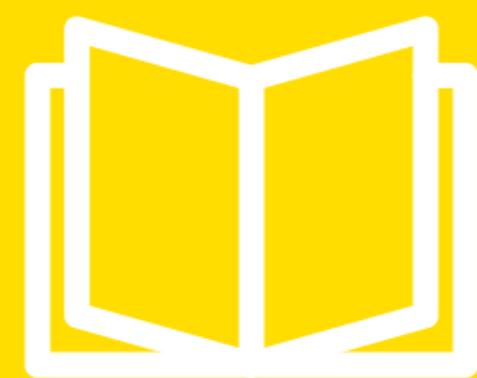


PhD Open Days



MICROSCAFS® as micro-reactors for TiO₂ nanoparticles production for photocatalytic applications

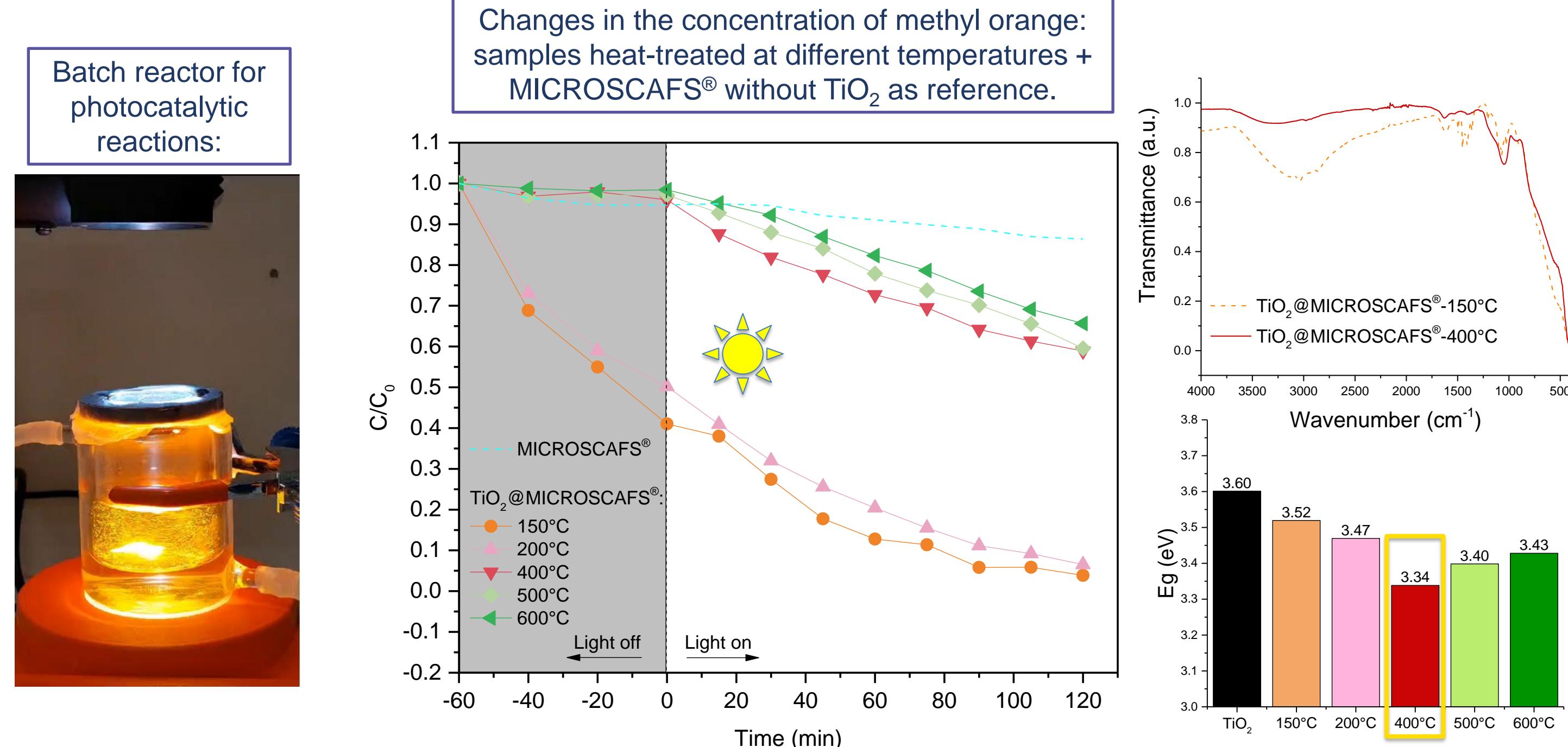
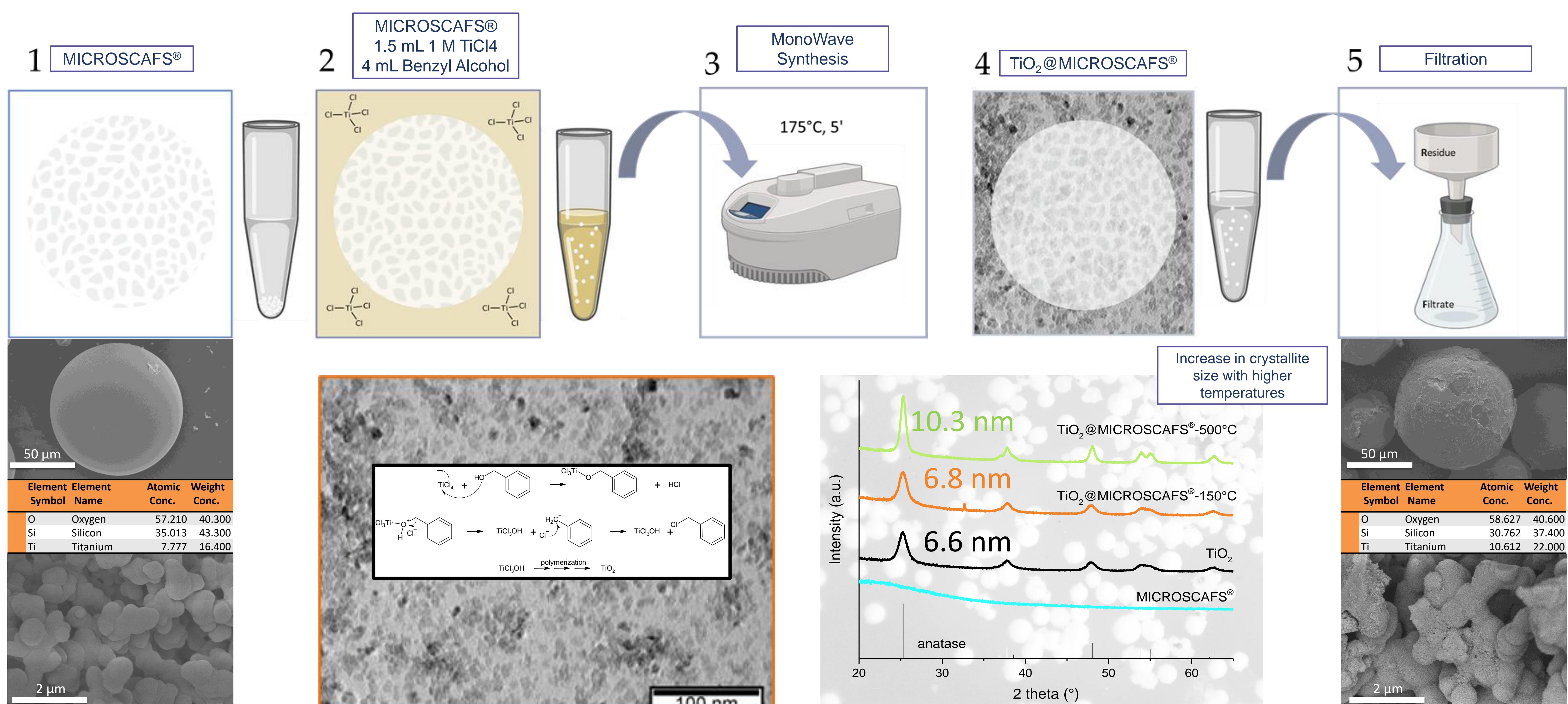
Materials Engineering

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INTRODUCTION

- Porous MICROSCAFS® serve as micro-reactors and a robust supports for TiO₂ photocatalyst.
- MonoWave reactor is used for the in-situ synthesis of anatase TiO₂ nanoparticles within MICROSCAFS®.
- Solar-powered sustainable photodegradation of pollutant (methyl orange) from water.
- Heat-treatment optimization for enhanced photocatalysis.

PROCEDURE



CONCLUSIONS

- Successful in-situ formation and impregnation of anatase TiO₂ nanoparticles within MICROSCAFS®, verified through analysis methods including XRD, SEM, and EDS.
- Heat-treatment removed the organic residues and results in an increase in the crystallite size of TiO₂ nanoparticles, as well as in alterations in band gap energies.
- The optimal heat-treatment of TiO₂@MICROSCAFS® for photocatalysis of methyl orange is 400°C. This temperature choice is substantiated by its correlation with the lowest band gap energy, ensuring efficient utilization of solar energy in the degradation process.
- With lower heat-treatment, 100% of methyl orange is removed. However, it is not attributed to photocatalysis. Instead, it appears to involve another mechanism, like adsorption, catalysis and/or a chemical reaction.

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CERENA Strategic Project FCT/UIDB/04028/2020, FCT grant number 2022.09822.BD,
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