Understanding and prevention of vivianite scaling in sewage treatment

Field: chemical/environmental/biotechnological engineering
Type of project: internship/MSc-thesis
Duration: 4-6 months
Location: Waterschapsbedrijf Limburg (Roermond, mainly) and Wetsus (Leeuwarden)
Allowance: 350 €/month

Description:
Research by Wetsus has shown that vivianite (ferrousphosphate) is an important precipitate of phosphate in sewage treatment plants that use iron salts for phosphate removal. There is potential for recovery of vivianite from sewage sludge and in this way recover phosphate and iron from this waste stream. Recovery of phosphate is very relevant as it is a critical resource and essential to food production. At the same time vivianite can cause a lot of problems through scaling and encrustation in pipes. In this project we want to understand better the conditions that create the formation of vivianite in pipes. This will help to formulate recommendations to water authorities to prevent scaling and at the same time this knowledge will help to stimulate the formation of vivianite in such a way that it can be recovered more easily.


Vivianite scaling in a sewage pipe

Tasks:
- Interviewing operators of sewage treatment plants of Waterschapsbedrijf Limburg (and possibly other water authorities) to better understand where and when vivianite scaling occurs
- Reviewing process data of these treatment plant to determine which process conditions may trigger vivianite formation.
- Sampling and analyzing sewage sludge at locations with pronounced vivianite scaling to determine the ion composition of the sludge at these points
- Formulating hypotheses for parameters and conditions that favor vivianite formation
- Propose process adjustments to minimize vivianite scaling.

Your profile:
- Actively enrolled in undergraduate (BSc) or graduate (MSc) studies
- EU citizen or international student registered at a Dutch university or technical high school
- Interested in combining practical experience with theoretical concepts
- Fluent in English language (speaking, writing and communication skills). Dutch language skills can be useful for interaction with the process operators.
- Highly motivated, enthusiastic and independent thinker and doer.

How to apply:
Interested students are invited to send a motivation letter (max. 1 page) and a CV (max. 2 pages) to Leon Korving (leon.korving@wetsus.nl). Please indicate as subject of the email “Internship vivianite scaling”.

The internship will mainly take place with Waterschapsbedrijf Limburg in the South of The Netherlands. Supervision will be jointly by Waterschapsbedrijf Limburg and Wetsus. Part of the analytical work will take place at Wetsus.