

Diplomarbeit / Masters Project

Project Summary:

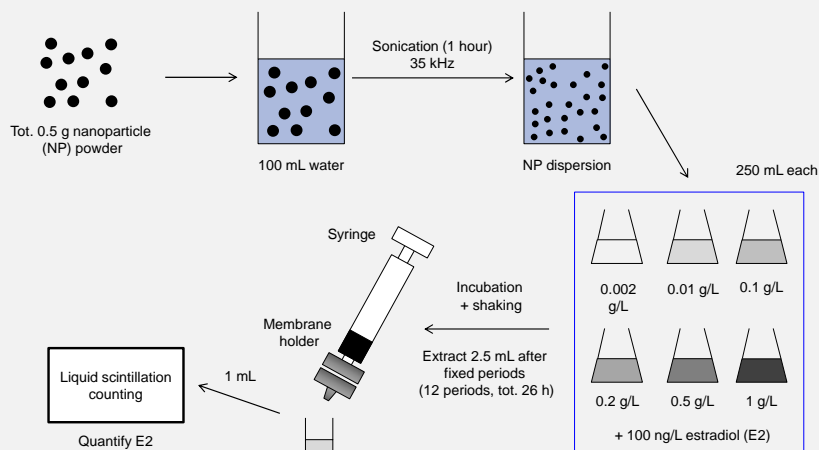
Static adsorption of hormones by carbon-based nanoparticles

Hormones in waters even at very low concentrations can cause endocrine disruption in wildlife or humans. It is a difficult task even in nanofiltration to remove >90% of hormones, both natural and synthetic. Meanwhile, carbon-based nanoparticles (CNPs) are effective adsorbents for micropollutants. CNPs have higher kinetic rates of adsorption compared to frequently-used activated carbon. Adsorption capacity mainly depends on supramolecular interactions, while electrostatic interaction of hydrophilic groups may contribute. Water chemistry, such as pH and the presence of natural organic matter may reduce the adsorption capacity of CNPs, while under certain water conditions, pollutants may desorb.

The aim of this project is to carry out experiments that help understand the adsorption mechanisms of different CNPs (single-walled carbon nanotubes, fullerene, graphene and graphene oxide) for trace estradiol removal via static adsorption process, prior to immobilizing efficient CNPs into a membrane.

For this project, the following tasks will be performed:

- Literature review on the topic (natural organic matter, adsorption, endocrine disrupting chemicals (EDCs), CNPs, adsorption processes)
- Perform static adsorption experiments of estradiol with various CNPs
- Perform static adsorption of estradiol at various pH to determine electrostatic effects
- Develop an adsorption profile and fit kinetic/isothermal models
- Analyze data and write/co-author a research publication (in English)
- This topic is built on a previous project (E2 adsorption by activated carbon) from which a publication is available.



Required Skills: Studies in Chemical/Process Engineering or equivalent (Uni, TH, FH)

Basic knowledge in polymer chemistry, materials and water treatment technologies. Evidenced writing skills in English language, MS Word, proficiency with Origin Labs software for data analysis and graphing, interest in contributing to the writing of a scientific publication.

Institute/Dept: Institute for Functional Interfaces (IFG) / Membrane Technology Department

Start Date: Flexible/negotiable

Application Procedure: Please email CV, transcripts and motivation letter with available time period for evaluation.

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