NEW PHOTOSENSITIVE RESINS @405 nm: APPLICATIONS TO 3D PRINTING

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ABSTRACT

The field of 3D printing is today a hot topic. The development of new resins more efficient for such applications is today a real challenge. To this purpose, photosensitive systems are the key point to develop new high performance 3D printing system. The photopolymerization allows the transformation of multifunctional monomer or prepolymer into highly crosslinked networks by action of light. According to the literature, photopolymerization of (meth)acrylate or epoxy monomers usually requires UV-curing. As UV wavelengths are known to be noxious, the development of new free radical initiating systems upon longer (safer) wavelengths irradiation such as 405 nm is crucial.

NEW PHOTOSENSITIZERS

New 1,8-Napthalimide derivatives

ADDITIVES AND MONOMER

MECHANISM

Phenyl radicals are detected

Figure 1. ESR spectra of Ph1+ trapped by PBN (λ = 405 nm in 28uL Ph) exp. (black) and sim. spectra (red)2)

CONCLUSION AND PERSPECTIVES

-Interesting light absorption properties in the near-UV range
- Very good conversions obtained
- Fast photopolymerization upon safe irradiation conditions (faster for polymerization of larger objects)
- Compatibility with Sharebot 3D printer @405 nm (Photo 1)
- Measure of spatial resolution (in progress) (Photo 2)
- Acknowledgments: Sharebot for the 3D printer

REFERENCES