Relation between photochemical properties of oxime esters and their efficiency as photoinitiators for free radical induced photopolymerization

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In recent years, oxime esters are of growing interest as Type I photoiniators thanks to their high efficiency in radical photopolymerization. Several structures have been proposed by varying the chromophoric group or the oxime ester substituent in order to improve the initiation properties.
In this paper, the relation between the structure, photophysical and photochemical properties, reactivity, and efficiency in photopolymerizeation processes of four commercial oxime esters has been studied. Their absorption properties were investigated using UV-Vis spectroscopy and fluorimetry. They were correlated to the molecule structures and electronic transitions thanks to density functional theory (DFT) calculations. The understanding of the reaction pathway was supported by photolysis experiments. Finally, photoinitiator efficiency was studied in photopolymerization by real time Fourier transform infrared (RT-FTIR) experiments and the results were related to the photochemical properties.

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