



Feasibility adsorption through zeolites

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**Dutch Innovation on Micropollutants
Removal from Municipal Wastewater
November 7th 2019 Aquatech Amsterdam**

Technology

1 : Zeolite is added to detergents for water softening

+

1 : Research shows that zeolites can remove micropollutants

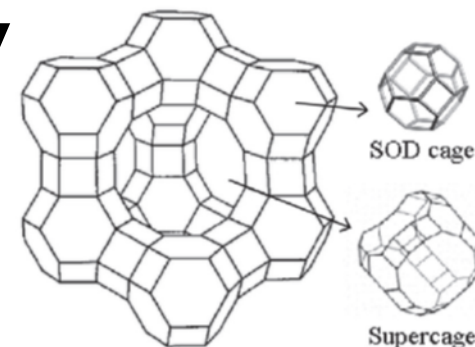
= **2** ?

What if zeolites in detergents also remove micropollutants in wastewater before it reaches a wwtp?

That means that for the same overall removal you can save in the technology at the wwtp



Feasibility Study



Literature study:

- Zeolites:
 - Al^{3+} cations and/or Si^{4+} cations surrounded by 4 O^{2-} anions.
 - Si/Al ratio varies and therefor also their charge and hydrophobicity.
- In detergents:
 - Zeolites for cationic exchange and remove calcium
 - Preferably low Si/Al ratio
- For removal of micropollutants:
 - Preferably high Si/Al ratio
 - Efficiency is based on properties of zeolite and the properties of the micropollutant.

Results

Criterion	Score in respect to PAC in activated sludge
Removal of micropollutants	0
CO ₂ footprint	+
Costs	+
Ecotoxicity	0
Microplastics	0
Antibiotic resistance	0

Further research

- Conclusions AdOx* research not published yet.
 - Can affect conclusions in this project.
- Most research is done on a single application of zeolites.
 - More insight in removal of micropollutants and calcium by one type of zeolites or combination of zeolites is required.
 - This can be done by lab experiments.

* a 'next generation' adsorption oxidation process: adsorption of CEC's with zeolites and chemical regeneration of exhausted zeolites with ozone



Thank you for your attention!

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