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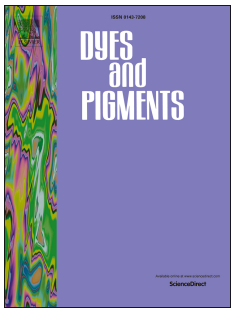

Conjugated dyes carrying N, N*N, N*-dialkylamino and ketone groups: One-component visible light Norrish type II photoinitiators

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Conjugated dyes carrying N, N-dialkylamino and ketone groups: one-component visible light Norrish type II photoinitiators

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Abstract

This work presents new conjugated dyes carrying N, N-dialkylamino and ketone groups for using as one-component Norrish type II visible light photoinitiators. The novel dyes without ketone group were also synthesized to compose two-component visible light photoinitiators for comparisons. The target dyes show the remarkable absorption in visible light region. Photo-differential scanning calorimetry was employed to study visible light photoinitiating polymerization kinetics of methyl methacrylate by new one-component photoinitiators and two-component photoinitiators respectively. The results suggest that the one-component photoinitiators showed much more efficient photoinitiating polymerization of methyl methacrylate than the two-component photoinitiating systems under visible light irradiation. The molecular weight of visible light photopolymer produced by the new photoinitiators was determined. The visible light photoinitiating mechanism of the one-component photoinitiators was studied by absorption and emission spectra, electron spin resonance spectra and cyclic voltammograms analysis.

Keywords: Norrish type II photoinitiator; Visible light phtotopolymerization; Photopolymerization kinetics; Free radical; Electron transfer; Acrylate monomers

1. Introduction