



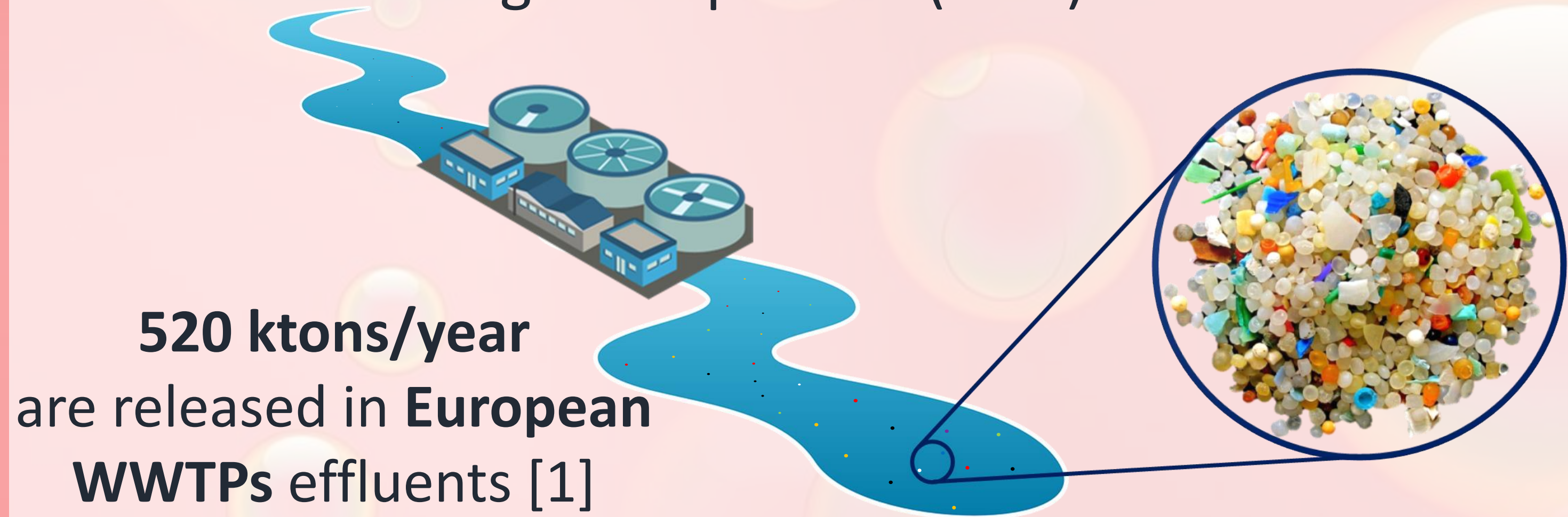
Insights into the oxidation of microplastics by the Fenton process

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Introduction and objectives

Wastewater treatment plants (WWTP) are not effective in removing microplastics (MPs) from water



Fenton Oxidation has reached high removal efficiencies on emerging contaminants [2]



Experimental

Homogeneous Fenton reaction

Thermostatic shaker bath

- VOLUME: 75 mL
- TEMPERATURE: 80 °C
- SHAKING RATE: 200 rpm
- pH: 3
- MP DOSE: 100 mg
- Fe³⁺ DOSE = 0.75 mg (0-5 pulses along reaction time)
- H₂O₂ DOSE = 75 mg (3 times a day)
- REACTION TIME: 5 days

Microplastics



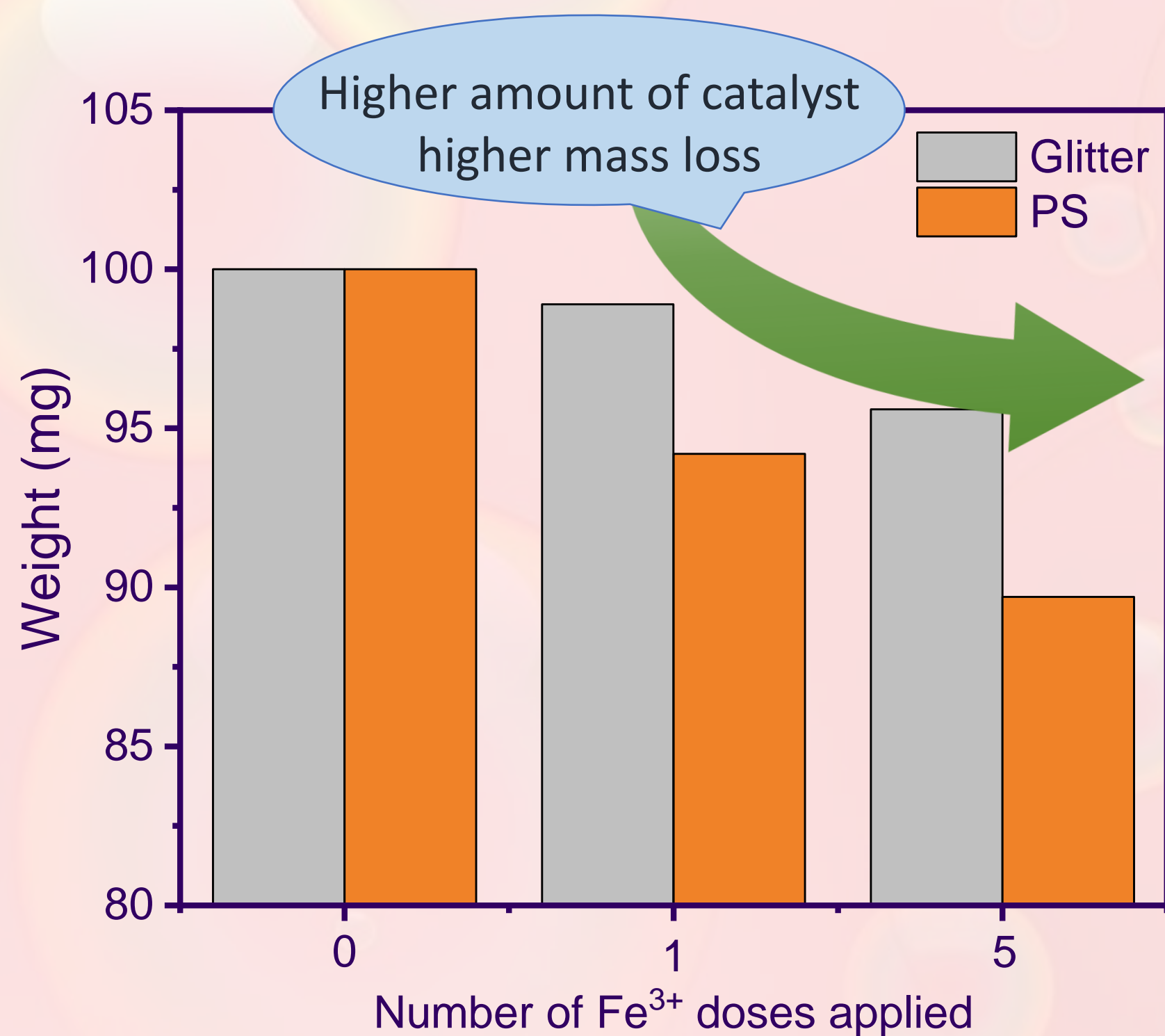
Obtention of microplastics

Cryogenic grinding
Size range: 100 – 250 μm

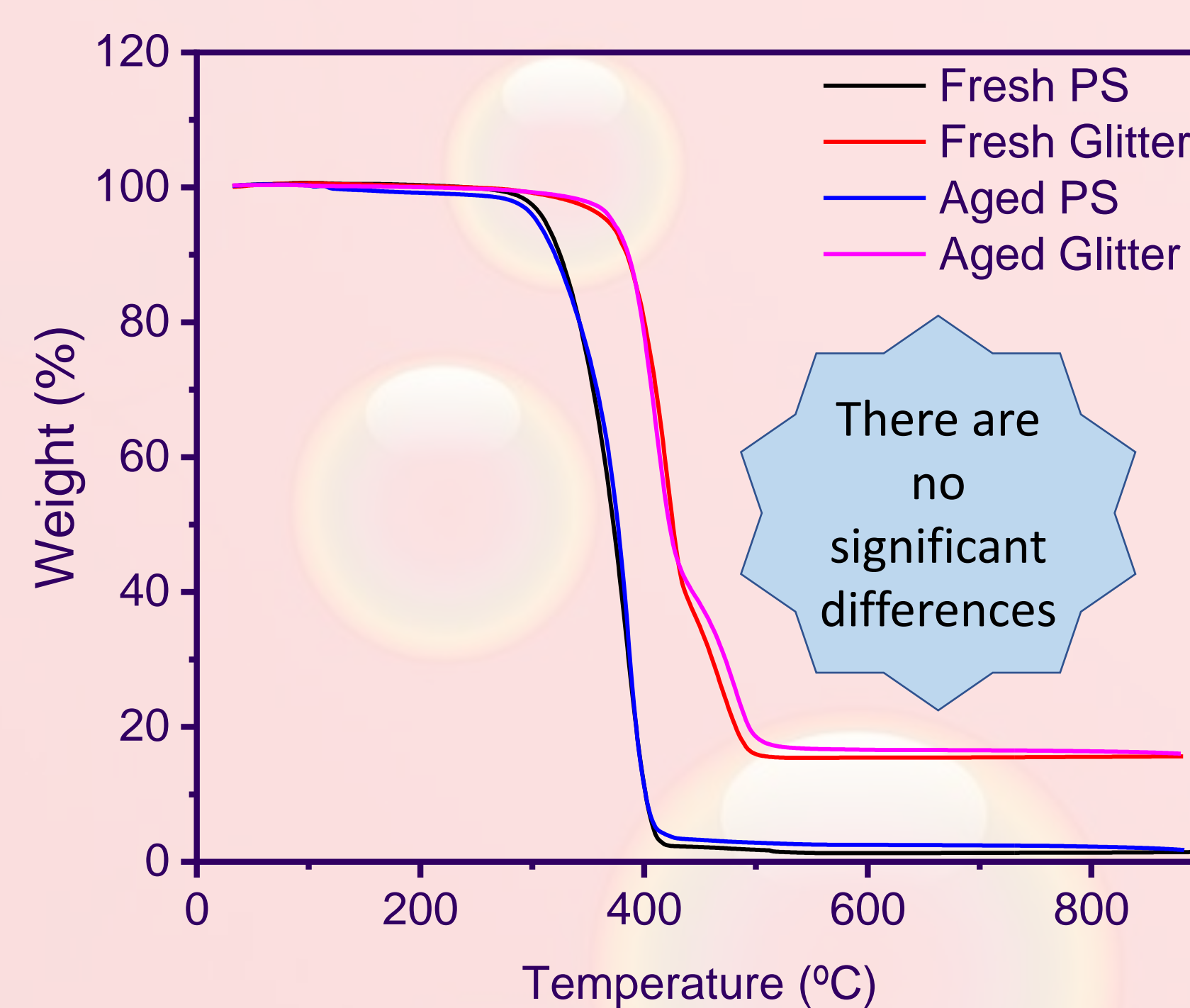


Results

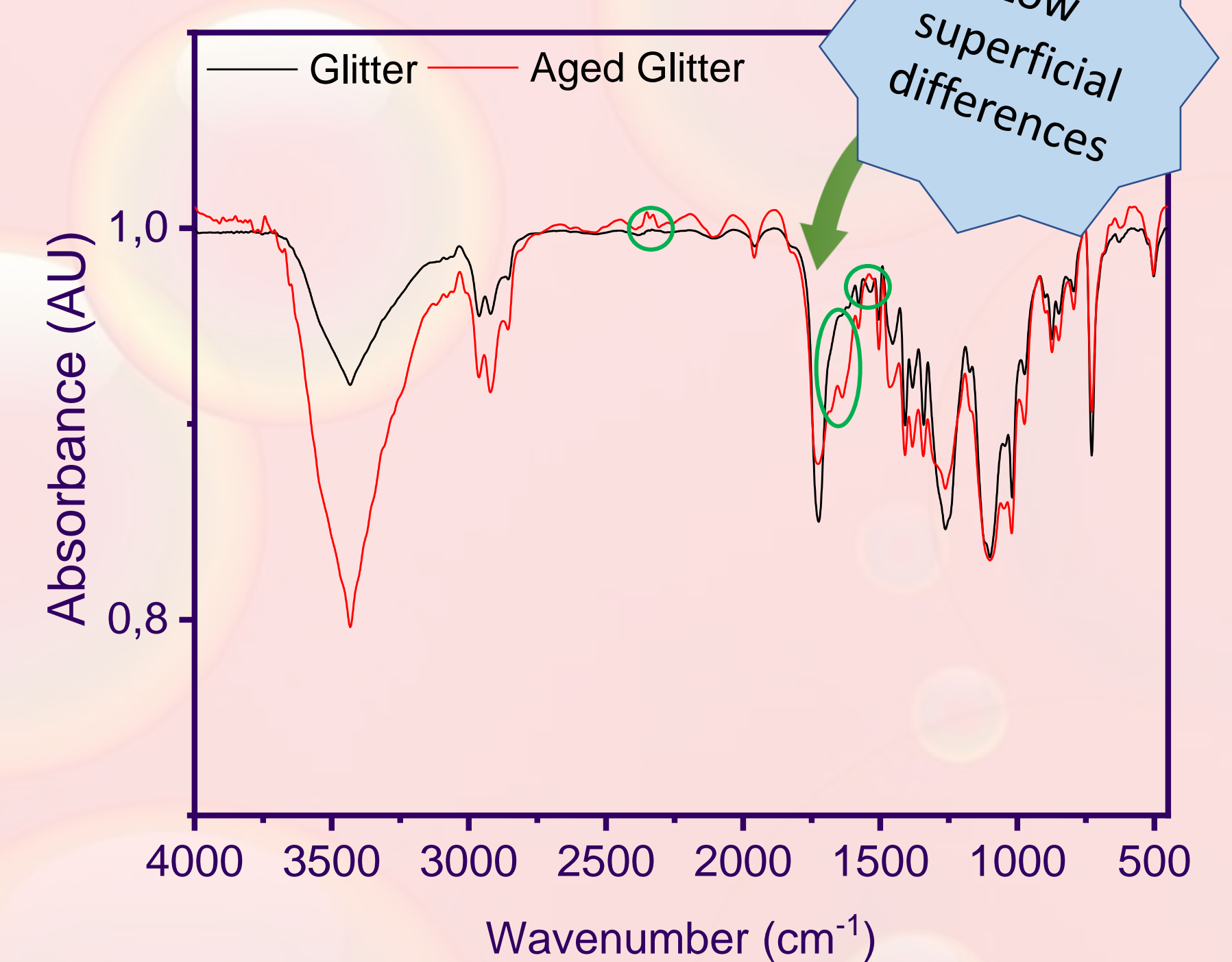
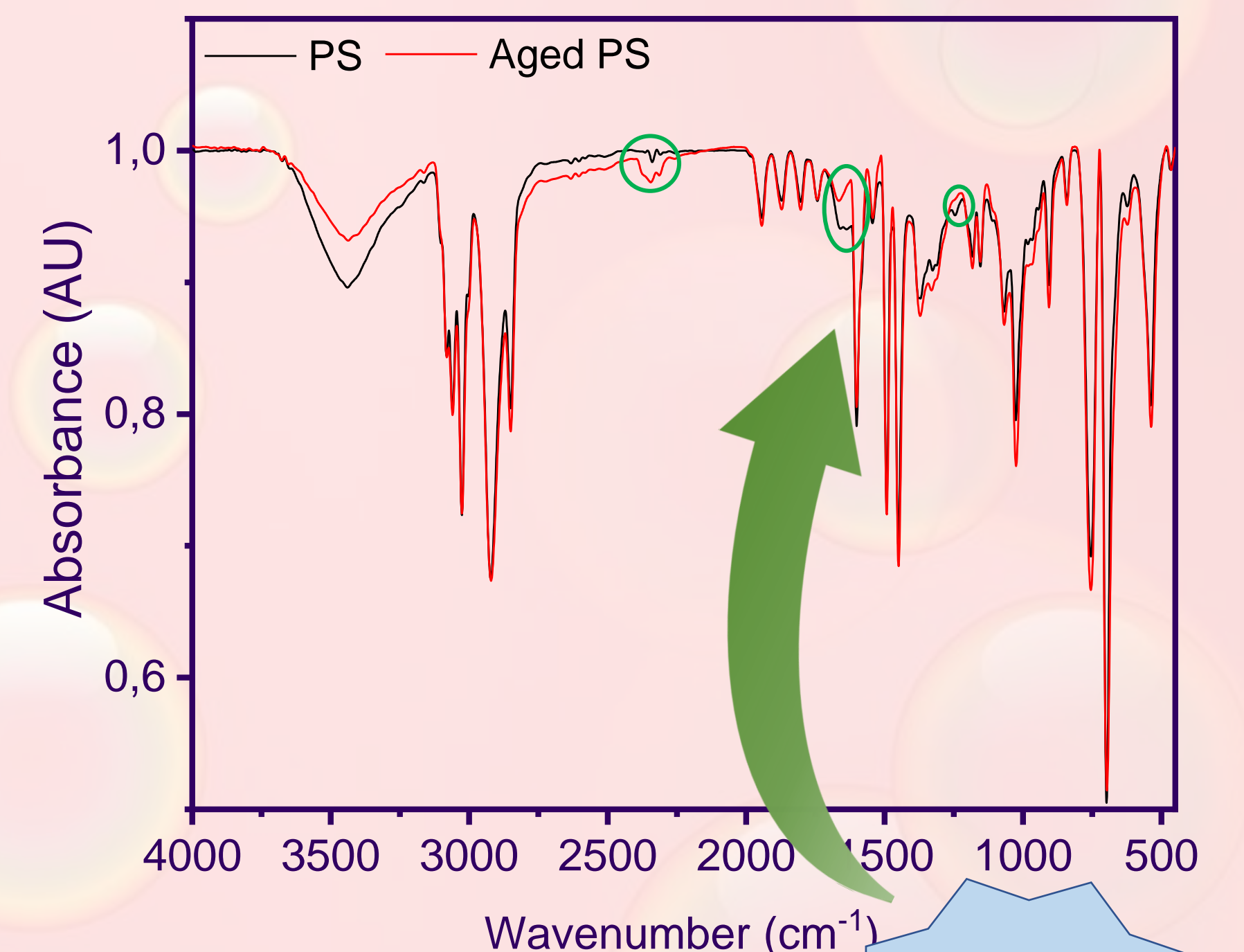
Mass Loss



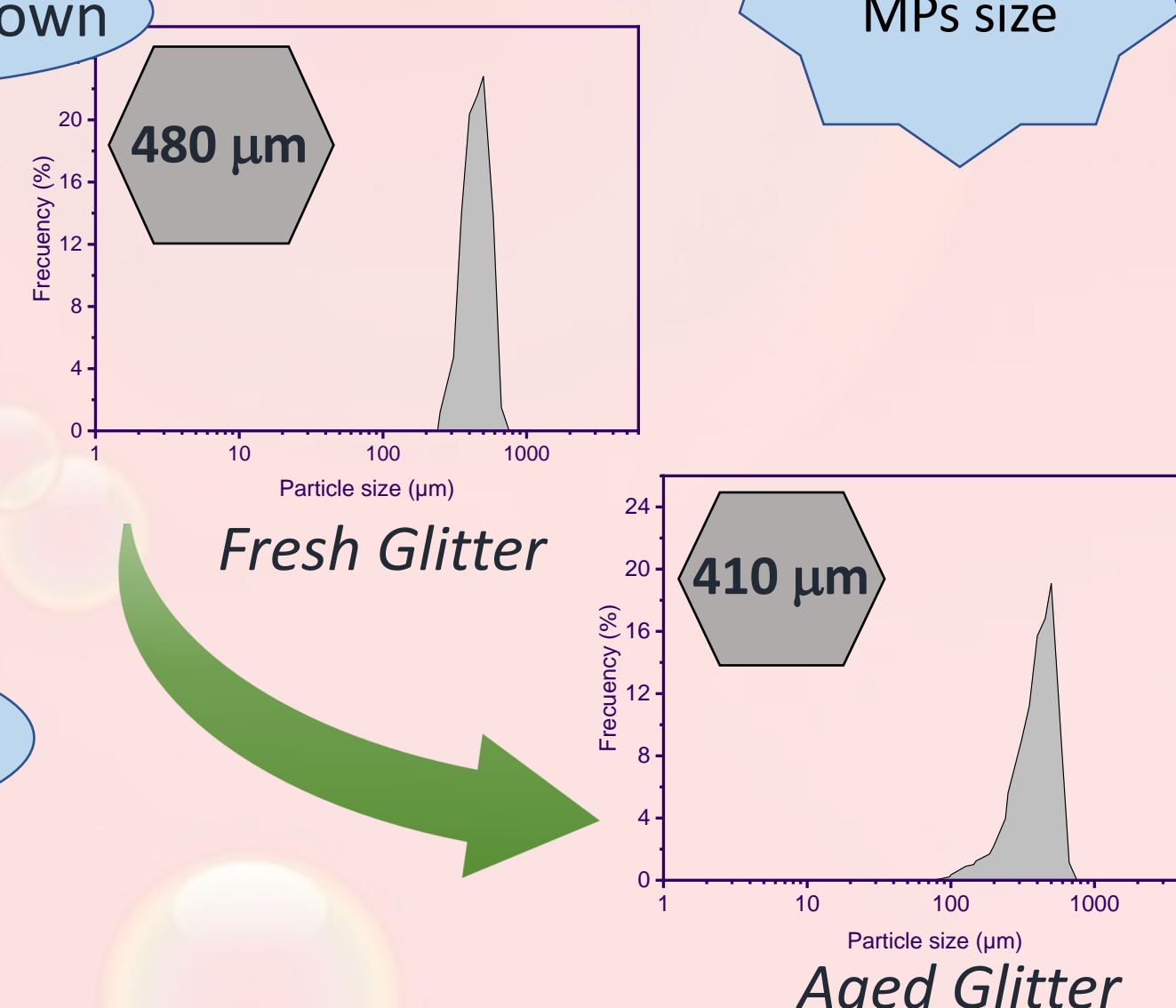
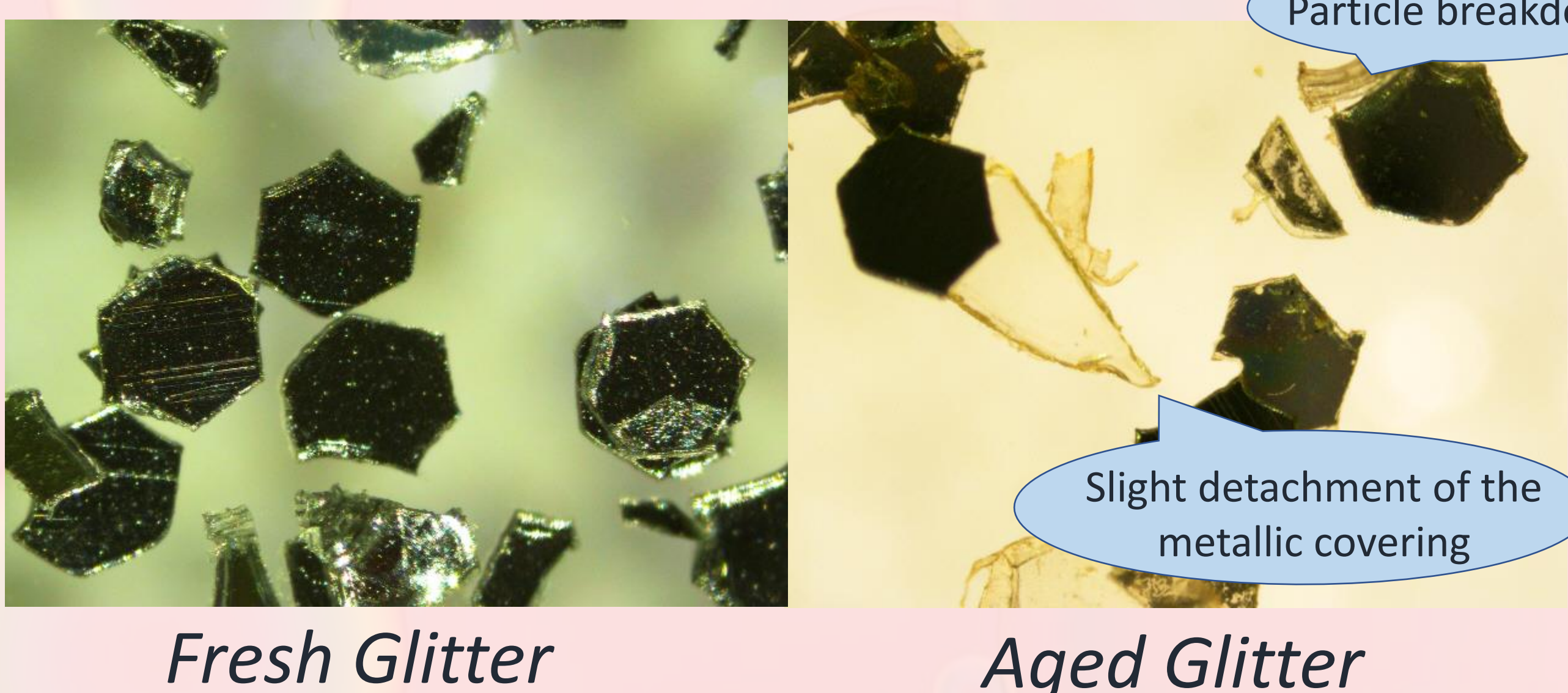
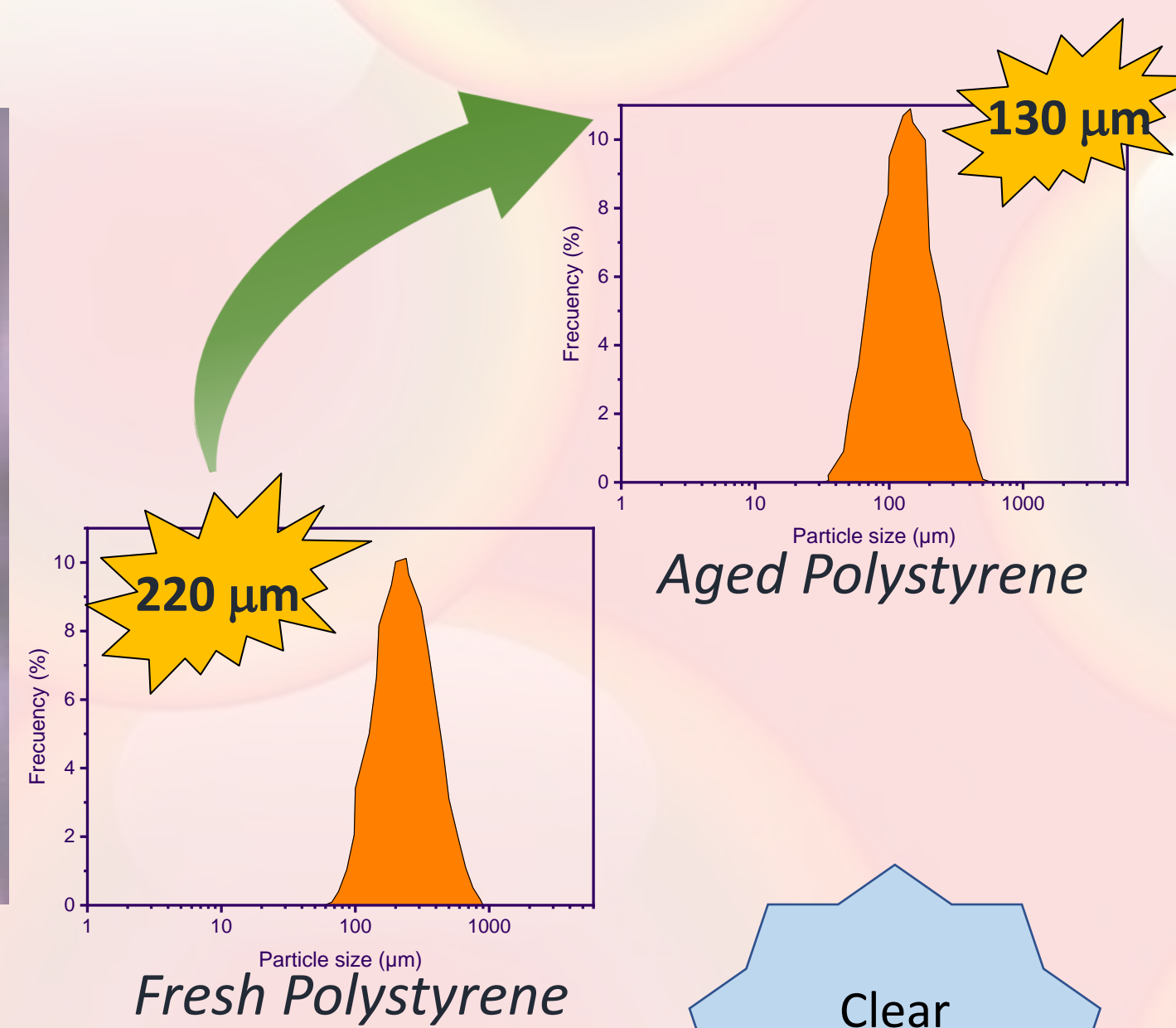
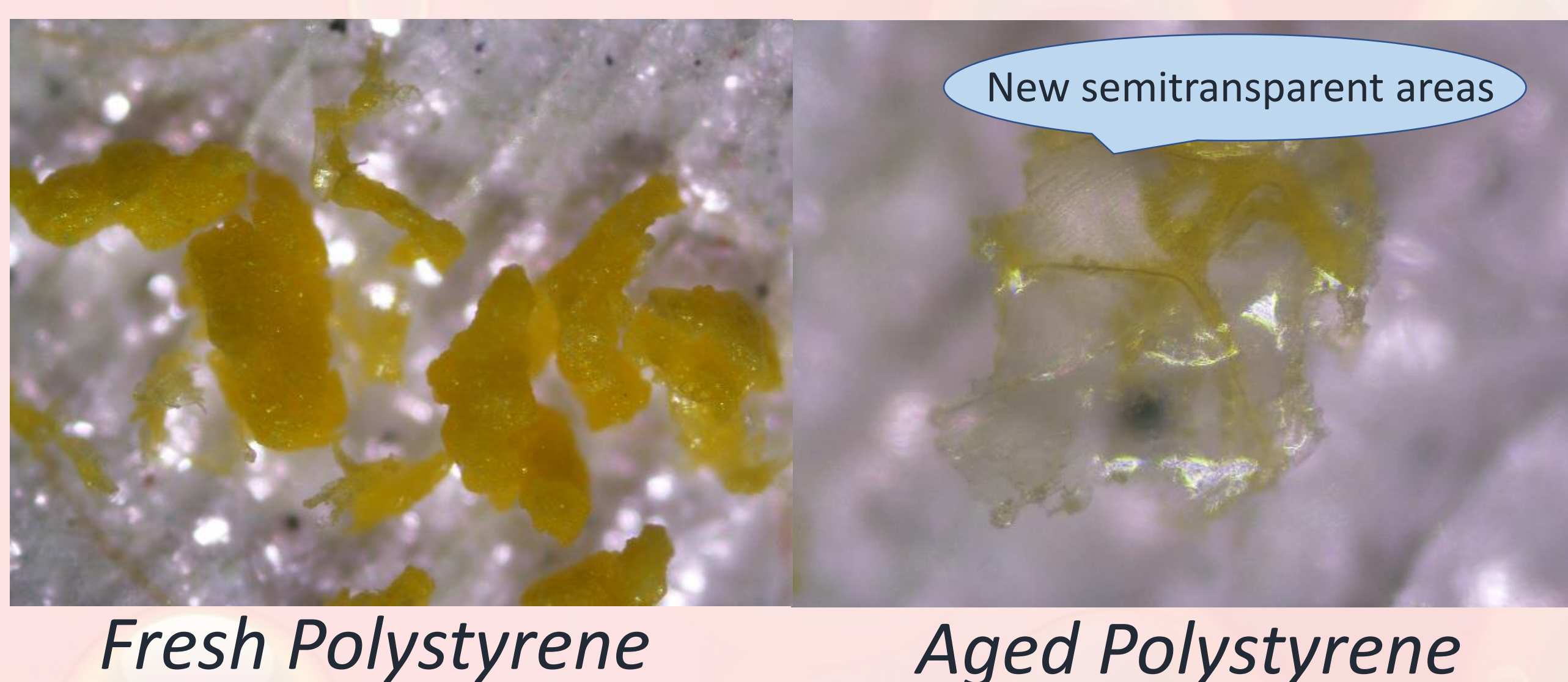
Thermogravimetric Analysis



FT-IR Spectroscopy



Microscopic Analysis



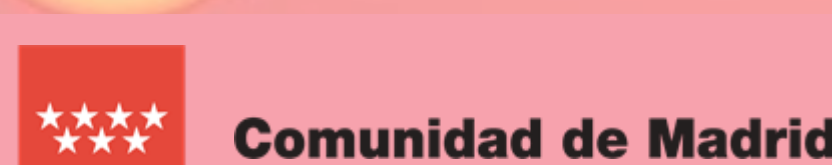
Conclusions

- Despite the severe conditions used, a **low MPs degradability** is observed.
- The most notable changes are **superficial modifications**.
- **Metal surfaces** are less susceptible to modification than **plastic surfaces**.
- These modifications **increase the hydrophilicity of MPs**.

References:

- [1] Alimi et al., Environ. Sci. Technol. 52 (2018) 1704.
[2] Klamerth et al., Water Res. 44 (2010) 545-554.

Acknowledgements:



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