

STUDENT POSITION WITH THE FOCUS ON: “INVESTIGATION OF PHYSICAL AND CHEMICAL CHARACTERISTICS OF ACTIVATED/MODIFIED CARBON”

Efforts for more environmental regulations and providing circular economy are forcing industrial consumer to use more effective and sustainable materials. The performance of activated carbon in water treatment systems is primarily influenced by both pore structure network and chemical characteristics of surface groups. Due to utilizing activated carbon in general, it is possible to remove (non-polar) dissolved organic compounds from industrial waste water by physical interactions (physisorption). Removal of polar organics and ionic substances can be improved due to chemical polarization and targeted modification of carbon surfaces. In this context the selectivity and increase of both chemical and physical interactions between surface groups and polar substances in the bulk solution are of major importance. For this reason both activation process and modification of surface structure is becoming increasingly important due to the demand for more and more specific carbon. Systematic investigations of different influencing variables (raw material, activating temperature, hold time and oxidizing agent) in a rotary kiln with regard to the formation of pore structures as well as settings of chemical surface functionalities are largely not documented in scientific publications.

Characterization of surface functionalities with different physical and chemical methods will be a main part of the position. The student will also investigate adsorption isotherms of aromatics in ionic solutions by using spectroscopic methods and investigate surface chemistry by using electrochemical methods. The activities can consider and contain following focusses:

- **Physical and chemical characterization** of activated carbon (e.g. Iodine number and further physical properties)
- **Development and support of RSSCT-system** (rapid small scale column tests) for simulation of filtration mechanisms
- **Chemical and thermal modification/oxidation** of activated carbon during pre-treatment, activation or post-treatment
- **Investigation of surface functionalities** by using titrimetric methods (e.g. Boehm), fluorescence labeling (e.g. FLOSS) and particle charge measurements (e.g. Zeta potential)
- **Recording adsorption isotherms/capacities** on model waters with polar organics in ionic solution by utilizing fluorescence- (FEEM) and UV-Vis-Spectrometry and TOC

The positions include a probationary period of 2 weeks. Under appropriate conditions the employment as student assistant in our chair can contain 10 – 19 hours per week.



REQUIREMENTS

- Outstanding commitment and motivation according to the desired position.
- Basic knowledge of water chemistry, analytics and water treatment technologies (esp. adsorption processes).
- Current grades overview.

If you are interested, please email your application with all required documents (as PDF) to the supervisor mentioned below.

Supervisor:

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