# Expanding the limits of aliphatic photoinitiators based on α-ketoesters for free radical photopolymerization

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Free radical photopolymerization of (meth)acrylate based formulations is considered one of the most important technologies in radiation curing industry due to the high energy efficiency and fast curing times. Therefore, it is frequently used for protective and decorative coatings, biomedical and dental applications. Common industrially used radical photoinitiators (PIs), e.g. benzophenone, contain benzoyl chromophores as a key moiety due to its excellent absorbance in the UV-Vis region. However, the use of these state-of-the-art photoinitiators in food or medicinal products is becoming more and more regulated as their degradation and recombination products are suspected of being mutagenic or cancerogenic to humans.[1,2]

Herein, we explored a new generation of aliphatic photoinitiators based on α-ketoester moieties due to their high biocompatibility.[3,4] Therefore, we envisioned "crowded PIs", containing more than one photocleavable group per molecule. Compared to the industrially used benzophenone-amine photoinitiator system, the developed α-ketoesters show enhanced photoreactivity, monomer conversion and higher curing speed in (meth)acrylate formulations and (meth)acrylate-based hydrogels. Furthermore, the applicability of α-ketoesters for the highly selective and biocompatible thiol-ene photoconjugation is demonstrated, making the novel set of α-ketoester photoinitiators potential substituents for biomedical applications.

Acknowledgements

Funding by the Christian Doppler Research Association (Christian Doppler Laboratory for Advanced Polymers for Biomaterials and 3D Printing), the Austrian Federal Ministry for Digital and Economic Affairs and the National Foundation for Research, Technology and Development is gratefully acknowledged.

References

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