Yusuf Koçak, Ph. D. ●

Researcher

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Scientific Background

- 2021- present, **Senior Researcher**
  Bilkent University, NANOTAM, Ankara/Turkey
  Advisor: **Prof. Dr. Emrah Özensoy**

- 2018 – 2021, **Post-Doctoral Researcher**
  Bilkent University, Department of Chemistry, Ankara/Turkey
  Advisor: **Prof. Dr. Emrah Özensoy**

- 2012 – 2019, **Ph. D. in Physics**
  Atatürk University, Department of Physics, Erzurum/Turkey
  Dissertation: "Investigation of Growth Dynamics of 2-Dimensional WS_2 Layers by Sputtering Method"
  Advisor: **Prof. Dr. Emre Gür**

- 2008 – 2011, **M. S. in Physics**
  Erciyes University, Department of Physics, Kayseri/Turkey
  Thesis: "Dependency of microstructure and microhardness on solidification processing parameters for directional solidified Pb-Bi alloys"
  Advisor: **Prof. Dr. Necmettin Maraşlı**

- 2004 – 2008, **B. S. in Physics**
  Selçuk University, Konya, Turkey. Department of Physics

National Research Centers (User)

- **DAYTAM** (East Anatolia High Technology Application and Research Center) Atatürk University, Erzurum/Turkey
- **UNAM** (Institute of Materials Science and Nanotechnology) Bilkent University, Ankara/Turkey

Research Interests

- Alloys
- Directional Solidification
- Nanomaterial characterization

- Thin-film technologies (synthesis and characterization)
- Renewable energy catalysts
- RF Magnetron sputtering and thermal coating
- Single-crystal materials
- UHV (ultra-high vacuum)
- Battery

Instrumentation

- XPS (X-Ray Photoelectron Spectroscopy)
- SEM-EDX (Scanning Electron Microscopy-Energy-dispersive X-Ray Spectroscopy)
- Raman Spectroscopy
- AFM (Atomic Force Microscopy)
- Nano-FTIR (nano - Fourier Transform Infrared Spectroscopy)

Certificates

- XPS-UPS (X-Ray Photoelectron Spectroscopy)
- Raman Spectroscopy
- RF Magnetron Sputtering and Termal Coating
- Pedagogical Formation (Atatürk University)

International Laboratory Experience

- **User,** Dec 2018

SESAME Synchrotron Facility, Amman, Jordan
Project title: "Performed various XANES/EXAFS Experiments on heterogeneous catalysts"

- **User,** Jan-Feb 2020

Synchrotron SOLEIL, Paris, France
Project title: "Understanding the Nature of the Iridium Based Oxidation Catalysts with EXAFS and XANES"

Projects

- **BAP (Scientific Research Project)**: Investigation Dependency of microstructure and microhardness on solidification processing parameters for directional solidified Pb-Bi alloys (Bi-Pb Alaşımının Kontrollü Doğrusal Katılaştırılması İle Mekanik Özelliklerinin ve Isı İletkenliğinin Kontrol Parametrelerine Bağlılığının İncelenmesi) Master thesis project, Erciyes University
- **KAP (Research Project)**: Characterization of growth dynamics of WS_2 thin films by sputtering method (Reaktif Saçtırma Metodu İle Büyütülmüş Tungsten Sülfür (WS_2) İnce Filmlerin Karakterizasyonu), Kapsamlı araştırma projesi Atatürk Üniversitesi
- **TÜBİTAK (The Scientific and Technological Research Council Of Turkey):** Investigation of electrical conductivity and current carrying capacity in carbon nanomaterial-copper composite wires **(**Karbon Nanomalzeme-Bakır Kompozit Yapıların Tellerin Akım Taşıma Kapasitelerinin Ve İletkenliklerinin Araştırılması), 1001, Atatürk University
- **ROKETSAN Company Research Project**: 2018 - 2020, Bilkent University
- **ASELSAN Company Research Project:** 2021-present, Bilkent University

Publications (SCI, SCIE) (h-Index: 12, Citation: 342)

1. Ebrahimi, E., Irfan, M., ***Kocak, Y***., Rostas, A. M., Erdem, E., & Ozensoy, E. (2024). Origins of the Photocatalytic NO x Oxidation and Storage Selectivity of Mixed Metal Oxide Photocatalysts: Prevalence of Electron-Mediated Routes, Surface Area, and Basicity. ***J. Phys. Chem. C***, 128, 4, 1669–1684
2. Ulusoy Ghobadi, T. G., ***Kocak, Y***., Jalal, A., Altinkaynak, Y., Celik, G., Semiz, T., ... & Ozensoy, E. (2023). Low-Pressure Deuterium Storage on Palladium-Coated Titanium Nanofilms: A Versatile Model System for Tritium-Based Betavoltaic Battery Applications. ***ACS Applied Materials & Interfaces***, 15(34), 40459-40468.
3. Anil, A., Sadak, O. F., Karakurt, B., ***Kocak, Y***., Lyubinetsky, I., & Ozensoy, E. (2023). Interaction of CO2 with MnOx/Pd (111) Reverse Model Catalytic Interfaces. ***ChemPhysChem***, e202200787.
4. Sika-Nartey, A. T., Sahin, Y., Ercan, K. E., Kap, Z., ***Kocak, Y***., Erdali, A. D., ... & Ozensoy, E. (2022). Two-Dimensional Bimetallic Hydroxide Nanostructures for Catalyzing Low-Temperature Aerobic C–H Bond Activation in Alkylarene and Alcohol Partial Oxidation. ***ACS Applied Nano Materials***, 5(12), 18855-18870.
5. Say, Z., Kaya, M., Kaderoğlu, C., ***Koçak, Y***., Ercan, K. E., Sika-Nartey, A. T., ... & Ozensoy, E. (2022). Unraveling Molecular Fingerprints of Catalytic Sulfur Poisoning at the Nanometer Scale with Near-Field Infrared Spectroscopy. ***Journal of the American Chemical Society***, *144*(19), 8848-8860.
6. Ozden, M., Say, Z., ***Kocak, Y***., Ercan, K. E., Jalal, A., Ozensoy, E., & Avci, A. K. (2022). A highly active and stable Ru catalyst for syngas production via glycerol dry reforming: Unraveling

the interplay between support material and the active sites. ***Applied Catalysis A**: General*, *636*, 118577.

7. Kurt, M., Kap, Z., Senol, S., Ercan, K. E., Sika-Nartey, A. T., ***Kocak, Y***., ... & Ozensoy, E. (2022). Influence of La and Si Promoters on the Anaerobic Heterogeneous Catalytic Decomposition of Ammonium Dinitramide (ADN) via Alumina Supported Iridium Active Sites. ***Applied Catalysis A**: General*, 118500.

8. Özmen, A., Mobtakeri, S., ***Koçak, Y***., Akbaba, U., Ertuğrul, M., & Gür, E. (2021). Ultra-conductive wires with cascaded carbon nanotube/Cu structure. *Diamond and Related Materials*, *120*, 108711.

9. Tutel, Y., Durukan, M. B., Koc, S., Koylan, S., Cakmak, H., ***Kocak, Y***., ... & Unalan, H. E. (2021). Multichromic Vanadium Pentoxide Thin Films Through Ultrasonic Spray Deposition. ***Journal of The Electrochemical Society***, *168*(10), 106511.

10. Sahin, Y., Sika-Nartey, A. T., Ercan, K. E., ***Kocak, Y***., Senol, S., Ozensoy, E., & Türkmen, Y. E. Precious Metal-Free LaMnO3 Perovskite Catalyst with an Optimized Nanostructure for Aerobic C–H Bond Activation Reactions: Alkylarene Oxidation and Naphthol Dimerization. ***ACS Applied Materials & Interfaces,*** 2021, 13, 4, 5099–5110

11. Ebrahimi E, Irfan M, Shabani F, ***Koçak Y***, Karakurt B, Erdem E, et al. *Core-crown Quantum Nanoplatelets with Favorable Type-II Heterojunctions Boost Charge Separation and Photocatalytic NO Oxidation on TiO2*. ***ChemCatChem*** (2020) 1867-3880

12. Karakurt B***, Kocak Y***, Lyubinetsky I, Ozensoy E. *Significance of the Mn-Oxidation State in Catalytic and Noncatalytic Promotional Effects of MnOx Domains in Formic Acid Dehydrogenation on Pd/MnOx Interfaces*. ***The Journal of Physical Chemistry C*** Vol. 124. 2020.124(41):22529–38.

13. Tigan, D., ***Kocak, Y***., Ercan, K. E., Cicek, M. O., Tunca, S., Koylan, S., ... & Unalan, H. E. (2020). *All-Solution-Processed, Oxidation-Resistant Copper Nanowire Networks for Optoelectronic Applications with Year-Long Stability*. ***ACS Applied Materials & Interfaces, (2020)*** *12*(40), 45136-45144.

14. ***Koçak, Yusuf***, and Emre Gür. "*Growth control of WS2; from 2D layer by layer to 3D vertical standing Nano-Walls*." ***ACS Applied Materials & Interfaces*** (2020) 12, 13, 15785–15792, https://doi.org/10.1021/acsami.9b18759.

15. Bartu Karakurt, ***Yusuf Koçak***, Emrah Ozensoy: *Enhancement of Formic Acid Dehydrogenation Selectivity of Pd(111) Single Crystal Model Catalyst Surface via Bronsted Bases*. ***The Journal of Physical Chemistry C*** 11/2019; *123, 47, 28777-28788***),** DOI:10.1021/acs.jpcc.9b08707

16. Mustafa Çağlayan, Muhammad Irfan, Kerem Emre Ercan, ***Yusuf Kocak***, Emrah Ozensoy: *Enhancement of Photocatalytic NOx Abatement on Titania via Additional Metal Oxide NOx-Storage Domains: Interplay between Surface Acidity, Specific Surface Area, and Humidity*. ***Applied Catalysis B: Environmental*** 09/2019;, DOI:10.1016/j.apcatb.2019.118227

17. Ilkay Demir, ***Yusuf Koçak***, A. Emre Kasapoğlu, Manijeh Razeghi, Emre Gür, Sezai Elagoz: *AlGaN/AlN MOVPE heteroepitaxy: pulsed co-doping SiH4 and TMIn*.***Semiconductor Science and Technology*** 06/2019; 34(7)., DOI:10.1088/1361-6641/ab2782

18. Selin Bac, Zafer Say, ***Yusuf Kocak***, Kerem E. Ercan, Messaoud Harfouche, Emrah Ozensoy, Ahmet K. Avci: *Exceptionally active and stable catalysts for CO2 reforming of glycerol to syngas*. ***Applied Catalysis B: Environmental*** 06/2019; 256:117808., DOI:10.1016/j.apcatb.2019.117808

19. Muhammad Irfan, Melike Sevim, ***Yusuf Koçak***, Merve Balci, Önder Metin, Emrah Ozensoy: *Enhanced Photocatalytic NOx Oxidation and Storage Under Visible-Light Irradiation by Anchoring Fe3O4 Nanoparticles on Mesoporous Graphitic Carbon Nitride (mpg-C3N4)*. ***Applied Catalysis B: Environmental*** 02/2019; 249., DOI:10.1016/j.apcatb.2019.02.067

20. Melek Fidan, Demet İskenderoğlu, ***Yusuf Koçak***, Zineb Benzait, Emre Gür: *Single, co-doping and triple doping Fe element in the ZnO crystal matrices*. ***Materials Research Express*** 01/2019; 6(4):046410., DOI:10.1088/2053-1591/aafaee

21. Merve Balci Leinen, Didem Dede, Munir Ullah Khan, Mustafa Çağlayan, ***Yusuf Koçak***, Hilmi Volkan Demir, Emrah Ozensoy: *CdTe Quantum Dot-Functionalized P25 Titania Composite with Enhanced Photocatalytic NO2 Storage Selectivity under UV and VIS Irradiation*. ***ACS Applied Materials & Interfaces*** 12/2018; 11(1)., DOI:10.1021/acsami.8b18036

22. Bayram Kilic, Sunay Turkdogan, Aykut Astam, Sümeyra Seniha Baran, Mansur Asgin, Emre Gur, ***Yusuf Kocak***: *Interfacial engineering of CuO nanorod/ZnO nanowire hybrid nanostructure photoanode in dye-sensitized solar cell*. ***Journal of Nanoparticle Research*** 01/2018; 20(1):11., DOI:10.1007/s11051-017-4103-4

23. ***Yusuf Koçak***, Emre Gür: *Magnetron sputtered WS2; optical and structural analysis*. ***Journal of Physics Conference Series*** 04/2016; 707(1)., DOI:10.1088/1742-6596/707/1/012028.

24. ***Y. Koçak***, S. Engin, U. Böyük, N. Maraşlı: *The influence of the growth rate on the eutectic spacings, undercoolings and microhardness of directional solidified bismuth–lead eutectic alloy*. ***Current Applied Physics*** 05/2013; 13(3):587–593., DOI:10.1016/j.cap.2012.10.005.

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Book Chapters

Emre GÜR, **Yusuf KOÇAK**: *Raman Spektroskopisi; Biyolojik Sistemlere Uygulamaları*. 12/2017. ISBN:978-605-9940-14-6

Conference Presentations (International)

- North American Catalysis Society Meeting, 2019, CdTe Quantum Dot-Functionalized P25 Titania Composite with Enhanced Photocatalytic NO_2 Storage Selectivity Under UV and VIS Irradiation Merve Balci Leinen, Didem Dede, Munir Ullah Khan, Mustafa Çağlayan, Yusuf Koçak, Hilmi Volkan Demir, and Emrah Ozensoy.
- IPCAP 2016, Erzurum, Turkey (**Oral presentation**); Magnetron Sputtered WS_2; Optical and Structural Analysis Y. Koçak, Y Akaltun, and Emre Gür.
- YMF 2016 (Condensed Matter Physics) İzmir, Turkey**, (Poster presentation),** Surface, Interfacial and Optical Properties of Two-Dimensional WS2 Thin Films**.**
- NANOTR12 12th Gebze, Turkey, (**Oral presentation**) International Nanoscience and Nanotechnology Conference Magnetron Sputtered WS2 Thin Films; surface, interface and optical analysis Yusuf Koçak, and Emre Gür.
- Trends in Nanotechnology International Conference (TNT2017), Dresden, Germany, (**Oral presentation**) Magnetron Sputtered WS2 Thin Films, Emre Gür, and Yusuf Koçak.
- Trends in Nanotechnology International Conference (TNT2017), Dresden, Germany, (**Poster presentation**) CuO nanoparticle composite structures with carbon nanotubes, Yusuf Koçak, Ahmet Özmen, Mehmet Ertuğrul, and Emre Gür.
- International Conference on Advanced Engineering Technologies, (ICADET'17), Bayburt, Turkey, (Oral presentation) Structural Characterization of Cu / MWCNT Composites, Yusuf Koçak, Ahmet Özmen, Emre Gür. and Mehmet Ertuğrul.
- 13th Nanoscience & Nanotechnology Conference, (NANOTR 13), Antalya, Turkey, (**Poster presentation**) Growth dynamics of WS2 by RF magnetron sputtering, Yusuf Koçak, and Emre Gür.
- 13th Nanoscience & Nanotechnology Conference, (NANOTR 13), Antalya, Turkey, (**Poster presentation**) MBE grown GaN Nanowires on Si (111) Substrate; Temperature Dependence, Ahmet Emre Kasapoğlu, Yusuf Koçak, Emre Gür, and Pınar Doğan.

Press Appearances

- 2019 Nature (Asia): "SESAME's first publication sees light"
  https://www.natureasia.com/en/nmiddleeast/article/10.1038/nmiddleeast.2019.90
- 2019 Lightsources.org: "Publication of the first scientific paper of SESAME"
  https://lightsources.org/2019/06/19/publication-of-the-first-scientific-paper/
- 2022 azom.com: Identifying Sulfur Poisoning with Near-Field Infrared Spectroscopy
  https://www.azom.com/article.aspx?ArticleID=21662

Hobbies & Activities

- Cycling, Tennis (Intermediate), Table Tennis
- Chess (Member of Bilkent University Tournament Team, won Blitz Tournament League (2021) between universities).