**Yusuf Koçak, Ph. D.** ●

Researcher

Bilkent University,

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## Scientific Background

- 2018 – present, **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
- Ultra-High Vacuum (UHV) systems
- Betavoltaic Battery
- Heterogeneous Catalysis & Surface/Interface Chemistry

## 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)
- DEMS (Differential Electrochemical Mass Spectrometry)

## International Laboratory Experience

- **User,**

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

- **User,**

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

- **Invited Observer,**

**Synchrotron SOLEIL**, Paris, France

## 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 ile Mekanik Özelliklerinin ve Isı İletkenliğinin Kontrol Parametrelerine Bağlılığının İncelenmesi) Master thesis project, Erciyes University
- **BAP (Research Project)**: Characterization of growth dynamics of $WS_2$ thin films by sputtering method (Reaktif Saçtırma Metodu ile 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:** 2021-2024, Bilkent University
- **BİNOM-ENG Company Research Project:** 2024-present, Bilkent University

## Publications (SCI, SCIE) (h-Index: 14, Citation: 577 -03.06.2026-)

1. Demiröz, E., Kurtoğlu-Öztulum, S. F., Ercan, K. E., Erdivan, B., Güleryüz, B., **Kocak, Y**., ... & Uzun, A. (2025). Effect of Calcination Temperature on CO2 Methanation Performance of LaCoO3 Perovskite Catalyst Precursors. ***Industrial & Engineering Chemistry Research***, *64*(33), 16053-16065.
2. Baglicakoglu, S. K., Oz, S., Ucar, A. D., **Kocak, Y**., Durukan, M. B., Ozensoy, E., & Unalan, H. E. (2025). Two-Dimensional Titanium Disulfide Nanosheets for Enhanced Capacity of Zinc-Ion Capacitors. ***ChemElectroChem,*** *12*(9), e202400663.
3. Ucar, A. D., Baglicakoglu, S. K., Durukan, M. B., Cugunlular, M., Oz, S., **Kocak, Y**., ... & Unalan, H. E. (2025). Overcoming instability challenges of binder-free, self-standing 1T-TiS2 electrodes in aqueous symmetric supercapacitors through dopamine functionalization. ***Materials Today Energy***, *48*, 101810.
4. Gözütok, A. N., Durukan, M. B., **Kocak, Y**., Ozensoy, E., Unalan, H. E., & Nalbant, E. (2025). Manganese-doped iron sulfide nanoplatelets on carbon cloth: A negative electrode material for flexible and wearable supercapacitors. ***Journal of Energy Storage***, *109*, 115182.
5. 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
6. 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.

7. Anil, A., Sadak, O. F., Karakurt, B., **Kocak, Y**., Lyubinetsky, I., & Ozensoy, E. (2023). Interaction of $CO_2$ with MnOx/Pd (111) Reverse Model Catalytic Interfaces. ***ChemPhysChem***, e202200787.
8. 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.
9. 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.
10. 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.
11. 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.
12. 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.
13. 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.
14. 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
15. 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
16. 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.
17. 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.
18. **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.
19. 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***).**
20. 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.

21. 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
22. 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
23. 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
24. 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.
25. 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).
26. 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.
27. **Yusuf Koçak**, Emre Gür: *Magnetron sputtered WS2; optical and structural analysis*. **Journal of Physics Conference Series** 04/2016; 707(1).
28. **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.

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## Book Chapters

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

## Patent

- CNT-METAL (Al, Cu, VD) ULTRAİLETKEN KOMPOZİT TELLER VE ULTRAİLETKEN TEL ÜRETİMİ İÇİN YÖNTEM VE SİSTEM. Tescil Tarihi: 24.04.2023. No: 2020 15500. (CNT–Metal (Al, Cu, VD) Superconducting Composite Wires: Method and System for Wire Fabrication)

## Conference Presentations (International)

- **Jul, 2024.** Spectrocat2024: International Symposium SpectroCat 2024 In-situ Spectroscopic Monitoring of Reactant/Product-Catalyst Interactions on Atomically Dispersed Rh/Ce-HAP Catalysts for Syngas Production from Ethanol *(Poster Presentation)* Ayse Dilay Erdali, Yusuf Kocak, Kaan Karaca, Emrah Ozensoy.
- **Mar 2025,** ACS Spring 2025, Investigating ethanol decomposition on atomically dispersed Rh sites: in-situ FTIR insights into decomposition products *(Poster Presentation)* Ayse Dilay Erdali, Yusuf Kocak, Kaan Karaca, Emrah Ozensoy.
- **Jun 2025,** North American Catalysis Society Meeting, 2025, Engineering the Nature of Rh Catalyst for Integrated $CO_2$ Capture and Utilization Via Dry Reforming of Methane: Effect of $CeO_x$ and $FeO_x$ Promoters on HAP. Aybala Topcu, Ayse Dilay Erdali, Erdem Deniz, Yusuf Kocak, Kaan Karaca, Zafer Say.
- **Jun 2025,** 10th National Catalysis Conference, NCC10, How Single Atoms Keep Your Catalysts Alive: Effect of Particle Size on Sulfur Poisoning and Regeneration of Rhodium Active Sites.(*Oral Presentation)* Asım Ahmet Dede, Ayse Dilay Erdali, Emrah Ozensoy.
- **Jun 2025,** 10th National Catalysis Conference, Influence of Rh Loading in Rh/Ce-HAP Single-Atom Catalysts on Ethanol and $CO_2$ Interactions: Oxidation vs. Decomposition Pathways. (*Poster Presentation)* Ayse Dilay Erdali, Yusuf Kocak, Kaan Karaca, Messaoud Harfouche, Ahsan Jalal, Ahmet Kerim Avcı, Emrah Ozensoy.
- **Aug 2025,** 19th Nanoscience and Nanotechnology Conference, Influence of Rh Loading in Rh/Ce-HAP Single-Atom Catalysts (*Poster Presentation)* Ayse Dilay Erdali, Yusuf Kocak, Kaan Karaca, Messaoud Harfouche, Ahsan Jalal, Ahmet Kerim Avcı, Emrah Ozensoy.
- **May 2026,** 18th National Spectroscopy Congress with International Participation, From Isolated Rh Single Atom Catalytic Sites to Cooperative Ensembles: Tuning Catalytic Pathways in $CO_2$ and Ethanol Interactions. (*Oral Presentation)* Ayse Dilay Erdali, Yusuf Kocak, Kaan Karaca, Messaoud Harfouche, Ahsan Jalal, Ahmet Kerim Avcı, Emrah Ozensoy.
- 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 $WS_2$ Thin Films**.**

- NANOTR12 12th Gebze, Turkey, (**Oral presentation**) International Nanoscience and Nanotechnology Conference Magnetron Sputtered $WS_2$ 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.
- 13$^{th}$ Nanoscience & Nanotechnology Conference, (NANOTR 13), Antalya, Turkey, (**Poster presentation**) Growth dynamics of $WS_2$ by RF magnetron sputtering, Yusuf Koçak, and Emre Gür.
- 13$^{th}$ 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
- 2025 Success Story – NEPHEWS Twinning Program – Yusuf Koçak, https://www.synchrotron-soleil.fr/en/news/success-story-nephews-twinning-program-yusuf-kocak-hosted-samba-beamline-25-28-november-2025

## Hobbies & Activities

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