

# Foam fractionation and electrochemical oxidation for treatment of PFAS-contaminated water

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# About me - Past



# About me - Present



**Per-** and polyfluorinated substances:  
towards the **F**uture **O**f **R**esearch and  
**C**ommunication in **E**urope

Developing innovative treatment  
techniques for PFAS in contaminated  
water

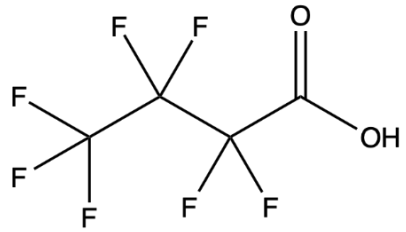
Date of thesis defense: 25-09-2023

# Introduction: PFAS

Short chain

PFCA:

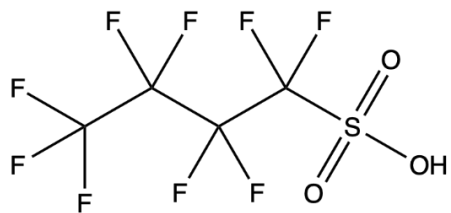
$n \leq 6$



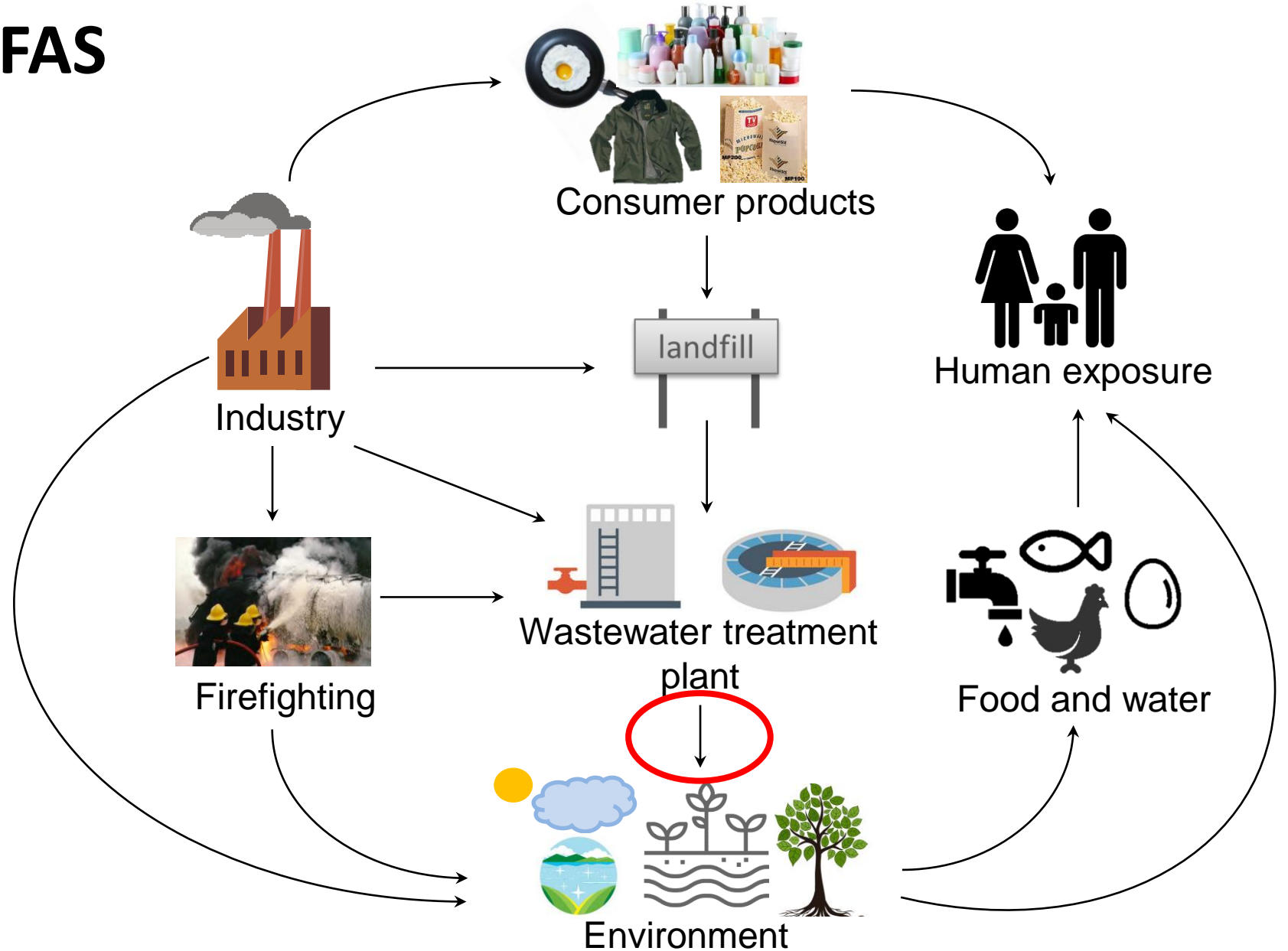
Short chain

PFSA:

$n \leq 5$

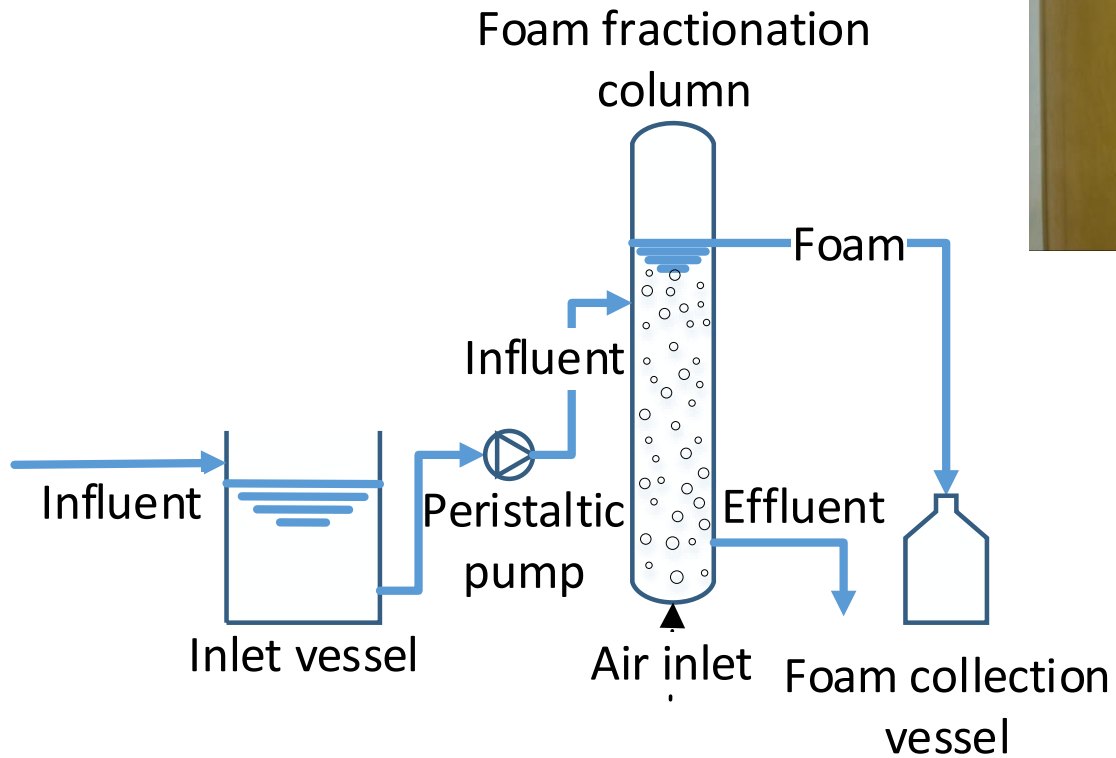


(Buck et al. 2011)



# Foam Fractionation

with leachate water

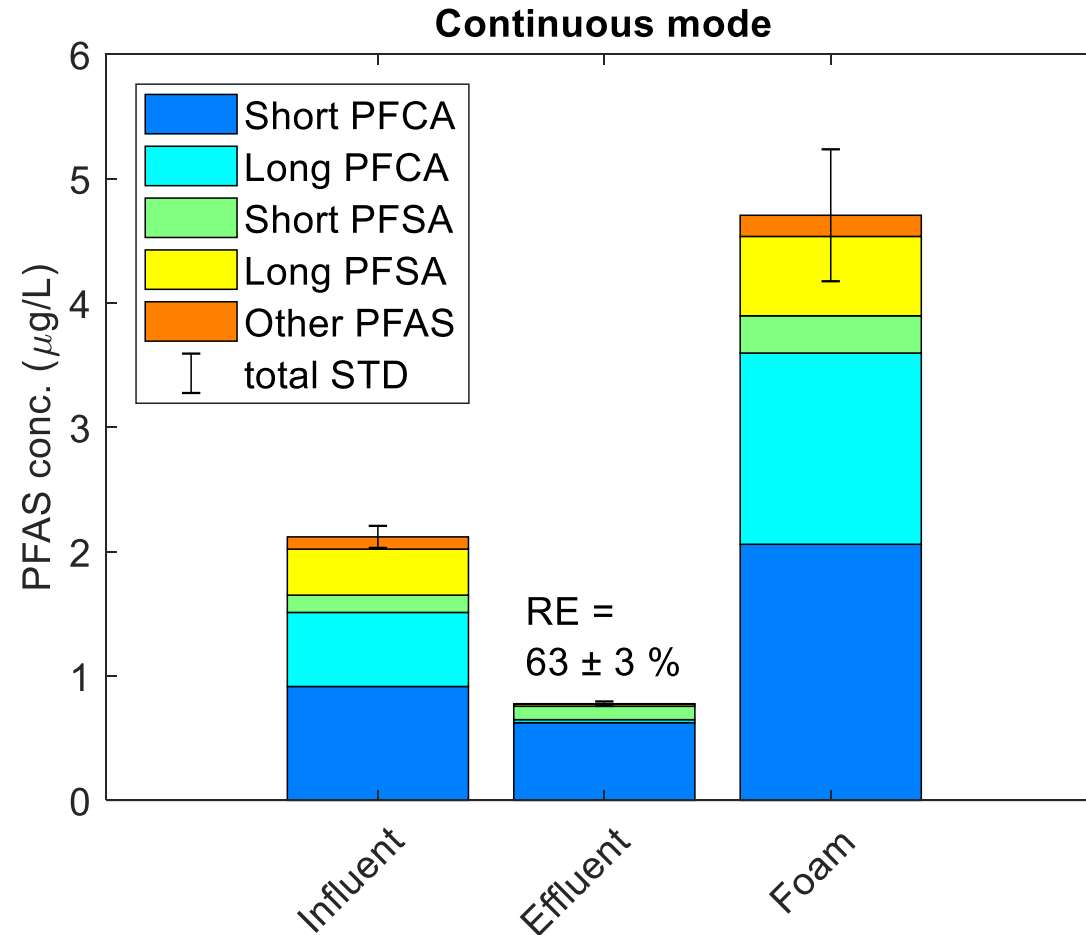


# Foam Fractionation

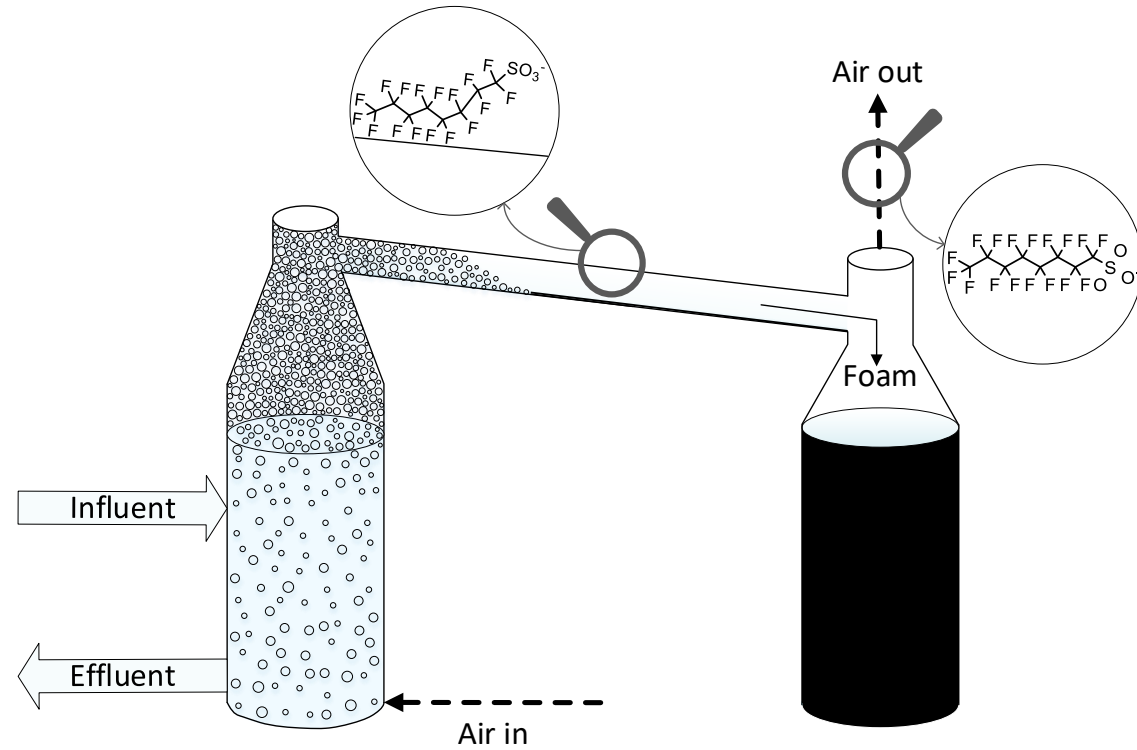
with leachate water

Removal decreased for:

- Contact time < 20 min
- % foam < 10 %
- Air flow < 7.5 L/min



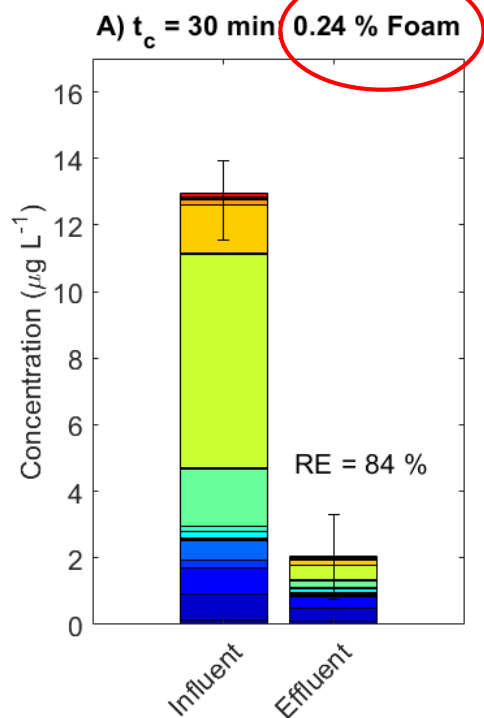
# Foam Fractionation with industrial water



# Foam Fractionation

with industrial water

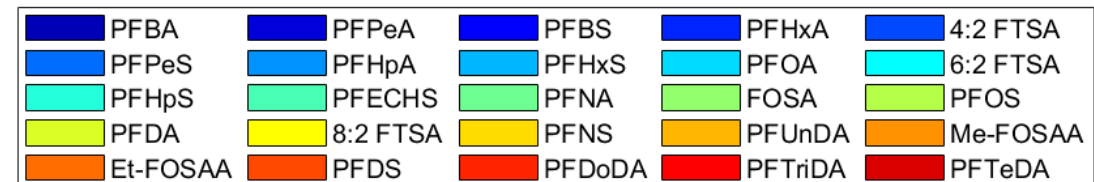
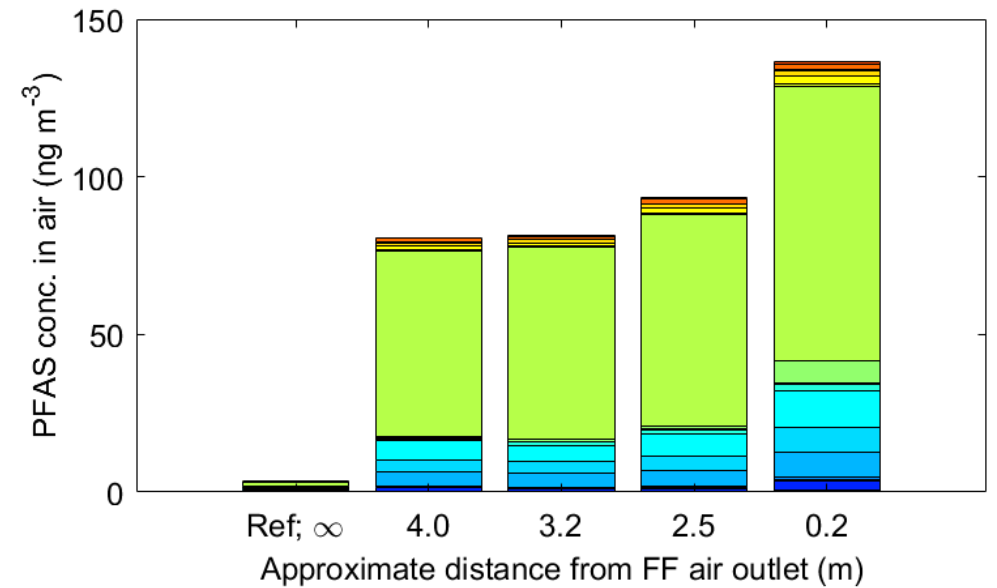
## Water phase



Removal decreased for  $t_c < 20$  min

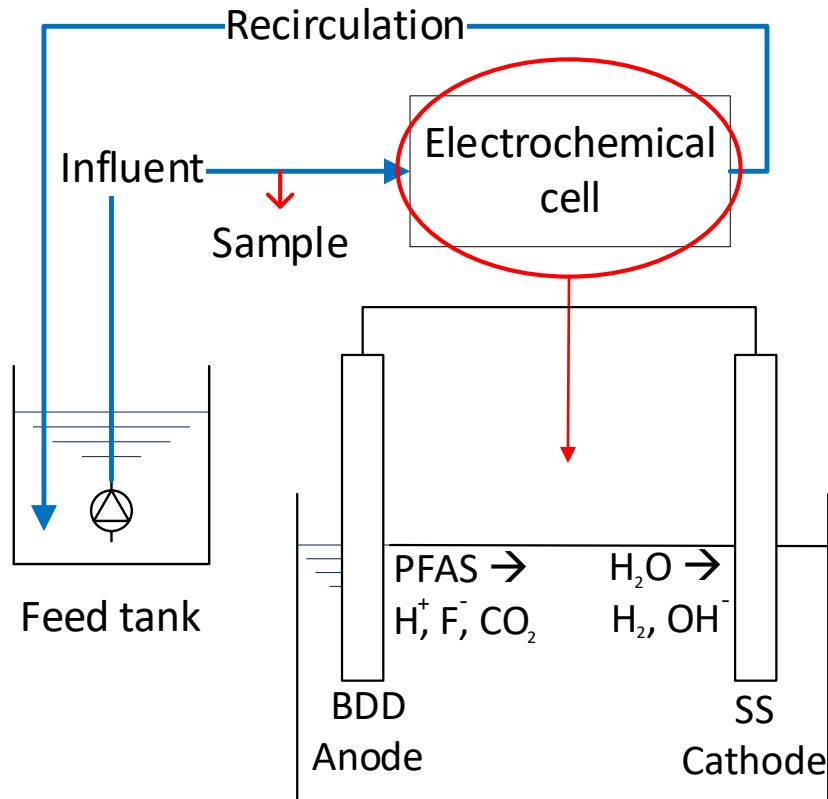
Positive effect of conductivity and total elements

## Air phase

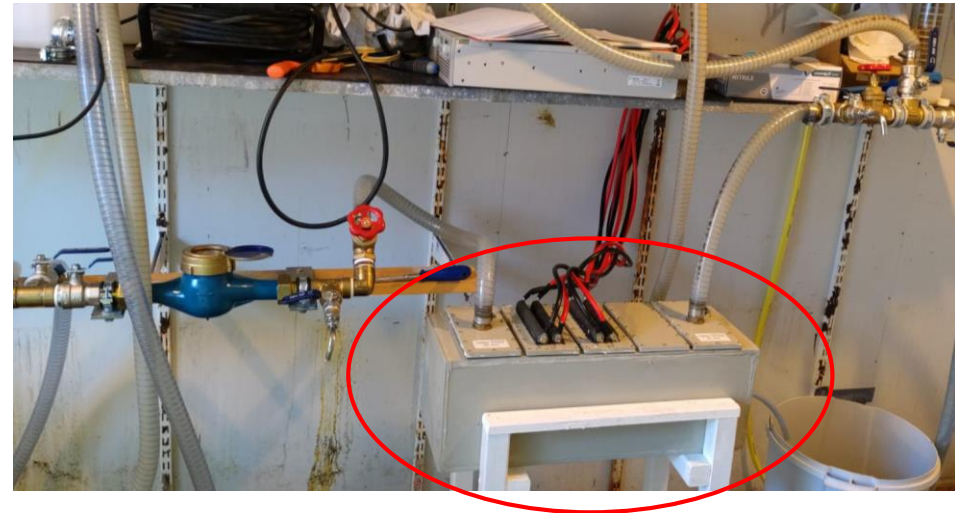


# Electrochemical Oxidation

with leachate and groundwater and foam

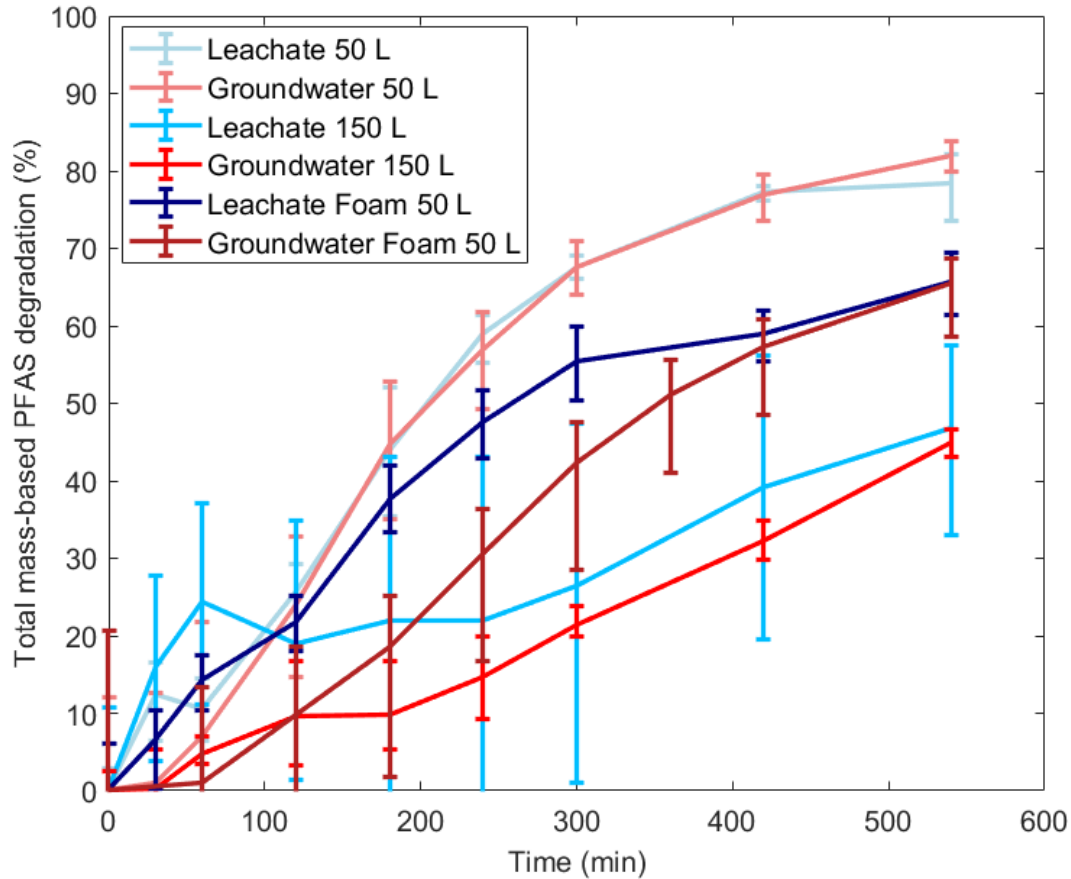


Electrochemical cell





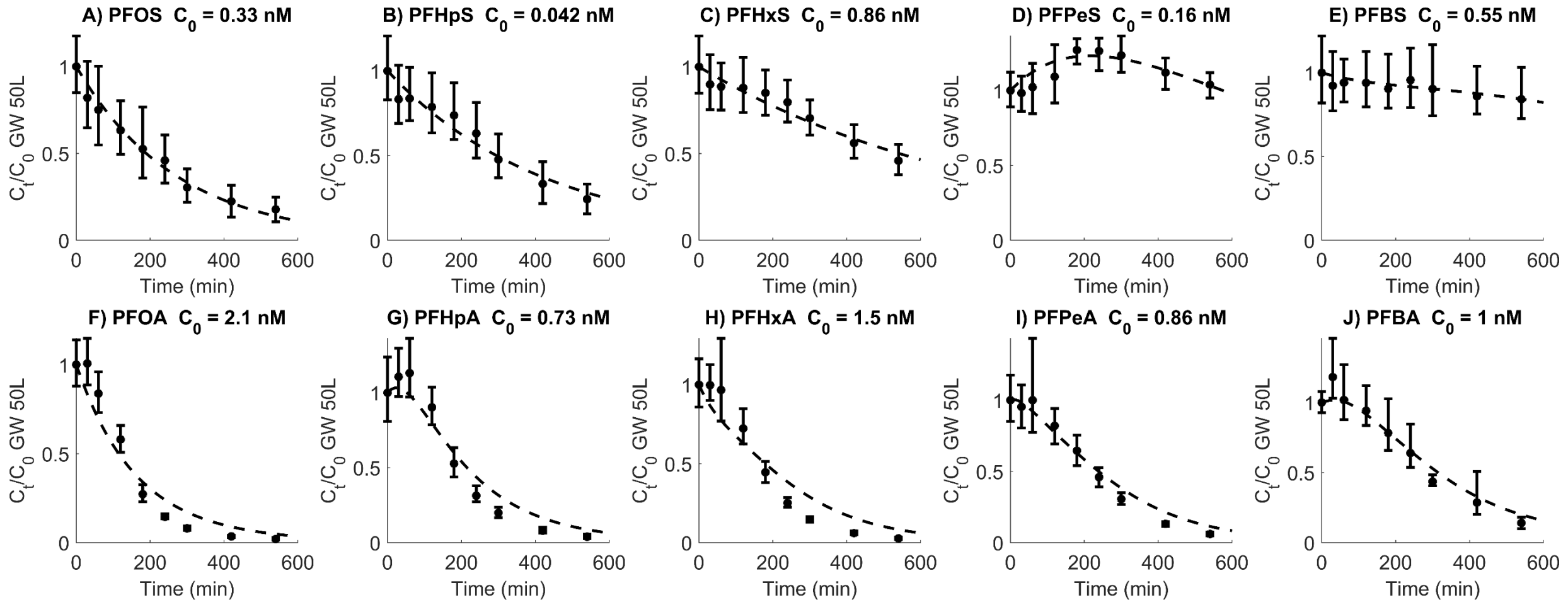
# Electrochemical Oxidation



Water	$\Sigma$ PFAS ( $\mu\text{g L}^{-1}$ )	TOC ( $\text{mg L}^{-1}$ )
Leachate	2.3	44
Groundwater	2.8	36
Leachate Foam	3.6	47
Groundwater Foam	19	80

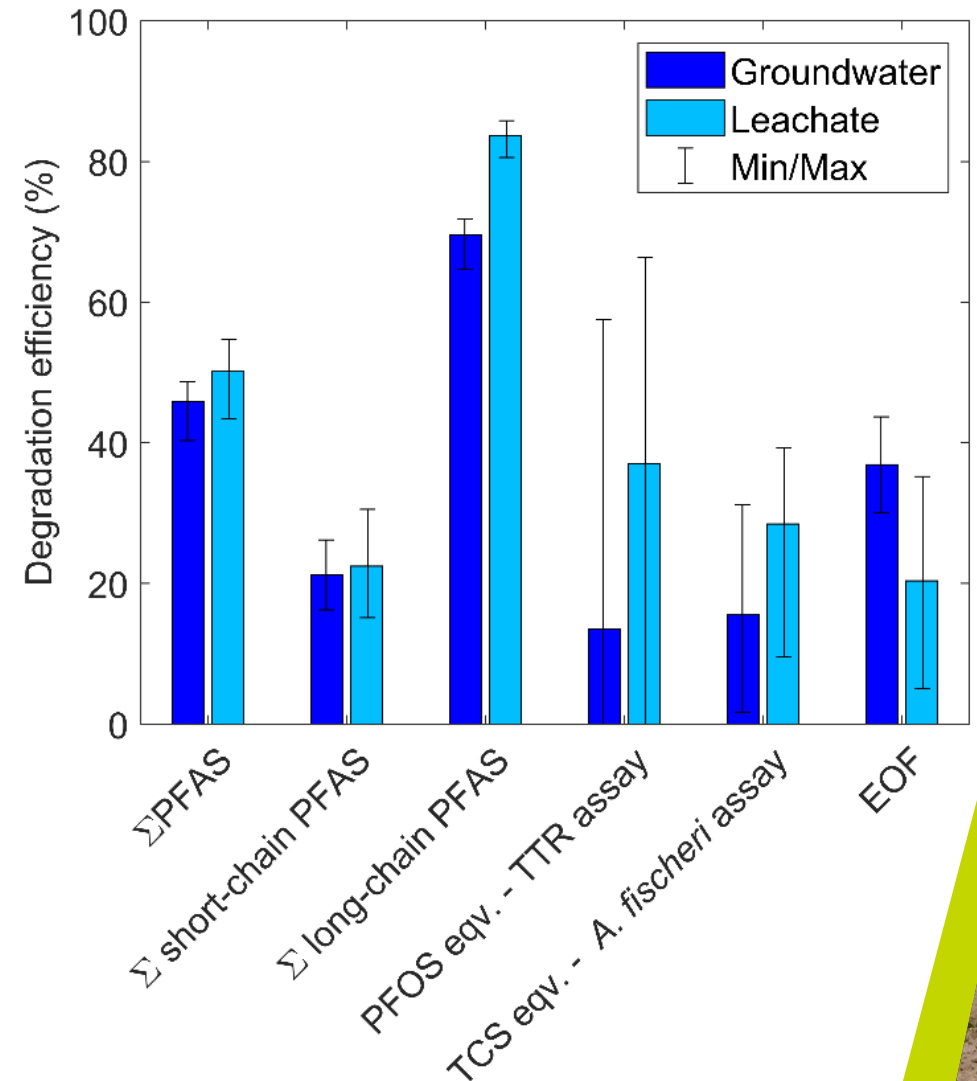
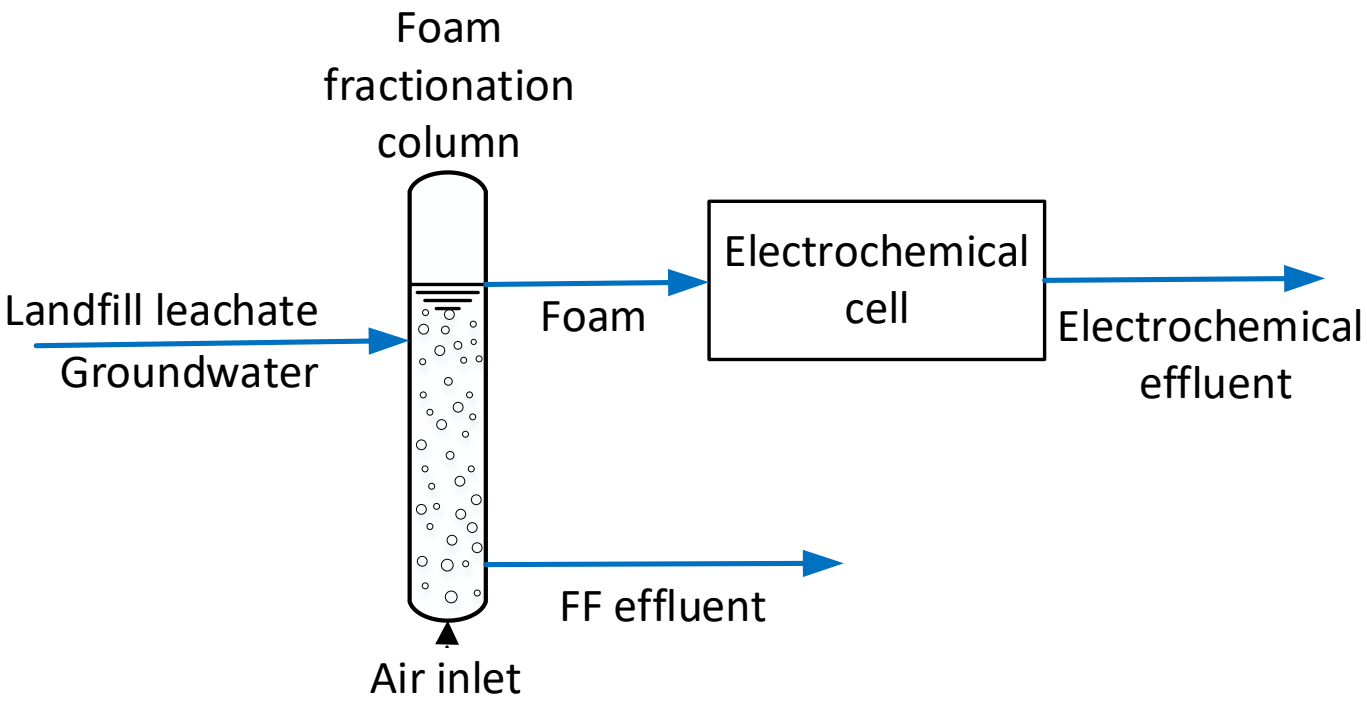


# Electrochemical Oxidation



**I** Experimental Data - - Numerical Model

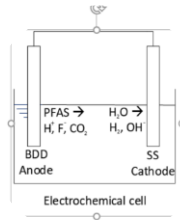
# Treatment train: FF + EO



# Is the proposed treatment scheme an efficient on-site PFAS remediation technology?

Yes!

But...



Mass transfer limitations?



# Thank you for your attention

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More about  PERFORCE<sup>3</sup>:

<https://perforce3-itn.eu/>



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More about PFAS?  
Listen to our podcast!

