Photoresponsive Molecules as Potential Candidates for Light-Induced Reversible Polymerization of Biobased Monomers

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As the world shifts towards greener economy, there is a demand to use less energy intensive processes for creating innovative materials[1]. And in bottom-up approaches to answer this call, molecules that undergo geometric and/or electronic changes through photon absorption instead of heat treatment are being explored. These molecules can be used in building self-healable and recyclable polymers through different photomediated reactions. Comprehensive library research had been conducted to better understand the advantages and disadvantages of their different mechanisms following three different perspectives – molecular, structural, and practical points of view.

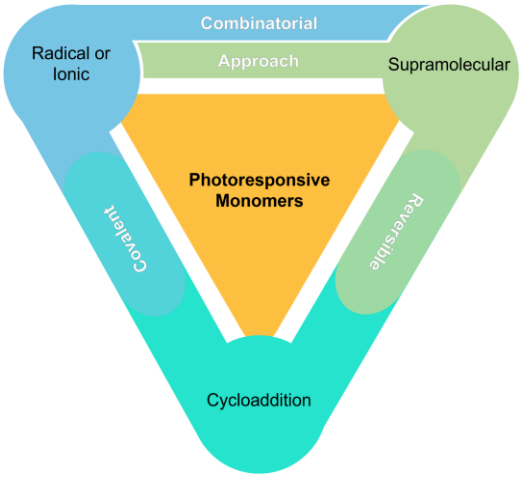

Figure 1. Interconnectedness of photomediated reactions *vis a vis* polymerization.

Early experimental works concerning the synthesis of new biobased monomers and their characterization had been carried out. To illustrate, coumarin-containing monomers were (co)-polymerized to investigate the extent of photocycloaddition. Introduction of conjunctive sources of energy (*i.e.* mechanical, electrochemical, thermal) was also tested to check whether this can improve the efficiency of decrosslinking. In the end, the aim is to provide a general framework in choosing suitable task-specific photoresponsive molecules in the context of sustainable formation of biobased composites[2].

References

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