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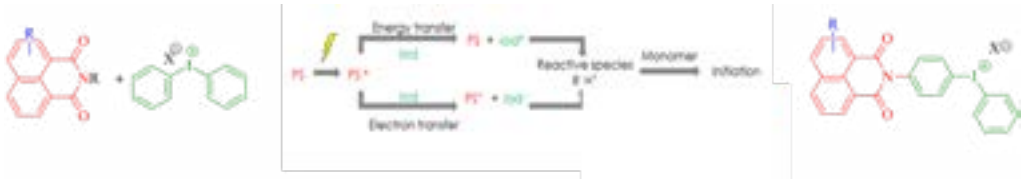
Iodonium based photoinitiators: Towards simplified photocurable formulations

Light induced cationic polymerization (CP) and free radical polymerization (FRP) reactions in the presence of a photoinitiator (PI) have been largely encountered for a long time in the radiation curing area. Today, due to their decisive advantages (low heat generation, low energy consumption, low operating costs, less maintenance, long life, portability, compact design, easy and safe handling, possible incorporation in robots or 3D printers, etc.), many developments are related to the use of Light Emitting Diode (LED) arrangements as excitation sources instead of the traditional mercury lamps or even lasers. Particularly, applications in the violet spectral range require LEDs operating at 365, 385, 395 or 405 nm. One of the key points is still the matching between the PI absorption and the LED emission spectrum. This condition is easily fulfilled with a lot of radical PIs. Diaryliodonium and triarylsulfonium salts and others have been extensively studied as PIs. However, the starting structures are characterized by an absorption in the UV region (230-300 nm). The design of novel high-performance cationic PIs directly adapted to violet or visible LED irradiation is still challenging. Here, we present a novel photosensitive iodonium salt resulting from a coupling between naphthalimide and diphenyliodonium moieties being able to work under LED exposure at 365, 385 and 395 nm without any additive and to initiate the cationic polymerization of diepoxides, divinylethers as well as diepoxide/divinyether blends and also the FRP of methacrylates.



Biography

Frederic Dumur has completed his PhD from Angers University (France) in 2002. From 2003 to 2008, he was successively a Postdoctoral Fellow in the group of Professor Ben L Feringa (2003-2005). Since 2008, he is an Associate Professor at the Institute of Radical Chemistry of Aix Marseille University, France. He has published more than 180 papers in international journals. He is specialized in the design of organocatalysts and metal complexes as photoinitiators of polymerization under soft irradiation conditions. He is mainly interested in researching of resins.

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