

Timuçin BALKAN, Dr.

✉ tbalkan@ku.edu.tr

☎ +90 (507) 948 62 88

📍 Koç University, Tüpraş Energy Center (KUTEM), Rumelifeneri Yolu
34450 Sarıyer, İstanbul, Türkiye

Nationality: Turkish

Marital Status: Married

Military Service: Done



Research Areas

Hydrogen Evolution	Water Splitting	Metal Oxides	Polymer Characterization
Water Splitting	Solar Cells	Electrocatalysts	Electrochemical Deposition
Echem. CO ₂ Reduction	Conducting Polymers	Electrospinning	
Echem. O ₂ Reduction	Polymer Synthesis	Photocatalysts	

Work Experience

Koç University (Central Research Infrastructure Directorate)

Position: Responsible Researcher for NMR, SAXS and FTIR Equipment

Duration: October 2019 –

Job Description:

- 1) Use and coordination of NMR and SAXS devices
- 2) Organizing and giving necessary training for users

Koç University (Tüpraş Energy Center, KUTEM)

Position: Postdoctoral Researcher (<http://home.ku.edu.tr/~sarpkaya/>)

Duration: October 2017 – October 2019

Job Description:

- 1) Catalyst synthesis and doing proper experiments for such as H₂ evolution, CO₂ and O₂ reduction reaction
- 2) Electrochemical splitting of H₂S and producing H₂ and S elements (This project was supported by Turkey Oil Refineries, Tüpraş)

Bilkent University (Chemistry, National Nanotechnology Research Center)

Position: Postdoctoral Researcher (<http://fen.bilkent.edu.tr/~dtuncel/>)

Duration: October 2016 – October 2017

Job Description:

- 1) Synthesis and Characterization of Conjugated Oligomer-Metal Hybrid Structures
- 2) Synthesis and Characterization of Porphyrin-Based Materials

İstanbul Technical University (Chemistry Department)

Position: Researcher Assistant (<http://www.kimya.itu.edu.tr/TR/>)

Duration: January 2009 – September 2016

Job Description:

- 1) Giving General Chemistry, Physical Chemistry, and Electrochemistry Labs to Undergraduate Students

- 2) Physical Chemistry and Electrochemistry Problem Solving for Undergraduate Students
- 3) Coordination of the Synthesis and Characterization of Macromolecules Lab Lecture for Master and Doctorate Students

Education Info

Ph.D.: Polymer Science and Technology (2010-2016)

Institute: İstanbul Technical University, Science

Supervisor: Prof. Dr. A Sezai SARAÇ

Thesis Title: Production of TiO₂-Poly (Alkeylenedioxythiophene) Nanostructures for DSSC Application (This thesis is a part of the 111T051 project supported by TUBITAK) (Erasmus Fellowship in Univerzita Karlova Praze for 1 semester).

M.Sc.: Polymer Science and Technology (2008-2010)

Institute: Istanbul Technical University, Science

Supervisor: Prof. Dr. A Sezai SARAÇ

Thesis Title: Synthesis and Characterization of Electrically Conductive Polypyrrole-Poly (Acrylonitrile-co-Styrene) Composites; Nanofiber Formation (This thesis is a part of the 107T578 project supported by TUBITAK Romania (ANCS)).

Bachelor: Chemistry (2004-2008)

University: Uludağ University, Department of Chemistry

Graduation Project Supervisor: Prof. Dr. Zeger HENS

Thesis Title: Synthesis of Core/Shell CdSe/PbSe and ZnO/Co: ZnO Quantum Dots (Erasmus Fellowship in Ghent University for 1 year).

Technical Experience

Lab. Characterization Equipment:

Used Equipment

Nuclear Magnetic Resonance (NMR)
Infrared Spectrophotometer (FT-IR)
Ultraviolet-Visible Spectrophotometer (UV-Vis)
Scanning Electron Microscopy (SEM)
Fluorescent Spectrophotometer
Electrospinning (Nanofiber Production)
Four Point Conductivity Meter
Raman Spectrophotometer
Small Angle X-Ray Diffraction (SAXS)
Potentiostat/Galvanostat
X-Ray Diffraction (XRD)
Gas Chromatography (GC)
Mass Spectroscopy

Data Interpretation

Differential Scanning Calorimeter (DSC)
Thermogravimetric Analyzer (TGA)
Nuclear Magnetic Resonance (NMR) (1H, 13C)
Atomic Force Microscope (AFM)
Transmission Electron Microscopy (TEM)

Experiences in Synchrotron Lab.

- International Centre for Theoretical Physics-Elettra (Italy, Trieste).
- Synchrotron Light for Experimental Science and Applications in the Middle East-SESAME (Jordan, Amman).

- Max IV Lab (Sweden, Lund).

Trainings

AVANCE/TopSpin Basic NMR Training (10-14 February 2020)-Bruker/Germany

Languages

Turkish (Native), English (Fluent).

Softwares

Origin, ChemDraw, TopSpin.

Research Activities

Publications

- Lommens, P., Lambert, K., Loncke, F., De Muynck, D., **Balkan, T.**, Vanhaecke, F. and Hens, Z. (2008). The growth of Co: ZnO/ZnO core/shell colloidal quantum dots: changes in nanocrystal size, concentration, and dopant coordination. *ChemPhysChem*, 9(3), 484-491.
- Balkan, T.**, & Sarac, A. S. (2011). Synthesis and characterization of electrically conductive composite films of polypyrrole/poly (acrylonitrile-co-styrene). *Fibers and Polymers*, 12(5), 565-571.
- Giray, D., **Balkan, T.**, Dietzel, B., & Sarac, A. S. (2013). Electrochemical impedance study on nanofibers of poly (m-anthranilic acid)/polyacrylonitrile blends. *European Polymer Journal*, 49(9), 2645-2653.
- Selcan Gungor-Ozkerim, P., **Balkan, T.**, Kose, G. T., Sezai Sarac, A., & Kok, F. N. (2014). Incorporation of growth factor loaded microspheres into polymeric electrospun nanofibers for tissue engineering applications. *Journal of Biomedical Materials Research Part A*, 102(6), 1897-1908.
- Solcova, O., **Balkan, T.**, Guler, Z., Morozova, M., Dytrych, P., & Sarac, A. S. (2014). New Preparation Route of TiO₂ Nanofibers by Electrospinning: Spectroscopic and Thermal Characterizations. *Science of Advanced Materials*, 6(12), 2618-2624.
- Polat, E., Güler, Z., **Balkan, T.**, & Sarac, A. S. (2016). Covalent streptavidin immobilization on electrospun poly (m-anthranilic acid)/polycaprolactone nanofibers and cytocompatibility. *Journal of Bioactive and Compatible Polymers: Biomedical Applications May 2016* 31: 291-303.
- Balkan, T.**, Guler, Z., Morozova, M., Dytrych, P., Solcova, O., & Sarac, A. S. (2016). The effect of deposition on electrochemical impedance properties of TiO₂/FTO photoanodes. *Journal of Electroceramics*, 36(1), 102-111.
- Balkan, T.**, & Sarac, A. S. (2017). Electrochemical and Morphological Analysis of Modified poly (3,4-alkylenedioxythiophene)-TiO₂ Nanorod Electrodes. *Journal of Nanoscience and Nanotechnology*, 17(8), 5461-5468.
- Balkan, T.**, & Sarac, A. S. (2017). Morphological Effect of Composite TiO₂ Nanorod-TiO₂ Nanoparticle/PEDOT:PSS Electrodes on Triiodide Reduction. *Express Polymer Letters*, 11(2), 106-116.
- Akcoren, D., **Balkan, T.**, Gokce G. Z., Avci, M.Z., & Sarac, A. S. (2017). Fabrication and Characterization of Poly(Butyl Acrylate-co-Methyl Methacrylate)-Polypyrrole Nanofibers. *Polymer Bulletin*, DOI 10.1007/s00289-017-2110-3.

- Balkan, T., Kizir, S., & Tuncel, D. (2017).** One-Pot Synthesis of Hybrid Conjugated Oligomer-Ag Nanoparticles. *ACS Omega*, 2(9), 5470-5477.
- Esenturk, İ., **Balkan, T.,** Güngör, S., Sarac, A.S., & Erdal, M. (2018). Preparation and characterization of naftifine-loaded poly (vinyl alcohol)/sodium alginate electrospun nanofibers. *Brazilian Journal of Pharmaceutical Sciences*, 56.
- Esentürk, İ., **Balkan, T.,** Özhan, G., Döşler, S., Güngör, S., Erdal, M. S., & Sarac, A. S. (2020). Voriconazole incorporated nanofiber formulations for topical application: preparation, characterization and antifungal activity studies against Candida species. *Pharmaceutical Development and Technology*, 25(4), 440-453.
- Zarenezhad, H., Askari, M., Halali, M., Solati, N., **Balkan, T.,** & Kaya, S. (2020). Enhanced electron transport induced by a ferroelectric field in efficient halide perovskite solar cells. *Solar Energy Materials and Solar Cells*, 206, 110318.
- Bavili, N., **Balkan, T.,** Morova, B., Eryürek, M., Uysallı, Y., Kaya, S., & Kiraz, A. (2020). Highly sensitive optical sensor for hydrogen gas based on a polymer microcylinder ring resonator. *Sensors and Actuators B: Chemical*, 310, 127806.
- Balkan, T.,** Küçükkeçeci, H., Zarenezhad, H., Kaya, S. & Metin, Ö. (2020). One Pot Synthesis of Monodisperse Copper-Silver Alloy Nanoparticles and Their Composition-Dependent Electrocatalytic Activity for Oxygen Reduction Reaction. *Journal of Alloys and Compounds*, 154787.
- Zarenezhad, H., **Balkan, T.,** Solati, N., Askari, M., Halali, M. & Kaya, S. (2020). Efficient Carrier Utilization Induced by Conductive Polypyrrole Additives in Organic-Inorganic Halide Perovskite Solar Cells. *Solar Energy*, 207, 1300-1307.
- Panahi, M., Solati, N., Kahraman, A., **Balkan, T.,** Pis, I., Bondino, F. & Kaya, S. (2020). Charge Transfer Controlled Hydrogenation of Graphene on an Electronically Modified Pt(111) Surface. *Carbon*, 107, 636-645.
- Vishlaghi M.B., Kahraman A., Apaydin S., Usman E., Aksoy D., **Balkan T.,** Munir S., Harfouche M., Ogasawara H., Kaya, S. (2021). The Significance of the Local Structure of Cobalt-based Catalysts on the Photoelectrochemical Water Oxidation Activity of BiVO₄. *Electrochimica Acta*, 366, 137467.
- Ullah, H., Vishlaghi, M. B., **Balkan, T.,** ur Rehman, Z., & Kaya, S. (2021). Scaling-up Photocatalytic Activity of CdS from Nanorods to Nanowires for the MB Degradation. *Inorganic Chemistry Communications*, 108744.
- Ullah, H., **Balkan, T.,** Butler, I. S., Kaya, S., & Rehman, Z. U. (2021). Surfactant-free synthesis of CdS nanorods for efficient reduction of carcinogenic Cr (VI). *Journal of Coordination Chemistry*, 1-13.
- Ullah, H., Khan, Z., Nasir, J. A., **Balkan, T.,** Butler, I. S., Kaya, S., & Rehman, Z. U. (2021). Green synthesis of mesoporous MoS₂ nanoflowers for efficient photocatalytic degradation of Congo red dye. *Journal of Coordination Chemistry*, 74(14), 2302-2314.
- Balkan, T.,** Küçükkeçeci, H., Aksoy, D., Harfouche, M., Metin, Ö. & Kaya, S. (2022). Ag/AgCl Clusters Derived from AgCu Alloy Nanoparticles as Electrocatalyst for Oxygen Reduction Reaction. *Sustainable Energy & Fuels*, Doi: 10.1039/D2SE00472K.
- Karakaya, C., Solati, N., **Balkan, T.,** Savaci, U., Keleş, E., Turan, S. & Kaya, S. (2022). Mesoporous Molybdenum Sulfide-Oxide Composite Thin-film Electrodes Prepared by a Soft Templating Method for Hydrogen Evolution Reaction. *ACS Applied Energy and Materials*, Just Accepted.

Proceeding Papers

Gungor, P. S., **Balkan, T.**, Kose, G., Sarac, A. S., & Kok, F. N. (2012). Polyblend nanofibers as tissue engineering matrices. *New Biotechnology*, 29, S112.

Presentation and Poster

5th Nanoscience and Nanotechnology Conference 8-12 June 2009 Anadolu University- TURKEY, Cansev Tezcan, Damla Ecevit, **Timuçin Balkan** and A. Sezai Saraç, 'Substrate Effects on PEDOT Thin Film Formation'.

3th National Polymer Science and Technology Conference 12-14 May 2010 Kocaeli University-TURKEY, **T. Balkan**, A. Sezai Saraç*, 'Polymerization of Pyrrole on Poly(Acrylonitrile-co-Styrene) Matrix, Characterization of Composite Thin Films and Nanofiber Formation'.

7th Nanoscience and Nanotechnology Conference 27 June 2011 Sabancı University- TURKEY, **T. Balkan**, Didem Giray, A.Sezai Sarac, 'Nanofibers of Poly (Anthranilic Acid)/Polyacrylonitrile Composite'.

7th Nanoscience and Nanotechnology Conference 27 June 2011 Sabancı Üniversitesi- TURKEY, **T. Balkan**, Derya Cetecioglu, A.Sezai Sarac, 'Electrografting Of Poly(n-vinylcarbazole) And Poly(n-vinylcarbazole-co-styrenesulfonic Acid Sodium Salt): Cyclovoltammetric And Morphological Study'.

Polychar-20 World Forum on Advanced Materials 26-30 March 2012 Dubrovnik-Croatia, **T. Balkan**, A. Sezai Sarac, 'Synthesis and Nanofiber Formation of Conducting Graft Copolymer'.

Nanotech Italy, 21-23 November 2012 Italy, B. Demircioglu, **T. Balkan**, Z. Guler, A.S. Sarac, 'Preparation and Characterization of Nanofibers of PEDOT:PSS and PVAc Mixture'.

Nanotech Italy 21-23 November 2012 Italy, Z. Guler, **T. Balkan**, B. Demircioglu, A.S. Sarac, 'Synthesis and Characterization of PEDOT:PSS-TiO₂ Films for Potential Use in DSSC Applications'.

European Polymer Congress 16-21 June 2013 Italy, **T. Balkan**, A. Sezai Sarac, 'Electrospun Nanofibers of Polypyrrole/Poly(Acrylonitrile-co-Styrene)'.

Termis-EU, 17-20 June 2013 Turkey, E. Polat, M.T. Satici, T. Balkan, A.S. Sarac, 'Polycaprolactone/Poly(anthranilic acid) Scaffolds for Improved Cell Adhesion in Tissue Engineering Applications'.

5th International Istanbul Textile Congress, 11-12 September 2015, **T. Balkan**, A.S Sarac, 'Production of TiO₂ Nanofibers by Electrospinning'.

Gebze Technical University, Nano Seminar Series, 6 February 2019, **T. Balkan**, 'Conducting Polymer Composites', Invited Speakers

nanoGe Fall Meeting, Online Conference, 18-22 Ekim 2021, S. Tafazoli, M. Yusufoglu, **T. Balkan***, S. Kaya 'The Effect of Copper Oxide and its Hybrid Structure with ZnO on the Activity and Selectivity of Electrochemical Carbon Dioxide (CO₂) Reduction', Poster Presentation

Patent

Balkan T., Gençtürk A., Sarac A.S., Production of TiO₂ based Counter Electrodes, Application File Number: 2016/08800 (National Patent Application).

Projects

'Synthesis and Detailed Characterization of Functional Polymeric Composite Nanostructured Materials' Project Number: 111T051, Project Partner: Dr.Olga SOLCOVA, Institute of Chemical Process Fundamentals, Project Duration: 2 years, Supporting Institution: TUBITAK and Czech Republic Academy of Sciences, **Fellowship**. (Completed)

'Production and Characterization of TiO₂-Conductive Polymer Composite Counter Electrodes for DSSCs' Project Number: 38556, Supporting Institution: İstanbul Technical University, **Fellowship**. (Completed)

'Study of Design, Synthesis, Characterization, Drug Loading Capacity and Release Efficiency of Supramolecular Drug Delivery Systems', Supporting Institution: TÜBİTAK, Project Number: 215Z035 **Post-Doctoral Researcher**, Bilkent University. (Completed)

'H₂S Splitting and Production of H₂', Supporting Institution: TÜPRAŞ, **Post-Doctoral Researcher**, Koç Üniversitesi. (Continue)

'Design of Copper-Based Catalysts with Tunable Selectivity for Electrochemical Reduction of Carbon Dioxide by Advanced Synthesis and Characterization Methods', Project Number: 118Z740, Supporting Institution: TÜBİTAK, Project Duration: 3 Years, **Supervisor** (2019-2022), Koç University. (Continue)

Given Lectures

- 1) Physical Chemistry Lab. 1 and 2
- 2) General Chemistry Lab. 1 and 2
- 3) Electrochemistry Lab.
- 4) Synthesis and Characterization of Macromolecules Lab (for Master and Ph.D. students)
- 5) Problem Solving of Physical Chemistry and Electrochemistry Lectures

References

1) Prof.Dr. A. Sezai SARAC
İstanbul Teknik Üniversitesi, Fen-Edebiyat Fakültesi, Kimya Bölümü,
34469 Maslak, İstanbul-Türkiye **Tel:** +90 555 542 0260, **E-mail:** sarac@itu.edu.tr

2) Doç. Dr. Sarp KAYA
Koç Üniversitesi, Fen Fakültesi, Kimya Bölümü,
Sarıyer, İstanbul-Türkiye, **Tel:** +90 534 376 0194, **E-mail:** kaya@ku.edu.tr

3) Doç. Dr. Önder METİN
Koç Üniversitesi, Fen Fakültesi, Kimya Bölümü,
Sarıyer, İstanbul-Türkiye, **Tel:** +90 212 338 0942, **E-mail:** ometin@ku.edu.tr

4) Dr. Nazif Uğur KAYA
Senior Scientist, VTT Technical Research Centre, Finland
Tel: +90 541 236 0066, **E-mail:** naugka12@gmail.com

5) Prof. Dr. Esmâ SEZER
İstanbul Teknik Üniversitesi, Fen-Edebiyat Fakültesi, Kimya Bölümü,
34469 Maslak, İstanbul-Türkiye **Tel:** +90 541 317 8184, **E-mail:** esezer@itu.edu.tr

6) Dr. Öğretim Üyesi İmren ESENTÜRK
Sağlık Bilimleri Üniversitesi, Eczacılık Fakültesi, Farmasötik Teknoloji ABD,
34668 Üsküdar, İstanbul-Türkiye **Tel:** +90 505 232 7291, **E-mail:** imren.esenturk@sbu.edu.tr