



Phosphate Adsorption through Doped Iron Oxide Nanoparticles



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

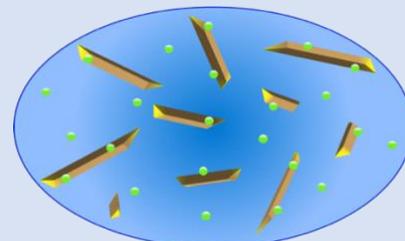
Overuse of **phosphate** (PO_4^{3-}) based fertilizers and wastewater streams discharge in water bodies can lead to environmental harmful consequences, such as **eutrophication**. This phenomenon can take place already at a concentration of $10 \mu\text{m/L}$. To go below such very low concentration, **adsorption** constitutes a valuable option. **Iron oxides** display great features both from performance and economical points of view, since they allow **regeneration** of the adsorbent and **recovery** of phosphate (reused as fertilizer). To improve removal, reusability and recover a purer phosphate based product, adsorbent performances and selectivity need to be enhanced. Doping represent an interesting option to play with the surface properties. 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 pure and doped iron oxides nanoparticles;
- perform phosphate adsorption batch experiments;
- improve current protocols;
- perform different measurements: ICP, FTIR, 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 (object: APPLICATION DOPING NP), 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>