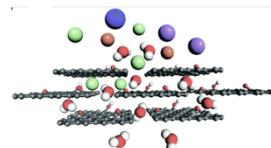




**Master Thesis in
Graphene-based Membranes for Water Desalination
(30/60 credits)**

Objective of the project

Preparation and characterization of graphene-based nanomaterials, and further use them as separation membranes for water purification/desalination.



Description of the project

Graphene-based materials have recently attracted a notable attention due to their extraordinary properties, which make them interesting candidates for many technological applications in energy storage, sensing, catalysis and nanodevices, membranes, etc.^[1,2] Graphene possesses two advantages including good permeability and high selectivity, which make it suitable for usage towards advanced membrane technologies.^[3]

During the past few decades, many clean water resources have shown an increasing amount of contamination, due to the introduction of different kinds of toxic inorganic and organic species. It is reported that around 70% of the global diseases and 20% of the global cancers are caused by contaminated water. Therefore, there is an urgent demand to remove these contaminants from polluted water for the future sustainable development of our society. Among different solutions, adsorption possesses the advantages such as high efficiency, easy to operate, environmentally friendly, and cost effective. Due to the large specific surface area, graphene is an ideal adsorbent for the removal of contaminated species.

The research project will mainly include preparation of graphene and functionalized graphene using wet chemical approaches. The as-prepared graphene-based nanomaterials will be characterized fully using various spectroscopic and microscopic methods. Finally, the graphene-based nanomaterials will be employed as membranes for water purification/desalination.

During the project, you will have opportunities to learn and get familiar with several techniques and skills including: (1) Raman, FTIR, UV/Vis absorption, Fluorescence ; (2) Thermal analysis (TGA) and surface analysis (XPS); (3) Microscopic techniques including TEM, SEM, and AFM

Interested? **You will be the owner of your project!**

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References:

1. Nanoscale 2015 (4598).
2. Adv. Energy Mater. 2016 (1600671).
3. Nanoscale 2016 (117).