Karlsruhe Institute of Technology

Diplomarbeit / Masters Project

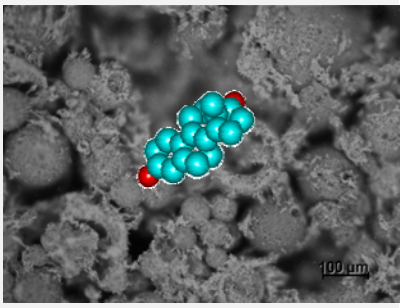
Project Summary:

Magnetic Ion Exchange (MIEX) for Water Treatment Applications

Removal of micropollutants such as the contraceptive pill, pharmaceuticals, drugs, pesticides or personal care products from drinking water is a major environmental and human health challenge. Several technologies exist to tackle such this challenge, namely adsorption, advanced oxidation, membrane technology and ion exchange. Through affinity interactions some uncharged micropollutants may partition to ion exchange resins and under certain water chemistry conditions (such as varying pH, ionic strength and organic matter content) desorb from the material.

The aim of this project is to carry out a range of experiments with a select number of water parameters and micropollutants to understand the interaction mechanism and estimate the potential uptake of magnetic ion exchange resin in water treatment applications. The following tasks will be performed;

- Literature review on the topic (magnetic ion exchange (MIEX); ultrafiltration (UF); natural organic matter (NOM); micropollutants; endocrine disrupting chemicals (EDCs); ion exchange and adsorption processes)
- Perform MIEX-UF experiments
- Analyse water samples from experiments with relevant analytical instruments following calibration and validation
- Analyse experimental data and write/co-author a research publication (in English)



The topic builds on previous projects from which some publishable experimental results are available.

Required Skills:

Studies in Chemical/Process Engineering or equivalent (Uni, TH)

Basic knowledge in water quality, water treatment technologies, membrane technology, adsorption/ion exchange. Evidenced writing skills in English language, proficiency with Origin Labs software for data analysis and graphing, willingness to lead or contribute to the writing of a scientific publication.

Institute/ Department:

Institute for Functional Interfaces (IFG) / Membrane Technology Department

Start Date:

Flexible/negotiable (projects are typically scoped for a duration of 6 months)

Application Procedure:

Please email CV, academic transcripts and motivation letter with available time period for evaluation.

Project Supervisor(s):

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Professor of Water Process Engineering, Faculty of Chemical and Process Engineering & Head of Membrane Technology Department

Schäfer 3.2.2016