Sustainable Water Management

Doctoral Programme (Water4All)

Title of the PhD Project	Nanostructured materials and wastewater treatment: the advanced oxidation processes (AOPs) by nanostructured materials for degradation of organic compounds
Acronym	Nanowater
Research Fields of the Project	Nanomaterials, Water treatment, Advanced water treatment processes
Keywords	Nanoparticles, Nanomaterials, Pharmaceuticals, Textile dyes, Ultrasonic assisted processes, Emerging pollutants
Host Institution, Department and Campus Location	Department of Chemical Engineering, Istanbul Technical University, Maslak, 34469 Istanbul, Turkey
PhD Awarding Institution and Graduate Programme	Istanbul Technical University, PhD in Chemical Engineering
Name and Affiliation of Main Supervisor	Prof. Dr. Alireza Khataee Department of Chemical Engineering & Nano Science and Nano Engineering Department, Istanbul Technical University, Maslak, 34469 Istanbul, Turkey
Name and Affiliation of Co-Supervisors	Doç. Dr. Hatice Eser Ökten Department of Environmental Engineering, Izmir Institute of Technology, Izmir, Turkey Prof. Dr. Mustafa M. Demir Department of Material Science and Engineering, Izmir Institute of Technology, Izmir, Turkey
Research Environment and Infrastructure	Istanbul Technical University (ITU) and Izmir Institute of Technology have all the facilities for synthesizing, characterizing, and testing nanomaterials as well as water and wastewater analysis. These facilities include: (I) for synthesis: precursors, solution-based and hydrothermal synthesis facilities; (II) for AOPs applications: ultrasonic baths and probes, different light sources; and (II) for characterization: XRD, SEM-EDX, BET, RAMAN, DRS, ICP, Spectrophotometers, GCMS. The TEM and XPS are available at service laboratories. During the visit to Zhejiang Normal University in China, the candidate will also have access to advanced laboratories for preparing nanomaterials and their characterization equipments.

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Scientific Context of the Project	The project deals with nanostructured materials for wastewater treatment. nanostructured catalysts would be synthesized for the degradation of organic compounds through advanced oxidation processes.
Brief Workplan	(1 year) Literature review and design of experimental setups (1 year) Synthesis, and characterization of nanostructured catalysts (1 year) Application of synthesized nanostructured catalysts in the advanced oxidation processes (1 year) Study the main parameters and removal mechanism of water and wastewater
Innovative Aspects of the Project	The project deals with state-of-the-art novel approaches to synthesis, characterization, and applications of novel nanostructured catalysts in AOPs.
Training Opportunities of the Project	The students will be trained in the advanced oxidation processes for degradation of hazardous organic pollutants, including pesticides, dyes and pharmaceuticals. They will be trained on water and wastewater analysis instruments such as UV-Vis spectrometer, HPLC, TOC and LCMS.
Interdisciplinary Aspects	
Intersectoral Mobility ☐ **Short Visit** ☐ **Secondment**	TBD
Intersectoral Mobility ☐ **Short Visit** ☐**Secondment**	TBD
International Academic Secondment	Host Supervisor: Prof. Yasin Orooji Host Institution: Zhejiang Normal University, China Host Department: College of Geography and Environmental Sciences Duration: 6-12 months Estimated Time of Mobility: 2nd or 3rd year of the project

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Main Supervisor	
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Co-supervisors	
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Brief CV	**Prof. Dr. Mustafa M. DEMİR** **E-mail:** mdemir@iyte.edu.tr **Academic Degrees** Ph.D. Materials Sciences and Engineering, Sabancı University, Türkiye 2004 M.Sc. Materials Sciences and Engineering, Sabancı University, Türkiye 2001 B.Sc. Chemistry, Boğaziçi University, Türkiye 1999 **Professional Networks** Google Scholar: https://scholar.google.com/citations?user=OX8Cq2wAAAAJ&hl=en ResearchGate: https://www.researchgate.net/profile/Mustafa-Demir-10 Scopus: https://www.scopus.com/authid/detail.uri?authorId=13907034500 ORCID: https://orcid.org/0000-0003-1309-3990