

## Diplomarbeit / Masters Project

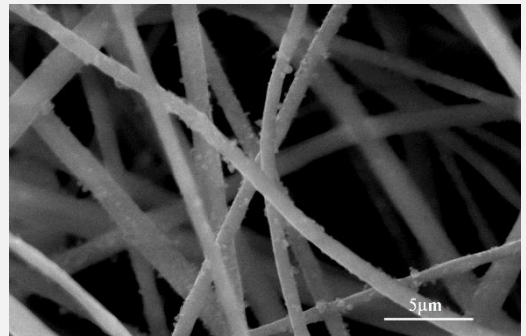
### Project Summary:

#### Development and characterization of novel PES-CD nanofiber membrane for water treatment applications

Steroid hormones are excreted by humans and are subsequently found in many waterways as micropollutants. Removal of such micropollutants is a major engineering challenge because the separation of steroid from water requires membranes with very small pores and hence a significant amount of energy. Nanomaterials such as cyclodextrin (CD) are able to adsorb certain micropollutants and hence reduce the energy requirements for water treatment if sufficient removal was attainable. PES-CD nanofiber composite membrane prepared in the Membrane Technology Department, Germany, will be investigated for possible application in water treatment.

The aim of this project is to develop and characterize these membranes i) for water permeability, ii) micropollutant adsorption, iii) breakthrough behaviour. Based on the variation of a number of water quality parameters interaction mechanisms can be understood and the potential micropollutant uptake capacity estimated. The specific tasks will be;

- Literature review on the topic (CD like materials; nanofiber composite membrane; micropollutants removal; endocrine disrupting chemicals (EDCs); advanced membrane materials)
- Perform PES-CD nanofiber membrane permeability, adsorption and breakthrough experiments with filtration equipment
- 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)



### Required Skills:

The topic builds on previous projects from which some publications are available.

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

Basic knowledge in water quality, water treatment technologies, membrane technology, nanomaterials. 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 Advanced Membrane Technology (IAMT); Bldg 352, Campus North

### 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 Advisor(s):

Prof. Dr.-Ing. Andrea Schäfer, Andrea.Iris.Schaefer@kit.edu; <https://www.iamt.kit.edu>