gül, D. Gökçen, O. Şentürk, Karaca E., N. Özçiçek Pekmez, K. Pekmez, Memristive Property of TiO_x Deposited by Catalyzed Anodization Process, **6th Nano Today Conference**, Lizbon, Portekiz, 16-20 Haziran 2019
 11. Karaca E., Gokcen, D., Pekmez N.Ö., Pekmez K, Uğur M., Nanostructured Ag-Ag₂O - Encapsulated PPy Composites on Partially Exfoliated Graphite Electrode for Supercapacitor, **International Symposium of Advanced Lithium Batteries for Automobile Applications ABAA 12**, Ulm, Almanya, October 2019
 12. Karaca E., Gokcen, D., U. Merve, Altıntaş Ö., Pekmez N.Ö., Pekmez K., Spectroscopic Characterization of Electrochemically Synthesized Polypyrrole Composites with Nano Structured MnO_x and PbO_x, **15th Nanoscience and Nanotechnology Conference**, Antalya, Turkey, November 2019
 13. Karaca E., Alkan E., Pekmez N.Ö., Pekmez K., The corrosion behavior of aluminum alloy in the presence of various sulphonic acids, **29th Topical Meeting of the International Society of Electrochemistry**, April 2021, Poster Presentation, Mikulov, Czech Republic

PAPERS PUBLISHED IN THE PROCEEDINGS OF NATIONAL MEETINGS

1. Karaca E., Gokcen, D., U. Merve, Altıntaş Ö., Pekmez N.Ö., Pekmez K., Nano-boyutlu CoO_x içeren Polipirol Kompozitinin Spektroskopik Karakterizasyonu, **XVI Ulusal Spektroskopik Kongresi**, Ankara, Turkey, November 2019, Poster Presentation.
2. Karaca E., Gokcen, D., U. Merve, Altıntaş Ö., Pekmez N.Ö., Pekmez K., Elektrokimyasal olarak Sentezlenen Polipirol/FeO_x Kompozitinin Spektroskopik Karakterizasyonu, **XVI Ulusal Spektroskopik Kongresi**, Ankara, Turkey, November 2019, Poster Presentation.
3. Karaca E., Özgenç H., Electropreparation of Nanosized MnO₂ Doped Polypyrrole-Polycarbazole Composite on Flexible Stainless-Steel Gauze for Supercapacitor Application, **33. Ulusal Kimya Kongresi**, Tekirdağ, October 2021, Oral Presentation.

PROJECTS

1. Pekmez K., Karaca E., Altınay A., Development of Vanadium with membrane and Lead Acid without membrane Redox Batteries and Electronic Power Management, Teknologis Teknoloji Yönetimi ve Danışmanlık Ltd. Şti., Pekmez K., Karaca E., Altınay A., Gazi Teknopark, Ankara, 1120051, 795.542,22 TL, **TÜBİTAK Research Fond, 01301601001**, September 2013, Researcher.
2. Özçiçek Pekmez N., Karaca E., Electrochemical Synthesis of Supercapacitor Materials Based on Tartaric Acid Doped Polypyrrole in Acetonitrile for Energy Storage, **Hacettepe University Research Fond**, Ankara, 01301601001, 47.809,00 TL, February 2014, Researcher.

3. İ. Arıkan, N. Namdar, C. Kahraman, E. Karaca, Investigation of The Some Health Effects of Human Used Arsenic-Containing Water, **Dumlupınar University Research Fond**, Kütahya, 2014/19, 17.757,00 TL, October 2014, Researcher.
4. Duysak A., Ceylantekin R., Karaca E., Akkaş M., The Feasibility Studies of Branding and Marketing for Kütahya Tile, **Zafer Development Agency Directly Activities Supporting**, Kütahya, TR33/14/DFD/0008, 74.489,00 TL, November 2014, Researcher.
5. Özçiçek Pekmez N., Teker Şen M., Karaca E., “The Syhtesis and Electropolymerization of (Aminophenyl)benzimidazole and Its Copolymerization with Conducting Polymers, **Hacettepe University Research Fond**, Ankara, 014D12601001, 19.800,00 TL, Jabuary 2015, Researcher.
6. Özçiçek Pekmez N., Saniarslan H., Karaca E., ., “Electrochemical synthesis and corrosion behavior of poly(3-aminophenylboronic acid-co-pyrrole) on mild steel”, **Hacettepe University Research Fond**, Ankara, FHD-2016-10513, 19.443,37 TL, December 2016, Researcher.
7. Gursel Y., Karaca E., Akkaş M., “Taking A Sputtering Device to Increase The Usage of Scanning Electron Microscope”, **Dumlupınar University Research Fond**, Dumlupınar Üniversitesi, Kütahya, 2016/76, 132.291,00 TL, July 2018, Researcher.
8. Ertekin Z., Pekmez K., Karaca E., Uğur M., “Electrochemical deposition and characterization of titanium sub-oxide thin films in acetonitrile solution on different electrode materials” **Hacettepe University Research Fond**, Ankara, FHD-2017-15110, April 2017, Researcher.
9. Özçiçek Pekmez N., Karaca E., The Preparation of Supercapacitor Electrode Materials from Electrochemically Synthesized Conducting Polymers-Metal Oxides for Energy Storage, **TÜBİTAK 1001 Research Fond**, Hacettepe Üniversitesi, Ankara, KBAG 117Z340, 470.427,00 TL, November 2019, Researcher.
10. Karaca E., Özçiçek Pekmez N., Çekiç M.G., Aluminyum alaşımının korozyon dayanımını arttırmak için yeni sülfonik asitlerin denenmesi ve endüstride kullanılan sülfonik asitler ile karşılaştırılması, **Hacettepe University Research Fond**, Ankara, January 2023, FHD-2022-1967, 49.854,37 TL, Project manager.
11. Çekiç M.G., Karaca E., Özçiçek Pekmez N., Preparation, Characterization and Supercapacitor Application of Polypyrrole Antimony Oxide and Polypyrrole Antimony Oxide Tin Oxide Composite Coated Electrodes for Energy Storage, **Hacettepe University Research Fond**, Ankara, April 2023, FYL-2022-19924, 44.817,58 TL, Researcher.

CERTIFICATES :

1. XPS Characterization Studies and Tips for Interpreting Analysis Data, Ege Matal
2. Basic Chemometry Course, 10. Analitik Kimya Kongresi, **Muğla Sıtkı Koçman Üniversitesi**, 2020.
3. ISE Stallite Student Regional Symposium on Electrochemistry – 15th PTASchool of Electrochemistry On-line Edition, **Instituto de Quimica**, Sau Paulo Brazil, 2021.
4. Scanning Electron Microscope Certificate Program, **ODTÜ MERLAB**, Şubat 2017
5. Scanning Electron Microscope (NovaNANOSEM 650 with 9 imaging detector and 3 analysis detector), FEI Company Tools for Nanotech, **ANATEK**, 2013.
6. EDAX Advanced Applications Training, EDS, EBSD and WDS, **EDAX**, 2015.
7. PANALYTICAL EMPYREAN XRD Spectrometry, **Atomika Teknik**, 01.2014.
8. PANALYTICAL Marka Axios-XRF Spectrometry, **Atomika Teknik**, 2013.
9. TEM and SEM sample preparation, **Technoorg-Linda**, 2016.
10. ALPHA FT-IR Spektrometresi, **ANATEK**, 2014.
11. Analytik Jena Zeenit 650P Atomic Absorption Spectroscopy (Flame, Hydride) ve Analytik ContrAA Atomic Absorption Spectroscopy (Graphite), **tetra**, 2013.
12. CEM Mars 6 Microwave digestion System, CEM Service, **tetra**, 2013.
13. Agilent Technologies HPLC, GC-MS ve QTOF Cihaz ve Chemstation Software ve Masshunter Software and Method Application, **SEM**, 2014.

14. MALVERN MS-3000 Particle Size Distribution, **Atomika Teknik**, 2013.
15. Gamry Electrochemical Instrument Training (Reference 3000 & 30k Booster), **Referans Kimya**, 2018
16. Potentiostat Galvanostat Training, **Metrohm**, 2016
17. CH Instruments 660E Model Potentiostat Training Certificate, **Global Analitik**, 2013
18. Thermal Analysis of Composites, **Mettler Toledo**, 2016.
19. 1., 2. ve 3. Materials for Energy Storage and Conversion, **ODTÜ**, 2015 ve 2017
20. 4.th National Summer School and Workshop on Applied Electrochemistry, **Manisa Celal Bayar Üniversitesi**, Mayıs 2016.
21. 1. ve 3. Electrochemical Impedance Spectroscopy Workshop, **Referans Kimya**, 2012 ve 2017
22. ZSIMPWIN Electrochemical Modelling Software, **AMETEK**, 2016
23. 1. ve 3. Battery Technology and Aviation Battery Systems, **ASPİLSAN**, 2018.
24. Examination of Faults in Aluminum Forming Techniques by Optical Microscope, Aluminum Test Training and Research Center **ALUTEAM**, 2017
25. Metkon Metallography Training, **Metkon**, 2017
26. “The Use and Application Techniques of XRD Rietveld Analysis in the Production of Cement” and “The Analysis Methods and Technologies of Cement Composition and Particle Size”, **Atomika Teknik**, 2017
27. “TS EN ISO 9001:2008 Quality Management System” and “GMP(Good Manufacturing Practices)”, **Kimyagerler Derneği**, 2010.
28. “ISO 17025-Lab. Accreditation Basic Training”, “GLP(Good Lab. Practice) Basic Training” and “ISO 10002-Customer Satisfaction Basic Training”, **artibel System&Certification**, 2012.
29. Applied Project Management in Science and Engineering, **Hacettepe Üniversitesi**, 2019.
30. Photovoltaic Workshop, Law, Regulations and Standards at Solar - Electric Conversion Systems, **Hacettepe Üniversitesi** – Temiz Enerji Vakfı – Fizik Mühendisleri Odası, 2013.

COMPUTER SKILLS :

- * ZSimpWin Electrochemical Impedance Spectroscopy Modelling Software
- * Originlab
- * Chemdraw
- * Orientation Imaging Microscopy for EBSD (OIM v8.0)
- * Microsoft Office (Word, Excel, Powerpoint)
- * Web Site Design with Adobe Dreamweaver
- * Orientation Imaging Microscopy Analysis (OIM v8.0, Crystal structure characterization)