Fate and Properties of Polyhydroxyalkanoates (PHAs) under Anaerobic Conditions

Field: Biotechnology and Environmental Sciences

Duration: 6 to 9 months, preferably 9 months

Starting Date: July 2020 with flexibility

Location: Wetsus, European Centre of Excellence for Sustainable Water Technology, Leeuwarden (The Netherlands)

Allowance: 175 €/month

1. Project description

Aerobic biological processes are widely applied for wastewater treatment. The principle of this process is improved water quality and a (waste) surplus activated sludge. Surplus activated sludge may comprise significant amounts of carbon storage elements, including Polyhydroxyalkanoates (PHAs). The objective of this project is to gain deepened insight into the fate and kinetics of PHA in activated sludge under anaerobic conditions. The initial steps of the work will be to characterize these components in surplus activated sludge and then study the rates of conversion under prescribed fermentation conditions. The effects on process kinetics due to pH, temperature, inoculum, and product formation are to be evaluated. Towards using PHAs as bioplastics potentially, it is essential to have a better characterization of the PHA in terms of molecular weight (Mw) and crystallinity, etc. This project is embedded in the theme 'Biopolymers from water' (https://www.wetsus.nl/biopolymers-from-water) in collaboration with Delft University and industrial partners.

2. What you can learn

- Design of the experiment, operation of the reactors and data analysis;
- Methods for monitoring reactors including online measurement and chemical analysis;
- Characterizing PHAs by using Thermogravimetric Analysis (TGA), Differential Scanning Calorimetry (DSC) and Rheometer, etc;
- Interaction and collaboration within a dynamic multidisciplinary and multinational research team.

3. Your profile

- Specializing in biotechnology, environmental engineering or related fields;
- Preferably an EU citizen or an international MSc student actively enrolled in a Dutch university;
- An aptitude and interest for practical laboratory experience and analytical work;
- Fluent in English language (spoken, written and communication skills);
- Highly motivated, enthusiastic and independent thinker and doer who also like to work in a team.

4. How to apply

Interested students are invited to send a motivation letter (max. 1 page) and a CV (max. 2 pages) to Ruizhe Pei (ruizhe.pei@wetsus.nl).