THIOXANTHONE BASED COMPOUNDS FOR PHOTOPOLYMERIZATION PROCESSES AND 3D PRINTING APPLICATION

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Thioxanthone-based compounds in combination with amines are described in the literature and have been widely used as photoinitiators for free radical polymerization, and less frequently for cationic polymerizations.

Novel thioxanthone-based compounds were synthesized and evaluated as a component of photoredox catalysts/photoinitiating systems for the free-radical polymerization (FRP) of acrylates and the ring-opening cationic polymerization (CP) of epoxy monomers. The performance of thioxanthone derivatives was investigated in two- and three-component photoinitiating systems, in combination with amines, iodonium or sulphonium salts, as well as with alkyl halide. What is more, studied compounds act also as one-component free-radical photoinitiators.

Photopolymerization processes were conducted upon exposure to light emitting diodes (LEDs) with a maximum emission of 405 nm and 420 nm. Fourier transform real-time infrared spectroscopy was used to monitor the kinetics of disappearance of the functional groups of the monomers during photoinitiated polymerization. The influence of thioxanthone skeleton substitution on photoinitiating effciency was studied and discussed.

Furthermore, a photopolymerizable formulations based on novel thioxanthone derivatives were used in a stereolithography three-dimensional (3D) printing technology under visible light [1].

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[1] E. Hola, M. Pilch, J. Ortyl, Catalysts, 2020, 10(8), 903-930