

Ayşe Dilay Erdali

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Scientific Background:

2020-Present: **Ph.D. in Chemistry** (Expected graduation: December 2026)

Department of Chemistry, Bilkent University, Ankara, Turkey.

Supervisor: Prof. Emrah Ozensoy

Thesis: *Atomically Dispersed Rh/CeHAP Catalysts for Ethanol Dry Reforming Reaction*

2017-2020: **M.S. in Chemical Engineering**

Department of Chemical Engineering, Gazi University, Ankara, Turkey

Supervisor: Prof. Meltem Dogan

Thesis: *Investigation of Isobutane Dehydrogenation in a Membrane Reactor*

2011-2016: **B.S. in Chemical Engineering**

Department of Chemical Engineering, Gazi University, Ankara, Turkey

Research Experiences:

2020-Present: Research on single-atom Rh catalysts supported on CeO₂ and hydroxyapatite (HAP) for ethanol dry reforming. Focus areas include:

- In situ FTIR spectroscopy.
- Ethanol and CO₂ surface interactions.
- Catalyst design and structure–function relationships.

2017-2020: Investigated isobutane dehydrogenation over chromia–alumina catalysts in a membrane reactor. Scope included:

- Catalyst synthesis and characterization.
 - Reactor, process operation.
 - Performance evaluation for light alkane dehydrogenation.
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Work Experience:

2020-2025: **Teaching Assistant**

General Chemistry II Laboratory (Bilkent University) *Assisted in conducting undergraduate lab experiments, maintaining safety protocols, and grading lab reports.*

Analytical Chemistry II Laboratory (Bilkent University) *Assisted in classical analysis experiments, with a focus on titration techniques and data interpretation.*

Physical Chemistry I Laboratory (Bilkent University) *Assisted in thermodynamics and kinetics-based experiments; provided technical support and graded lab work.*

Quantum Chemistry II-Grader (Bilkent University) *Graded homework and quizzes; provided feedback on problem-solving and theoretical concepts.*

2018-2020: R&D Engineer

YEDIC Engineering, METU Technopolis, Ankara, Turkey.

- Hydrogen technologies and renewable energy systems
- Gas adsorption systems and industrial adsorbents
- End-to-end project management, from concept to product launch
- Process development and continuous improvement
- Technical documentation and reporting
- Cost analysis and financial feasibility assessment.

2017-2018: Long Term Production Intern

HENKEL, Ankara, Turkey

- Liquid and powder detergent manufacturing
- Sulfonation process operations
- Monitoring OEE/MOEE and KPIs for production lines
- Evaluating line efficiency and reporting to management
- Supporting R&D for improved chemical processes
- TPM and lean manufacturing practices
- SMED, 5S, Visual Management, and Kaizen initiatives

July 2016: Intern

Eti Mining Operations General Directorate, Kütahya, Turkey.

- Boric Acid Production Plant

August 2015: Intern

TAI- TUSAŞ/ Turkish Aerospace Industries, Ankara, Turkey.

- Chemical Processes Treatment, Autopaint Heat Treatment

Instrumentation:

- FTIR (Fourier-Transform Infrared Spectroscopy)
- ATR-FTIR (Attenuated Total Reflection)
- XPS (X-Ray Photoelectron Spectroscopy)
- Raman Spectroscopy
- X-Ray Diffraction (XRD)
- Specific Surface Area Analysis via BET Method (BET-SSA)
- ICP-MS (Inductively Coupled Plasma Mass Spectrometry)
- TGA (Thermogravimetric analysis)

International Laboratory Experience:

User, BM08 – XAFS/XRF Beamline (X-ray Absorption Fine Structure / X-ray Fluorescence), SESAME Synchrotron Facility, Amman, Jordan

March 2023

Bimetallic Hydroxide Catalysts for Aerobic C-H Activation

June 2023

Structure and Functionality Investigation of Highly Dispersed Nickel, Rhodium on HAP Support for Catalytic Production of Syngas from Ethanol

December 2023

Understanding the Electronic Structure of Shape-Defined Cu₂O Nano-Cube and Nano-Octahedra Photocatalysts in Methanol Oxidation to Formaldehyde

May 2024

Elucidating the Structure Functionality Relationships of Highly Dispersed Rhodium Catalytic Active Sites on Ce Promoted Hydroxyapatite in Reverse Water Gas Shift Reaction

Publications:

1. **Ayse Dilay Erdali**, Saliha Cetinyokus, Meltem Dogan. "Investigation of Isobutane Dehydrogenation on CrO_x/ Al₂O₃ Catalyst in a Membrane Reactor." *Chemical Engineering and Processing - Process Intensification* 175 (2022): 108904.
<https://doi.org/10.1016/j.cep.2022.108904>
2. Abel Tetteh Sika-Nartey, Yesim Sahin, Kerem Emre Ercan, Zeynep Kap, Yusuf Kocak, **Ayse Dilay Erdali**, Beyzanur Erdivan, Yunus Emre Türkmen, Emrah Ozensoy. "Two-Dimensional Bimetallic Hydroxide Nanostructures for Catalyzing Low-Temperature Aerobic C–H Bond Activation in Alkylarene and Alcohol Partial Oxidation." *ACS Catalysis*, 12 (2022): 15038–15053. <https://doi.org/10.1021/acsanm.2c04634>
3. Beyzanur Erdivan, Eylul Calikyilmaz, Suay Bilgin, **Ayse Dilay Erdali**, Damla Nur Gul, Kerem Emre Ercan, Yunus Emre Türkmen, Emrah Ozensoy. "Na-Promoted Bimetallic Hydroxide Nanoparticles for Aerobic C–H Activation: Catalyst Design Principles and Insights into Reaction Mechanism." *ACS Catalysis*, 14 (2024) <https://doi.org/10.1021/acсами.4c11070>
4. Mert Ozden, N. Semih Altınsoy, Ahsan Jalal, **Ayse Dilay Erdali**, Orhan Ozcan, Ayse Nilgun Akin, Emrah Ozensoy, Ahmet K. Avcı. "Enhancement of One-Step Catalytic Dimethyl Ether Production from CO₂ via Selective Enrichment of Brønsted Acid Sites on Alumina with Phosphotungstic Acid" *ACS Sustainable Chemistry & Engineering*, 14, 11, 5650–5663 (2026) <https://doi.org/10.1021/acssuschemeng.5c13468>

5. **Ayse Dilay Erdali**, Yusuf Kocak, Kaan Karaca, Messaoud Harfouche, Ahsan Jalal, Ahmet Kerim Avcı, Emrah Ozensoy. "From Isolated Rh Single Atom Catalytic Sites to Cooperative Ensembles: Tuning Catalytic Pathways in CO₂ and Ethanol Interactions" *Manuscript in preparation*.
6. Erdem Deniz, **Ayse Dilay Erdali**, Aybala Büşra Topçu, Yusuf Koçak, Kaan Karaca, Zafer Say. "Engineering the Nature of Rh Catalyst for Dry Reforming of Methane: Effect of CeO_x and FeO_x Promoters on HAP." *Manuscript in preparation*.
7. Kaan Karaca, Seda Karaboğa, **Ayse Dilay Erdali**, Miray Tamer, Yusuf Koçak, Berfin Güteryüz, Rukiye Babacan Tosun, Emrah Ozensoy. "Unraveling Structure-Functionality Relationships of Shape-Defined Cu₂O Nanocrystal Model Catalysts for Methanol Decomposition." *Manuscript in preparation*.
8. Berfin Güteryüz, Seda Karaboğa, **Ayse Dilay Erdali**, Yusuf Koçak, Rukiye Babacan Tosun, Miray Tamer, Kaan Karaca, Emrah Ozensoy. "Structure Sensitivity in DeNO_x Catalysis on Shape-Defined Cu₂O Nanocrystal Model Catalysts." *Manuscript in preparation*.
9. Asım Ahmet Dede, **Ayse Dilay Erdali**, Yusuf Kocak, Rukiye Babacan Tosun, Emrah Ozensoy. "How Single Atoms Keep Your Catalysts Alive: Effect of Particle Size on Sulfur Poisoning and Regeneration of Rhodium Active Sites." *Manuscript in preparation*.

Conference Presentations:

Sep, 2016. National Chemical Engineering Congress 2016, Izmir Institute of Technology (*Poster Presentation*).

May, 2019. 1st of May International Congress on Social Policies and Scientific Research, (*Oral Presentation*) **Ayse Dilay Erdali**, Meltem Dogan.

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.

Nov, 2024. Joint ICTP-WE Heraeus Conference on Sustainability and Resilience Through Large Scale Infrastructures and Remote and Automated Experiments, Na-promoted bimetallic hydroxide nanoparticles for aerobic C-H activation: Catalyst design principles and insights into reaction mechanism. (*Poster Presentation*) Beyzanur Erdivan, Eylül Calikyilmaz, Suay Bilgin, **Ayse Dilay Erdali**, Damla Nur Gul, Kerem Emre Ercan, Yunus Emre Türkmen, 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 CO₂ 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*) Asim 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 CO₂ Interactions: Oxidation vs. Decomposition Pathways. (*Poster Presentation*) **Ayse Dilay Erdali**, Yusuf Kocak, Kaan Karaca, Messaoud Harfouche, Ahsan Jalal, Ahmet Kerim Avci, 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 Avci, 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 CO₂ and Ethanol Interactions. (*Oral Presentation*) **Ayse Dilay Erdali**, Yusuf Kocak, Kaan Karaca, Messaoud Harfouche, Ahsan Jalal, Ahmet Kerim Avci, Emrah Ozensoy.

Trainings, Meetings:

Feb, 2020. Turkey in Horizon 2020 Accelerator Project Writing Training for SMEs.

Feb, 2020. TSSK 7th Project Fair and Collaboration Summit.

Jan, 2020. Developing International Partnerships Training, Bernard DELCOURT

Nov, 2019. Technology Valuation Training, Kazım YALÇINOĞLU

Nov, 2019. EIF 2019 - 12th International Energy Congress and Expo

Aug, 2019. Bootcamp Climate LaunchPad

Apr, 2019. PCM (Project Cycle Management) Training, Ankara Development Agency

Jan, 2018. Value Stream Mapping, Kaizen Atölyesi

Dec, 2017. IOSH Leading Safely, Doga HSE Group

Sep, 2017. Machinery Safety, PILZ

Aug, 2017. ISO 9001:2015 Quality Management System

Aug, 2016. National Chemical Engineering Congress 2016, Izmir Institute of Technology

Jun, 2016. IV. Entrepreneurship Training Courses, Gazi Technopark.

Aug, 2022. 6th Anatolian School of Catalysis 2022

Sep, 2023. 9th National Catalysis Conference

Jan, 2025. ICTP- School on Synchrotron Light Sources and their Applications

Apr, 2025. SESAME SUNSTONE Training Programme - First Edition

Projects:

2020- Hydrogen Purification by Pressure Swing Adsorption

Yedic Engineering (TUBITAK 1507 SME R&D Start-up Support Programme)

2020- Development of Production Infrastructure

(KOSGEB R&D, Innovation and Industrial Application Support Program)

2019- REENSO- Renewable Energy Solutions

Yedic Engineering (4th place in national finals Climate LaunchPad Turkey)

2019- REENSO- Renewable Energy Solutions

Yedic Engineering (TechAnkara Project Market 2018 top 100 companies)

2019- Regenerative Hydrogen Dryer

Yedic Engineering (TUBITAK 1507 SME R&D Start-up Support Programme)

Awards

Best Teaching Assistant Award 2023, Bilkent Chemistry Department (Fall-Spring 2023)

Best Poster Presentation Award-10th National Catalysis Conference, NCC10 (June 2025)

Best Poster Presentation Award-19th Nanoscience and Nanotechnology Conference, NanoTR-19 (August 2025)

Hobbies & Activities:

Painting, Yoga, Folk Dances