INVESTIGATION OF NOVEL LONG WAVELENGTH PHOTOINITIATORS FOR RADICAL POLYMERIZATION

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Photoinitiators (PI) for free radical polymerization have been modified using heteroatoms in the α-position to the benzoyl chromophore since the 1980s.[1] At that time, acylphosphine oxides were introduced, originally for an application in the coating industry.

Further investigations led to the discovery of Ge-based PIs, with diacylgermanes showing particularly good properties.[2] These molecules show the desired bathochromic shift in the absorption spectra, what enables the use of light with longer wavelength. This red-shifted light is important for enhancing the curing depth of formulations.

The current state-of-the-art PI is also located in the diacylgermane family with the trade name Ivocerin®. Additional advantages of Ivocerin® are thermal stability and low toxicity. Nevertheless, Ge-based PIs are higher in price compared to e.g. phosphorus based PIs, and therefore not for every application suitable. One way to overcome this disadvantage are Sn-based PIs, as this substance class is known to reach excellent bathochromic shifts in their absorbance as well as high reactivity.[3] The only drawback is the poor storage stability of the so far known Sn-based PIs.

In this work, novel Ge as well as Sn-based PI were successfully synthesized and photochemically investigated including UV/Vis measurements, photo-DSC measurements and steady state photolysis experiments in order to compare their photochemical properties as well as stability with literature known Sn-based PIs.

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