

## OUR OFFER

- Start: preferably from February 2020 on, at least for 5 months;
- Place: Wetsus, Leeuwarden, Netherlands;
- Allowance: 350 €/month;
- Working in a multidisciplinary and international environment.

## BACKGROUND

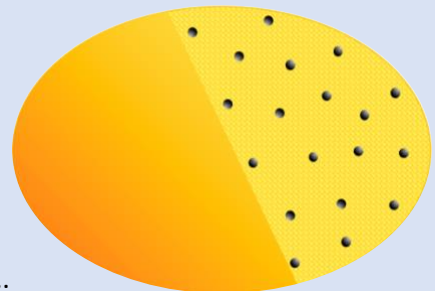
**Phosphate** ( $\text{PO}_4^{3-}$ ) has a dual role in ecological systems: it is a fundamental nutrient for life, but it can also become a polluting agent, e. g., causing **eutrophication** in fresh water bodies. **Iron oxides** (IO) based **adsorbents** display good properties to obtain an efficient removal and to also recover of  $\text{PO}_4^{3-}$  (scarce resource) and regenerate the adsorbent (economics). Pure commercial granular IO adsorbents shows some defaults (e. g., slow pore diffusion, low efficiency regeneration, ...). Composite materials, e. g., polymeric structures with embedded IO nanoparticles, might constitute a valuable option to overcome those issues, taking advantage of both the faster kinetics (of NP and polymeric structures) and good affinity of IO towards  $\text{PO}_4^{3-}$ . Some resins are already commercially available, but there is still need and room for improvement. 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 nanoparticles;
- develop a composite IO based material;
- perform phosphate adsorption batch experiments;
- improve current protocols;
- perform different measurements: ICP, IR, RAMAN, NANOSIGHT...
- get acquainted with exotic techniques such as MÖSSBAUER SPECTROSCOPY, SEM-EDX, TEM, ...



## REQUIREMENTS

We are looking for a student with a background in Physics, Chemistry, Chemical Engineering, Environmental Engineering, Materials Sciences, with already 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:

- 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>