

**Sustainable Water Management
Doctoral Programme (Water4All)**



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Title of the PhD Project	Synthesis of doped layered double hydroxides for sonophotocatalytic degradation of emerging pollutants under visible light
Acronym	Doped LDHs
Research Fields of the Project	Nanotechnology, Nanomaterials preparation, Sonophotocatalytic processes
Keywords	Emerging pollutants, Doping, Photocatalysis, Sonocatalysis, Water treatment
Host Institution, Department and Campus Location	Nano Science and Nano Engineering Department, Istanbul Technical University, Maslak, 34469 Istanbul, Turkey
PhD Awarding Institution and Graduate Programme	Istanbul Technical University, PhD in Nano Science and Nano 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

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<p>Research Environment and Infrastructure</p>	<p>Istanbul Technical University (ITU) and Izmir Institute of Technology have all the facilities for synthesizing, characterizing, and testing nanomaterials and layered catalysts. 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.</p>
<p>Scientific Context of the Project</p>	<p>The project deals with doping of layered double hydroxides. A family of layered double hydroxides would be synthesized and doped to make them sensitive to visible light. They would be used in the degradation of emerging organic pollutants through photocatalytic and sonocatalytic processes.</p>
<p>Brief Workplan</p>	<p>(1 year) Literature review and design of experimental setups</p> <p>(1 year) Synthesis, doping, and characterization of layered double hydroxides</p> <p>(1 year) Application of doped layered double hydroxides in the photocatalytic and sonocatalytic processes</p> <p>(1 year) Study the main parameters, doping mechanism and degradation pathway.</p>
<p>Innovative Aspects of the Project</p>	<p>The project deals with state-of-the-art novel approaches for synthesizing and doping layered double hydroxides to design visible sensitive catalysts for photocatalytic and sonocatalytic processes.</p>
<p>Training Opportunities of the Project</p>	<p>The PhD candidates will be trained on the various properties of nanostructured materials. They will be trained on nanomaterials characterization instruments such as TEM, SEM, XRD, XPS, and BET. In addition, students will be trained in photocatalysis, sonocatalysis, Fenton-based processes, and electrochemical processes. 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.</p>

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Interdisciplinary Aspects	A professional team will implement the project gathered from academicians in the fields of nanoscience & nanoengineering, chemical engineering, and environmental engineering.
Intersectoral Mobility <input type="checkbox"/> Short Visit <input type="checkbox"/> Secondment	TBD
Intersectoral Mobility <input type="checkbox"/> Short Visit <input type="checkbox"/> 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

Main Supervisor	
Brief CV	<p>Prof. Dr. Alireza KHATAEE</p> <p>Email: khataee@itu.edu.tr</p> <p>Academic Degrees</p> <p>Ph.D. Applied Chemistry, University of Tabriz, Iran 2007</p>



	<p>M.Sc. Applied Chemistry, University of Tabriz, Iran 2003</p> <p>B.Sc. Applied Chemistry, University of Tabriz, Iran 2001</p> <p>Professional Networks</p> <p>Scopus: https://www.scopus.com/authid/detail.uri?authorId=26422283200</p> <p>ORCID: https://orcid.org/0000-0002-4673-0223</p>
Co-supervisors	
Brief CV	<p>Assoc. Prof. Dr. Hatice Eser ÖKTEN</p> <p>Email: haticeokten@iyte.edu.tr</p> <p>Academic Degrees:</p> <p>Ph.D. University of Wisconsin-Madison, Madison, Wisconsin, USA 2008</p> <p>M.Sc. İstanbul Technical University, Türkiye 2002</p> <p>B.Sc. İstanbul University, Türkiye 1999</p> <p>Professional Networks</p> <p>Google Scholar: https://scholar.google.com.tr/citations?user=GLVckPMAAAAJ&hl=en</p> <p>ResearchGate: https://www.researchgate.net/profile/Hatice-Eser-Oekten</p> <p>Scopus: https://www.scopus.com/authid/detail.uri?authorId=12776514500&origin=recordpage</p> <p>ORCID: https://orcid.org/0000-0001-7511-940X</p>
Brief CV	<p>Prof. Dr. Mustafa M. DEMİR</p> <p>E-mail: mdemir@iyte.edu.tr</p> <p>Academic Degrees</p> <p>Ph.D. Materials Sciences and Engineering, Sabancı University, Türkiye 2004</p>



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	B.Sc. Chemistry, Boğaziçi University, Türkiye	1999
	Professional Networks	
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	https://scholar.google.com/citations?user=OX8Cq2wAAAAJ&hl=en	
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	https://www.researchgate.net/profile/Mustafa-Demir-10	
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