

INSTRUCTOR	TITLE	TYPE / # STUDENT
Prof. Dr. Seyda Malta	<p><u>Shape Memory Magnetic Nanocomposites :</u> In this project, students will learn how to synthesize magnetic nanoparticles via different routes, make nanocomposite films using these particles and how addition of magnetic nanoparticle result in composites that exhibit shape memory property.</p> <p><u>Synthesis Of Cationic Magnetic Nanoparticles</u> In this project, student will learn how to synthesize magnetic particles with partial oxidation method. The aim is to then coat these particles with a cationic polymer, which has not yet been achieved.</p>	Experimental 2 Students  Experimental 1 Student
Prof. Dr. Süheyla Uzman	<p><u>Chromatographic Methods Of Analysis: Principles And Applications</u> The theoretical project includes the theory of Chromatographic Methods and examples of various applications.</p> <p><u>Distillation Methods Used In Chemical Industry</u> A survey of the different Distillation Methods used in Industry. Some experimental work may be included</p> <p><u>Processing of Laminated Packaging Materials</u> A theoretical survey on the effects of laminated packaging materials on the environment. Experimental work on recovery of aluminum will be included.</p>	Theoretical 1 student  Theoretical 1 Student  Theo./Exp. 1 Student
Assoc. Prof. Dr. Tuğba C. Davran	<p><u>Catalytic Reduction of NOx in Automobile Industry</u> Parallel to the increasing concern about the environment, car emission standards are getting more and more stringent nowadays, leading the automobile companies to invest seriously on the research and development of more efficient cars. One major group of pollutants produced by the car engine is nitrogen oxides (NOx) and the catalytic reduction of NOx seems to be one of the most promising technologies that is under investigation. This project aims a detailed review of the situation in the industry.</p> <p><u>Industrial CO2 Capture Plants</u> CO2 is one of the main anthropogenic greenhouse gases, the concentration of which has increased tremendously since the beginning of the industrial revolution. Since the climate change observed on earth was associated with the increasing level of CO2 in the atmosphere, reduction of emissions has become indispensable with the increasing environmental concerns. This project aims to investigate the commercial technologies that are in use for the separation of CO2 from the flue gas.</p> <p><u>Literature Review On The Mechanism Of CO2 Capture</u> Removal of CO2 from flue gas streams is indispensable for the reduction of CO2 concentrations in atmosphere and mitigation of the adverse effects of the climate change. In this manner, determination of the interactions of CO2 with potential capture materials is crucial for the design of effective capture materials. This project aims a detailed literature review on the mechanism of CO2 capture by amine-based materials.</p>	Lit. Surv. 1 Student  Lit. Surv. 1 Student  Lit. Surv. 1 Student

Assoc. Prof. Dr. Nihan Ç. Ölçüm	(To be announced)	Computational 3 Students
Assist. Prof. Dr. Cem L. Altan	<p><u>Kinetic Studies and Adsorption Equilibria for the Removal of Cationic Dyes From Aqueous Solutions By Using Ferrimagnetic Magnetite Nanoparticles</u> Several adsorbents are used to remove contaminants from effluents. Among those, magnetite is a special candidate as it is biocompatible and has excellent magnetic properties. As a consequence of its magnetic properties, it is possible to adsorb contaminants from the effluent and remove the entity from the medium by using an external magnetic field. In this study, adsorption mechanism for the adsorption of two different cationic dyes onto poly(acrylic acid) coated ferrimagnetic magnetite nanoparticles will be investigated by using different equilibrium isotherm models.</p> <p><u>The Production and Antibacterial Effects of Liquid Hand Soaps Containing Organic Essential Oils</u> Common antibacterial active ingredients including triclosan and triclocarban that are used for the production of consumer antiseptic wash products are banned in Europe as well as in the United States by the U.S. Food and Drug Administration (FDA). The essential justification of these regulations is the lack of enough scientific evidence showing the safety of these active ingredients for the daily use over a long period of time. Additionally, these antibacterial active ingredients were shown to contribute to making bacteria that are resistant to antibiotics. As a consequence, there is a strong need in the replacement of these chemicals with natural alternatives. In this study, natural liquid hand soaps will be produced in the presence of organic essential oils which have shown to possess antibacterial effect and these soaps will also be tested in accordance with the European standard, EN1276.</p> <p><u>The formation of Inclusion Complex Between Ferrocene and Cyclodextrin in Aqueous Media as a Potential Radiosensitizing Agent in Radiotherapy.</u> Ferrocene is an organometallic compound containing one center iron atom and two coordinated cyclopentadiene rings. It exhibits reversible redox properties and was shown to act as a potential radiosensitizer of cancer cells by enhancing the effect of radiation therapy. However, its use in biomedical applications is limited owing to its poor aqueous solubility. In this study, inclusion complexes between ferrocene and different types of cyclodextrins will be formed in order to achieve a reasonable aqueous solubility of the radiosensitizing agent which may lead to its extensive use in cancer therapy.</p>	<p>Experimental 1 Student</p> <p>Experimental 1 Student</p> <p>Experimental 1 Student</p>
Assist. Prof. Dr. Erde Can	<p><u>Preparation And Characterization Of Poly Propylene Fumarate (Ppf)- Beta Tricalcium Phosphate Based Composites For Bone Tissue Engineering Applications</u> The project will involve the preparation and characterization of poly propylene fumarate (PPF)/vinyl phosphonic acid and di-ethyl vinyl phosphonate based polymers and their composites with beta-tricalcium phosphate.</p> <p><u>Preparation and Characterization of Polyether sulfone/Zelite Beta nano-composite membranes for Direct Methanol Fuel Cells (DMFCs)</u> In this study sulfonated polyether sulfone (PESS)/Zeolite Beta nano composite membranes will be developed for direct methanol fuel cell (DMFC) applications. For this purpose, commercial polyether sulfone will be sulfonated using chlorosulfonic acid (CSA) as sulfonating agent and dichloromethane as solvent. Zeolite Beta will also be synthesized and modified with phosphonic acid. PESS/Zeolite Beta nano-composite membranes at changing zeolite content will be prepared via solution casting method. The</p>	<p>Experimental 2 Students</p> <p>Experimental 1 Student</p>

	synthesized sulfonated Polyether sulfone (PESS), Zeolite Beta and the nano-composite membranes prepared will be characterized for various properties.	
Assist. Prof. Dr. S. Funda Oğuz	<p><u>The Effects Of Chiral Catalysts On The Hydroxyamination Reaction Of 3-Substituted-2-Oxindoles</u> In this project, the reaction of 3-substituted-2-oxindoles with nitrosobenzene will be investigated. Different chiral catalysts, which are commercially available or are to be synthesized regarding the previous theoretical results, will be used, and their effects on the yield and enantioselectivity will be discussed.</p> <p><u>Efficiency Of Polymeric Chiral Organocatalysts In The Selected Reaction</u> In this project, a literature review about the polymeric chiral orgacatalysts will be done. Polymeric catalysts will be synthesized regarding the previous studies and literature review. They will be used in some reactions to figure out how many times the organocatalyst can be used with the same reactivity and enantioselectivity.</p>	<p>Experimental 2 Students</p> <p>Exp./Lit. Surv. 1 Student</p>
Assist. Prof. Dr. Levent Organ	<p><u>Corrosion Sensors</u> This project will include a literature survey on sensors used in detection and monitoring of corrosion. The emphasis will be on the sensors/probes working on electrochemical principles. Their principles of operation and application areas will also be surveyed. Student will need to learn basics of related electrochemistry and forms of corrosion.</p> <p><u>Metastable Pitting Corrosion of Aluminum Alloys</u> This will be a literature survey on metastable pitting corrosion of aluminum alloys. Student will need to learn about electrochemical thermodynamics and kinetics of corrosion as well as the pitting (metastable as well as stable) corrosion.</p> <p><u>Pitting Corrosion of Aluminum Alloys</u> This will be a literature survey on stable pitting corrosion of aluminum alloys. Student will need to learn about electrochemical thermodynamics and kinetics of corrosion as well as the pitting (metastable as well as stable) corrosion.</p>	<p>Lit. survey 1 student</p> <p>Lit. survey 1 student</p> <p>Lit. survey 1 student</p>
Assist. Prof. Dr. M. Oluş Özbek	<p><u>Computational study on the corrosion inhibitors of iron</u> Corrosion of iron due to chloride and the inhibition effect of a selected inhibitor will be studied computationally (DFT) on several flat iron surfaces. (Co-supervisor: Assist. Prof. Dr. Levent Organ)</p> <p><u>Computational study on the iron corrosion</u> Corrosion of iron due to different halogens will be studied computationally (DFT) on several flat iron surfaces. (Co-supervisor: Assist. Prof. Dr. Levent Organ)</p> <p><u>Computational study on the aluminum corrosion</u> Corrosion of aluminum due to different halogens will be studied computationally (DFT) on several flat aluminum surfaces. (Co-supervisor: Assist. Prof. Dr. Levent Organ)</p>	<p>Comp./Lit. Surv. 1 Student</p> <p>Comp./Lit. Surv. 1 Student</p> <p>Comp./Lit. Surv. 1 Student</p>

Assist. Prof. Dr. Betül Ünlüsü	<u>Novel Directions for Reuse of Carbon dioxide</u> This study aims to explore carbon dioxide valorization technologies developed for the reduction of atmospheric emissions including novel industrial processes using carbon dioxide as feedstock.	Lit. Surv. 1 Student
	<u>Integration of Sustainability Evaluation Software into Process Design</u> The study will examine the WAR (waste reduction algorithm) software integrated into Chemcad using an example process.	Computational 1 Student
	<u>Modeling of Viscous Mixing of Carbon dioxide and an Ionic Liquid</u> In fluid flow, mixing is due to molecular diffusion when the flow regime is laminar. Viscous mixing of carbon dioxide and an ionic liquid will be studied using ANSYS FLUENT. This work is of significance in the design of microfluidic flow systems.	Computational 1 Student