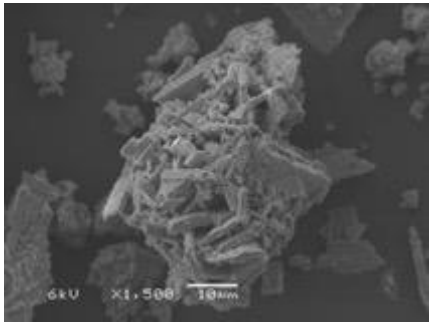
ViVi MAG

Magnetic recovery of vivianite from iron phosphate containing sewage sludge



CONSORTIUM

wetsus

TU Delft

Outotec

kemira

Pilot host: Waterschap Brabantse Delta

PRINCIPLE

- Vivianite, $Fe(II)_3(PO4)_2$, is the main P bearing precipitate in digested, Fe containing sewage sludge
- Up to 70-90% of all P can be present as vivianite
- Commercial wet magnetic separators can recover the vivianite from the sludge in pure form

IMPACT

- Opens P recovery for wwtp's using chemical P removal
- High recovery efficiencies (>50%)
- 10-20% reduction of sludge volume

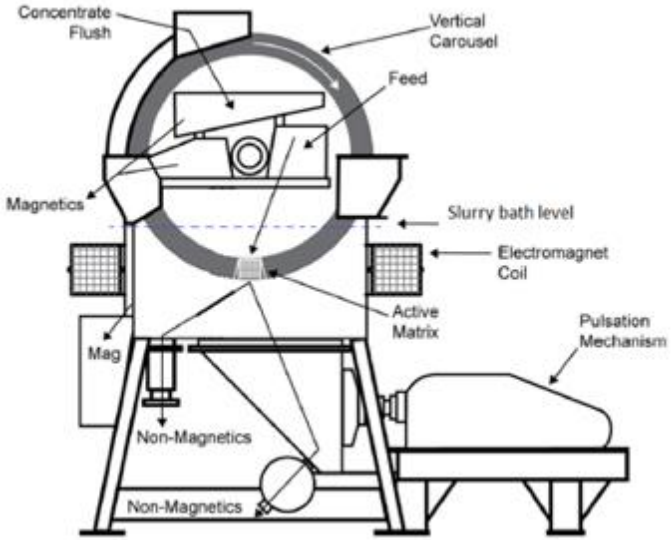
1 m^3/h pilot facility at wwtp Nieuwveer, NL

wetsus

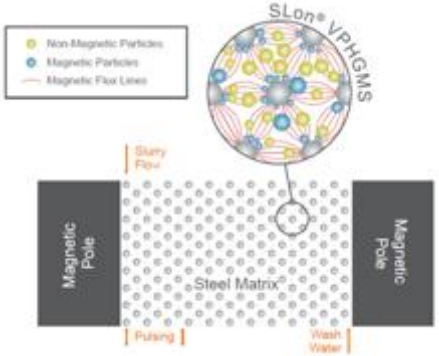
eit RawMaterials Connecting matters

This activity has received funding from the European Institute of Innovation and Technology (EIT), a body of the European Union, under the Horizon 2020, the EU Framework Programme for Research and Innovation

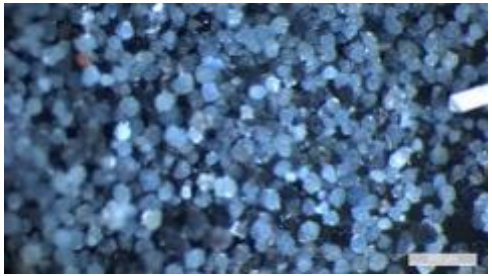
Magnetic separation of vivianite



Vertical ring Pulsating High Gradient Magnetic Separator (VPHGMS)



Visualisation of the paramagnetic properties

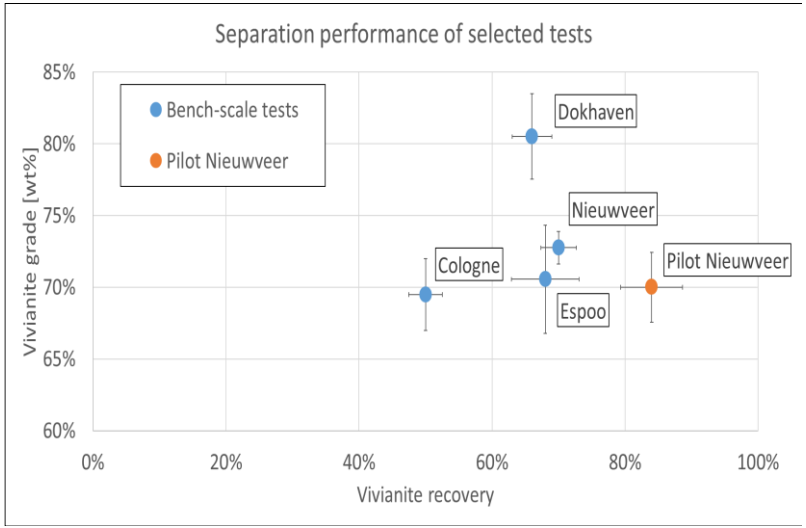


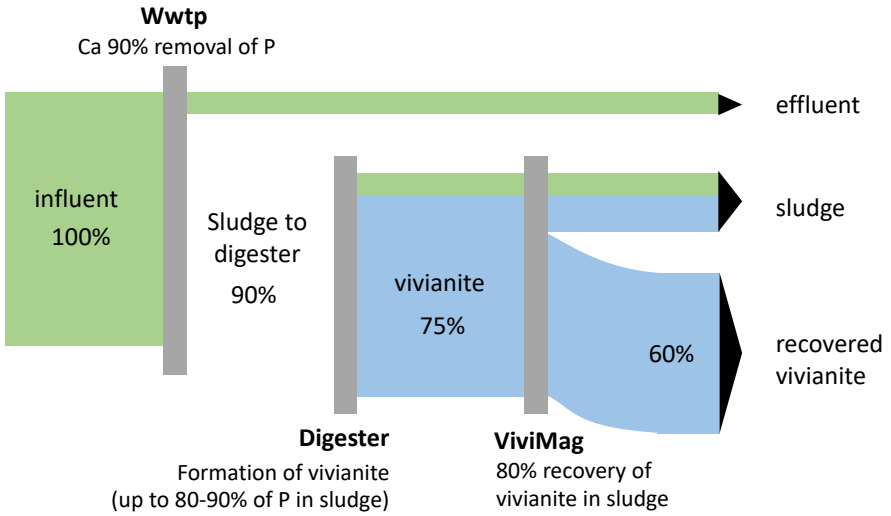
Recovered vivianite crystals (microscope image)

Vivianite is paramagnetic and can be recovered with existing mining equipment

Paramagnetic: vivianite is not magnetic by itself but attracted by a magnet

P-recovery





RESULTS

- 80% recovery of vivianite demonstrated
- Vivianite purity ca 70%, washing improves quality to >90% purity
- Overall: 60% P recovery from sewage influent possible

Vivianite application

- Short term: Fe-fertiliser to treat iron chlorisis
- Longer term: splitting of vivianite to recycle Fe and use P as watersoluble fertiliser