

## OUR OFFER

- Start: preferably from August 2021 on, for 5-6 months;
- Place: Wetsus, Leeuwarden, Netherlands;
- Allowance: 175 €/month (*for students without scholarships/grants*);
- Working in a multidisciplinary and international environment.

## BACKGROUND

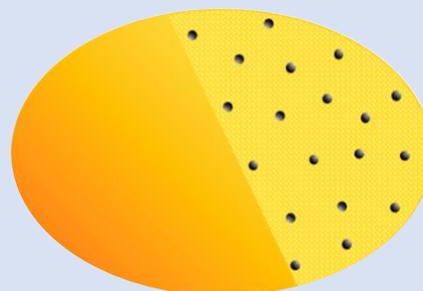
**Phosphate** ( $\text{PO}_4^{3-}$ ) has a dual role in ecological systems: it is a fundamental nutrient for life (fertilizer), which can turn into a polluting, causing **eutrophication** of freshwater bodies. **Iron oxides** (IO) based **adsorbents** display good properties to obtain an efficient  $\text{PO}_4^{3-}$  removal, as a polishing step, allowing also  $\text{PO}_4^{3-}$  recovery (being a scarce resource) and adsorbent regeneration (economics). Composite adsorbents, e.g., polymeric structures with embedded IO nanoparticles, showed promising results and constitute a valuable option for an efficient and viable phosphate recovery system. These adsorbents are already commercially available, but they lack in terms of regenerability and lifespan. These are essential characteristics for the economic feasibility of the system. Adsorbents' modifications could improve these aspects, making these adsorbents an excellent choice for  $\text{PO}_4^{3-}$  phosphate recovery adsorption systems. This interdisciplinary insight into the fundamentals consists in a journey from *materials science* to *nuclear physics*, passing through *physical* and *analytical chemistry*.



## TASKS

You will have the chance to:

- Synthesize and characterized IO-based nanoparticles;
- Develop a composite IO-based adsorbents;
- Perform phosphate adsorption/desorption experiments;
- Perform different measurements: ICP, IC, MWD, ...
- Get acquainted with exotic techniques such as SEM-EDX, CLSM, MÖSSBAUER SPECTROSCOPY, ...



## REQUIREMENTS

We are looking for a student with a background in Physics, Chemistry, Chemical Engineering, Environmental Engineering, Materials Sciences, with experience of work in a chemical lab. The student has to be fluent in English, highly motivated, enthusiastic, with active thinking and not afraid of working independently.

## HOW TO APPLY

The offer is open to all EU students, and to non-EU students already living in the Netherlands. If you are interested in this project, send an e-mail to Carlo Belloni: [carlo.belloni@wetsus.nl](mailto:carlo.belloni@wetsus.nl) (object: APPLICATION COMPOSITE ADSORBENT), together with the following attachments (in English):

- CV;
- Motivation letter (max 1 page);
- Transcript of records.

A short Skype interview will then be scheduled.

PHOSPHATE RECOVERY THEME: <https://www.wetsus.nl/phosphate-recovery>

