Shedding light on the photobase mediated oxa-Michael polyaddition

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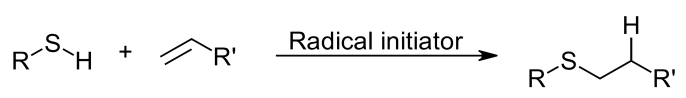
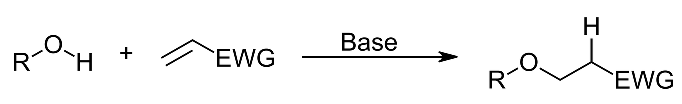
Introduction

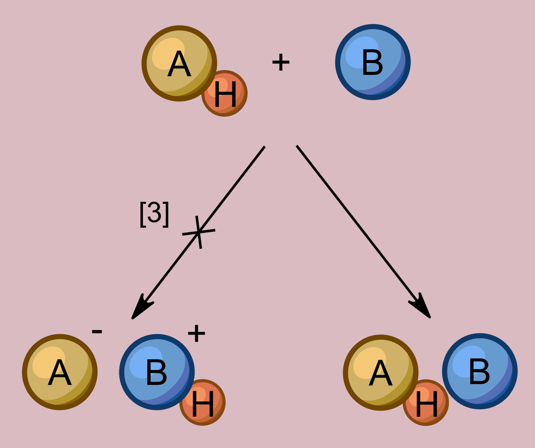
THIOL-ENE [1] vs. OXA-MICHAEL [2]



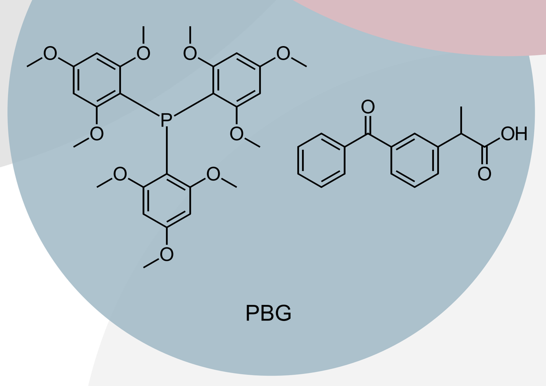


THIOL-ENE		OXA-MICHAEL
Step growth mechanism Less shrinkage Tough photopolymers	👍	Step growth mechanism Less shrinkage Numerous monomers available No bad odor
Limited monomer availability Bad odor Poor storage stability	👎	Expensive Brønsted bases

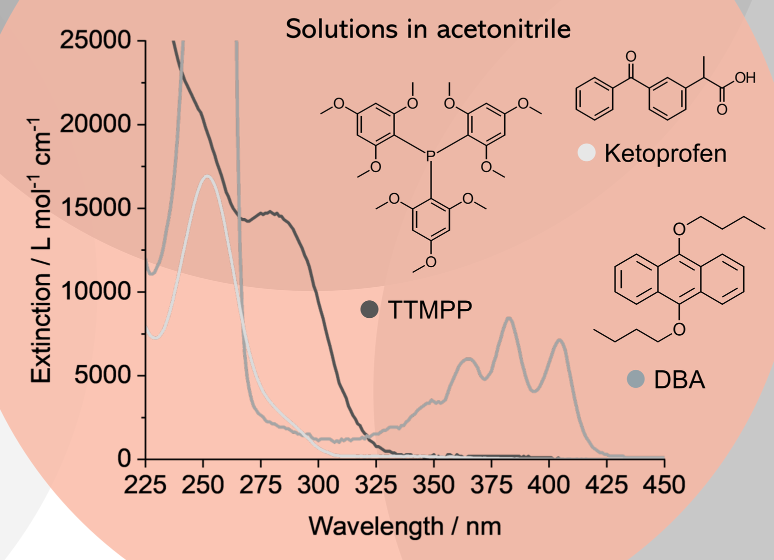
Synthesis



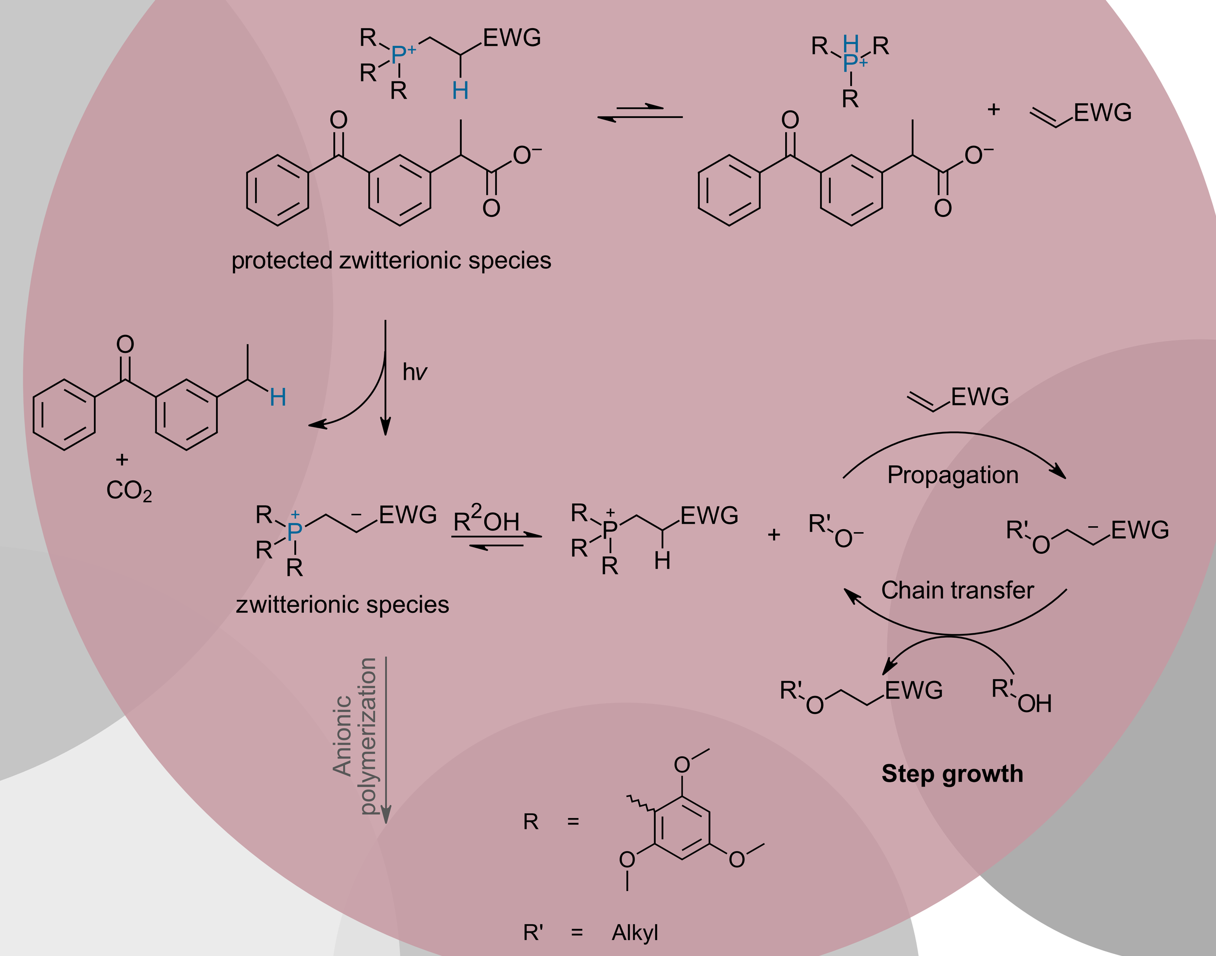
A … Photoactive Acid
B … Lewis Base



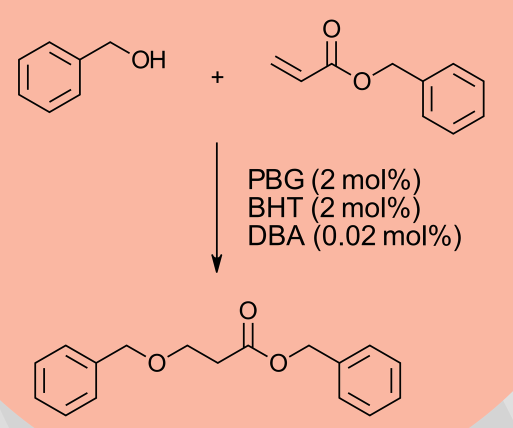
Absorption



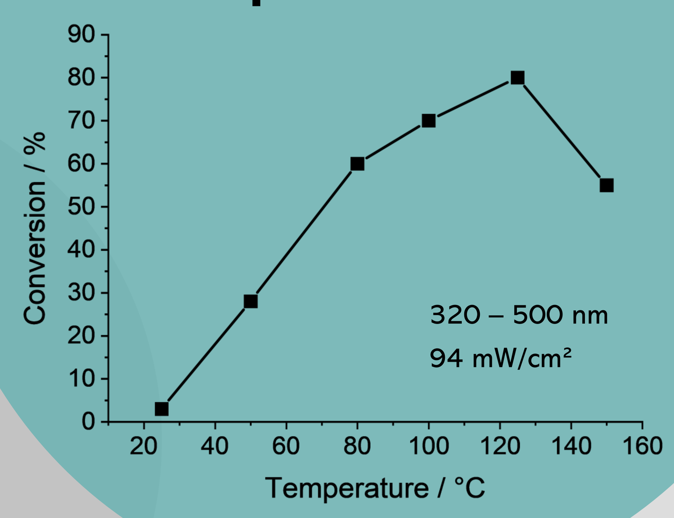
Mechanism



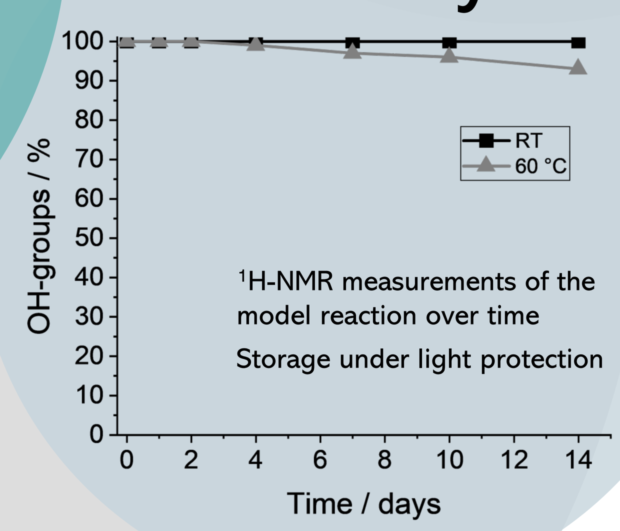
Model reaction



Temperature dependance

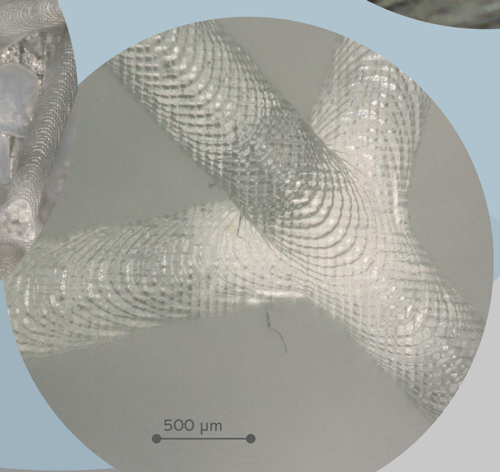


Stability

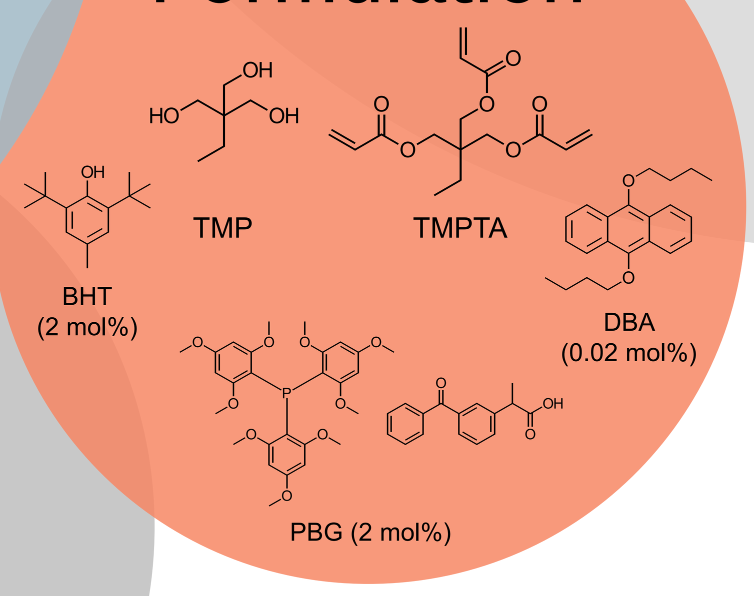


Hot Lithography

- DLP Printer
- 385 nm light engine
- 75 mW/cm² intensity
- 80 °C printing temperature
- 18 s irradiation/layer
- 50 µm thick layers



Formulation



Conclusion

Possibilities:

- Easy upscaling due to cheap starting materials
- Good stability of formulation
- Hot Lithography

Challenges:

- Absorption of the photoactive compound
- Reactivity at lower temperature

References and Acknowledgements

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