THE FUTURE OF PHOTOINITIATORS IN THE 21TH CENTURY

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Currently there are many concerns regarding the toxicity and mutagenicity of certain very frequently used photoinitiators. Some benzophenones and acylphosphine oxides, to name only a few, a currently more or the less banned from the market and there is a huge hunt to find good substitutes.

Very recently, we have shown that aliphatic a-keto esters could be a good substitute, however limited reactivity and oxygen inhibition avoided broader use. Now we have identified so called "Crowded photoinitiators", as a suitable alternative, that are able to compete with classical Type I initiators.

Long wavelength absorption is frequently also highly important, especially when it comes to pigmented formulations or for composites like in the dental field. Acyl tin compounds are highly interesting due to their long wavelength absorption and also surprisingly low toxicity but suffer from poor storage stability. Having the right substitution pattern allows now not only an absorption well beyond 550 nm, but also excellent storage stability, high reactivity, perfect photo-bleaching at an reasonable price.

While radical and cationic photoinitiators can be frequently found in industry, latent photo-bases suffer from a sleeping beauty sleep. Besides that, thiol ene photopolymerization is gaining more and more interest, thanks to the pioneering work of Hoyle and Bowman. While outstanding mechanical properties are a huge benefit, the sometimes bad odour and poor storage stability are an issue. The question is if alcohols are able to substitute those thiols. The answer is yes, with the right photo-latent base.