The Possibilities and Challenges of Photobase Generators for Oxa-Michael Reactions

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Step-growth polymerization is still highly valued in the field of additive manufacturing to produce tougher materials compared to free radical polymerization. Thiol-ene chemistry sees widespread use in this application, yet, it has its drawbacks, such as the availability of thiols, their strong odor, and a low storage stability.[1,2] Switching from sulfur to oxygen enables a wider variety of available monomers without the odor. The oxa-ene reaction is a base catalysed Michael-type reaction with recent research finding highly effective Lewis-base catalysts.[3] Our work includes the transition from a free base catalysed system to light triggered systems using our novel Lewis photobase generators. These were applied for both model reactions and polymeric formulations. Former allowed for an in-depth investigation of the mechanism alongside the high storage stability of the system. As the reaction speed was higher at elevated temperatures, our polymeric system was a perfect fit for Hot Lithography yielding 3D-printed parts with high resolution.[4]

References

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