Synthesis and Characterization of Novel Photoinitiators based on Tetraacylgermanes

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Additive manufacturing (AM), also known as 3D printing, is gaining more and more relevance in everyday life since it was introduced in the late 1980s.[1] One technique is lithography based ceramic manufacturing (LCM), where a photopolymerizable formulation highly filled with ceramic particles is 3D printed in a layer by layer fashion to receive a customized object optional with high shape complexity.

An important component in highly filled formulations is the photoinitiator (PI), as it is determining the layer thickness during the printing process. Therefore, tetraacylgermanes are auspicious candidates, as they are known to show absorption at wavelengths above 460 nm and additionally high reactivity towards (meth)acrylates.[2]

We synthesized two novel tetraacylgermanes with methoxy groups in ortho position of the aromatic moiety and investigated their reactivity compared to reference substances without these substitution pattern and to Ivocerin®. In order to determine the performance of these photoinitiators, steady-state photolysis (SSP) experiments and RT-FTIR photorheology measurements were performed. Comparable strong absorption at longer wavelengths and high photoreactivity has been found for the novel compounds.

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