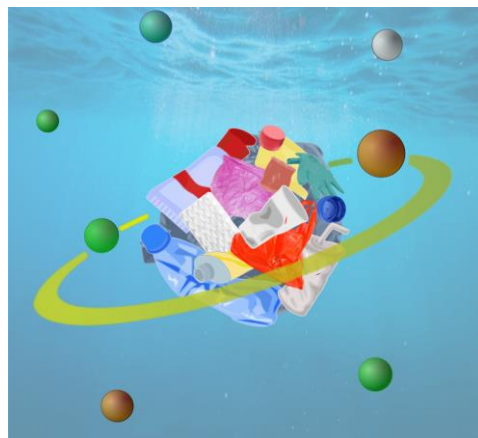


Understanding the effects of plastic pollution on the biogeochemical cycle of elements: introducing PLANET project

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Main project hypothesis

Plastic dispersion and diffusion in water bodies



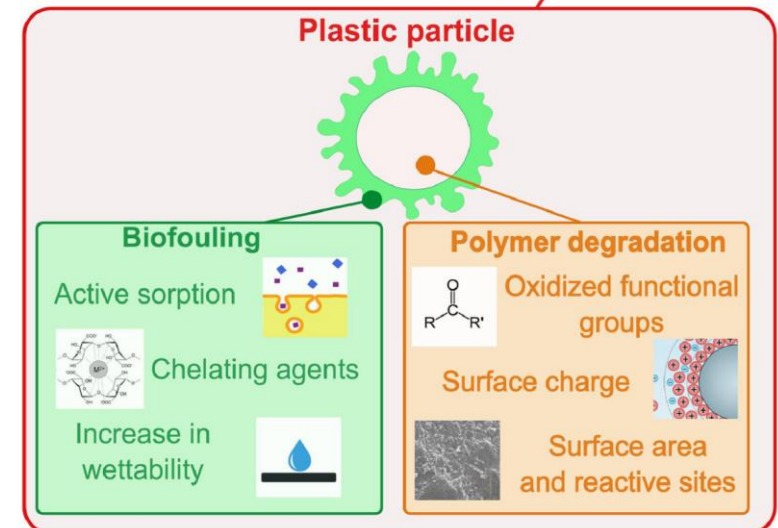
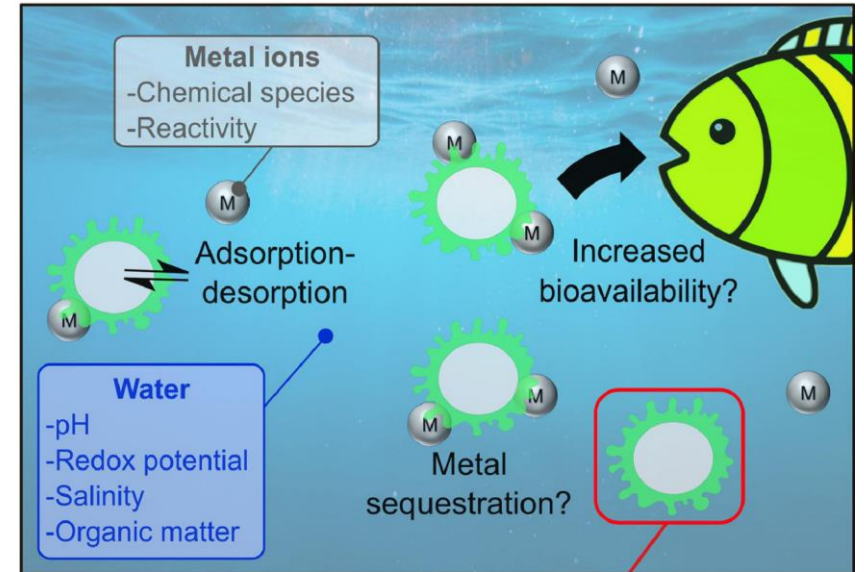
Plastic ageing and biofouling



**Interaction with other chemicals
(also inorganic components!)**



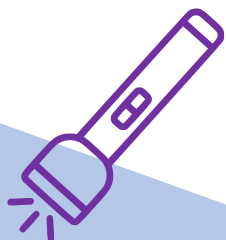
Unclear mechanisms and consequences



Project planning

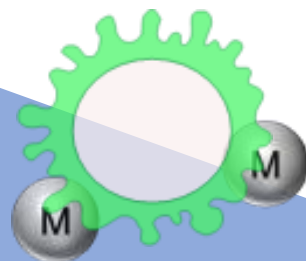
4 main pillars:

1



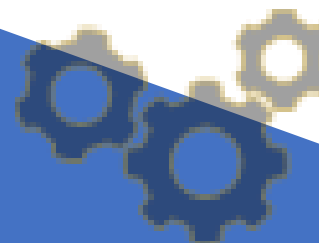
Simulate
weathering and
biofouling of
synthetic and
biodegradable
polymers

2



Test the
interaction with
metals and other
inorganic ions in
varying water
conditions

3



Create a
quantitative
framework of
plastic-element
interaction

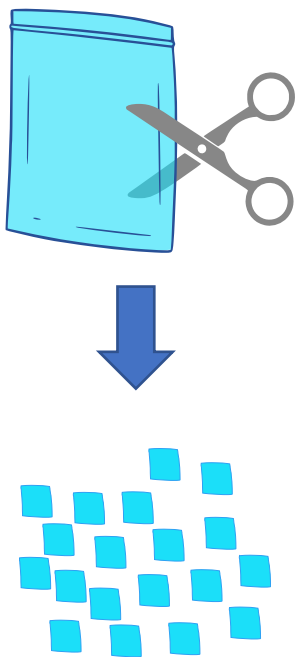
4



Test the prepared
model in a
micro/mesocosm

First pillar: polymer ageing tests

PE particles



UV-A ageing in different media



HNO₃
NaOH
H₂O₂
Lake water
Air

10 days

Biofouling in algal strain

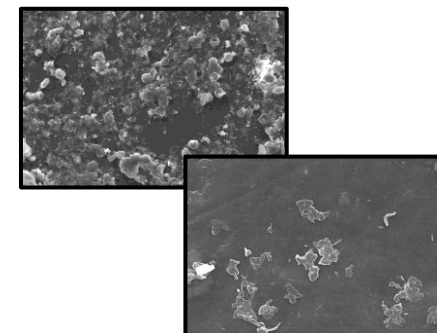


Pseudokirchneriella subcapitata
inoculum

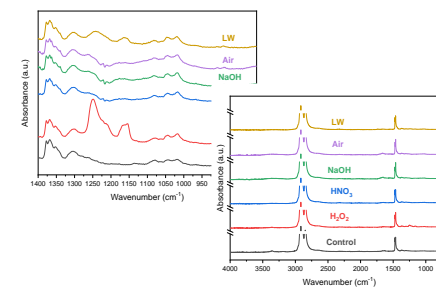
30 days

Characterization

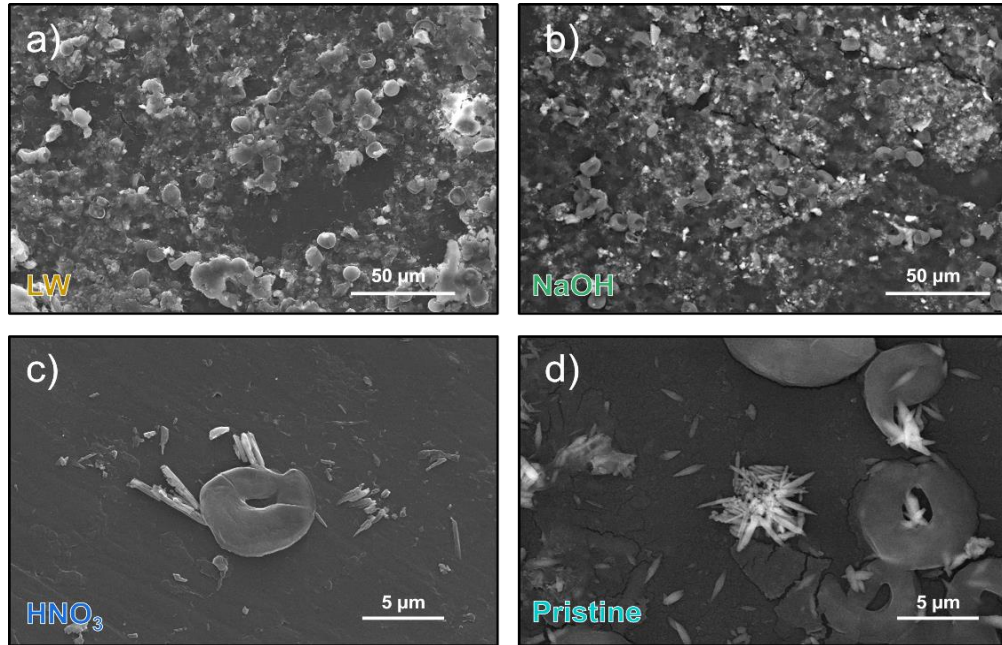
Morphology (SEM)



Functional groups (FT-IR)

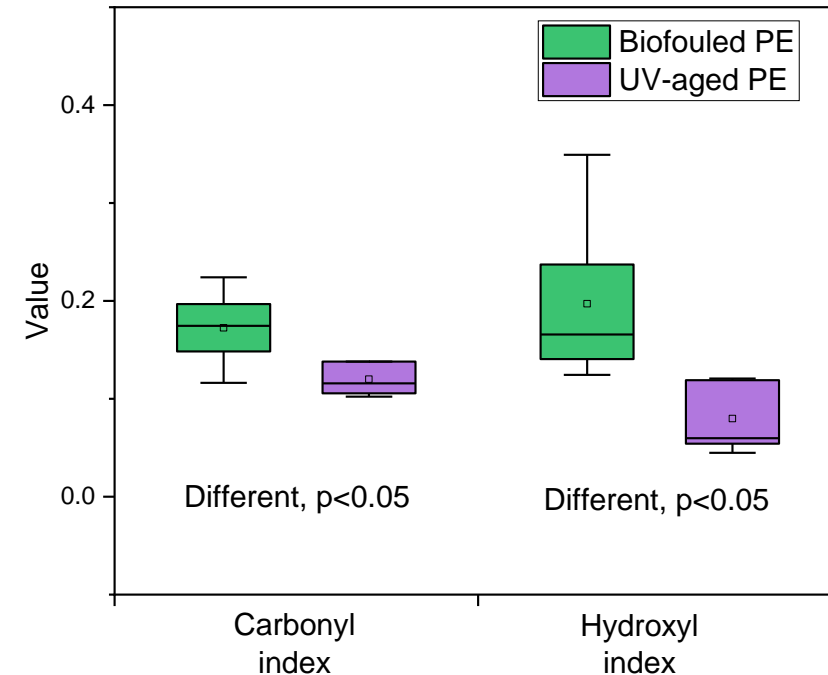


Results



- Attachments observed in all samples
- Variable coverage, the previous ageing treatment

- Changes in functional groups, presence of new bands (Secondary amides and polysaccharides)
- Increase in Hydroxyl and Carbonyl indexes



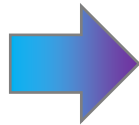
Current experimental setup

A focus on biofouling process

Test on different polymers

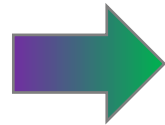
Synthetic polymers
(PE - PP)

Biodegradable polymers
(PLA - PBAT)



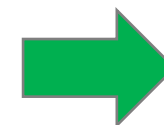
Simplified UV ageing

Ageing in air under UV-B radiation
(900h)



Effects of priming

Rinsing with Humic acids for 48 hours
or
Untreated



Incubation with mixed algae culture

Cosmopolite species found on plastic particles:

- Klebsormidium sp. (green algae)
- Achnantes sp. (diatom)
- Aphanocapsa sp.




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Acknowledgements



This work is financed under the EU H2020-MSCA-IF scheme, grant number 101023603.



Thanks for your attention!

Questions?



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