

Supplementary Materials:

Free radical photopolymerization and 3D printing using newly developed dyes: indane-1,3-dione and 1*H*-cyclopenta naphthalene-1,3-dione derivatives as photoinitiators in three-component systems

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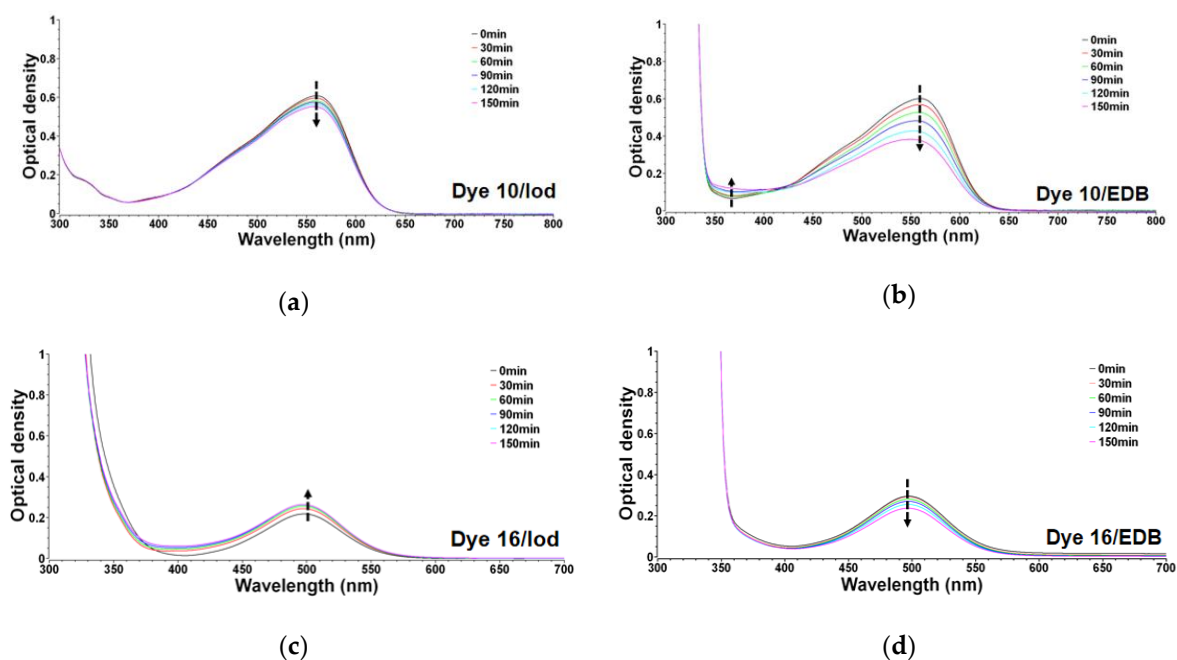
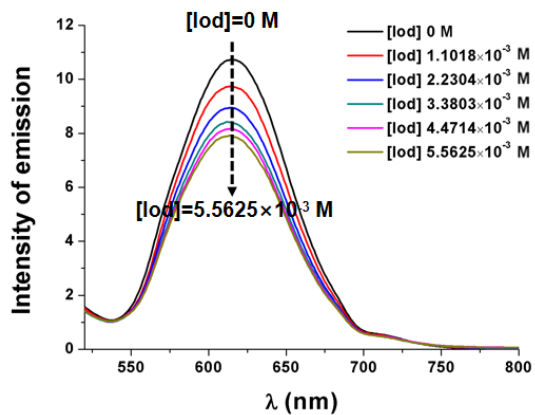
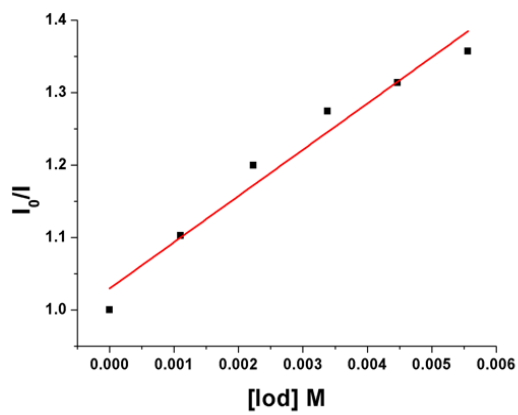


Figure S1. UV-vis absorption spectra of dyes 10, 16 ($9.31 \times 10^{-6} \text{M}$; $6.46 \times 10^{-6} \text{M}$, respectively.) (left) in the presence of Iodonium salt (Speedcure 938, $1.46 \times 10^{-4} \text{M}$) upon exposure to LED@405nm under air in the solvent of acetonitrile: (a) dye 5, (c) dye 17 and (right) in the presence of amine (Speedcure EDB, $4.07 \times 10^{-4} \text{M}$) upon exposure to LED@405nm under air in the solvent of acetonitrile: (c) dye 5, (d) dye 17.

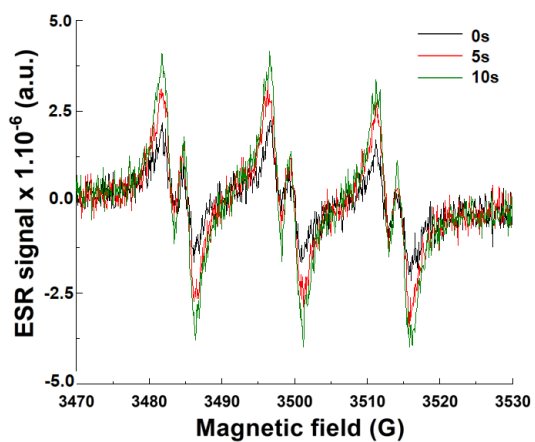


(a)

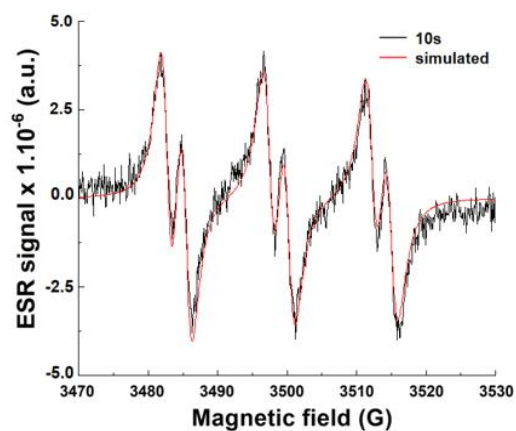


(b)

Figure S2. (a) Fluorescence quenching of dye 16 by Iodonium salt; (b) Stern–Volmer treatment for the dye 16/Iodonium salt fluorescence quenching.



(a)

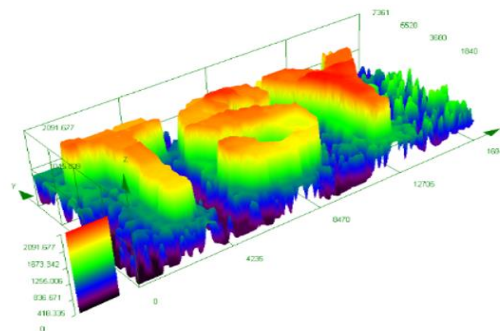


(b)

Figure S3. ESR spectra obtained from ESR-spin trapping experiment using PBN = 2 mg/mL (as spin trap agent); Iodonium salt (Speedcure 938) and amine (Speedcure EDB)= 12.6 mg/mL and dye 17= 0.8 mg/mL in acetonitrile under N_2 : **(a)** dye 17/Iod/amine, Irradiation time =10s (green), =5s (red) and =0s (black) spectra; **(b)** dye 17/Iod/amine, Irradiation time =100s (black) and simulated (red) spectra.



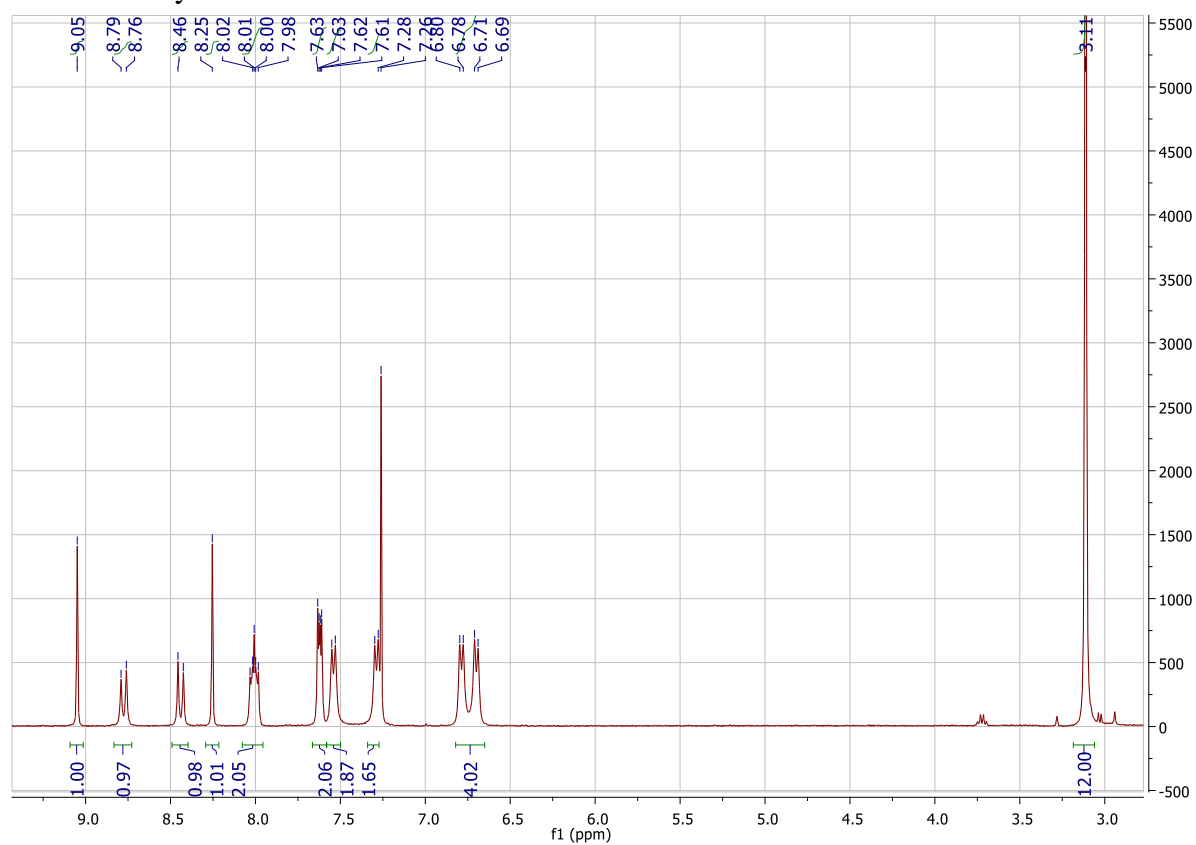
(a)



(b)

Figure S4. Free radical photopolymerization experiments for laser write experiments for dye 17/Iod/amine (0.1%/2%/2% w/w/w) three-component photoinitiating system in Ebecryl 40. Characterization of the 3D patterns by numerical optical microscopy: **(a)** top surface morphology **(b)** 3-D overall appearance of the 3D patterns.

^1H NMR of dye 21



^{13}C NMR of dye 21

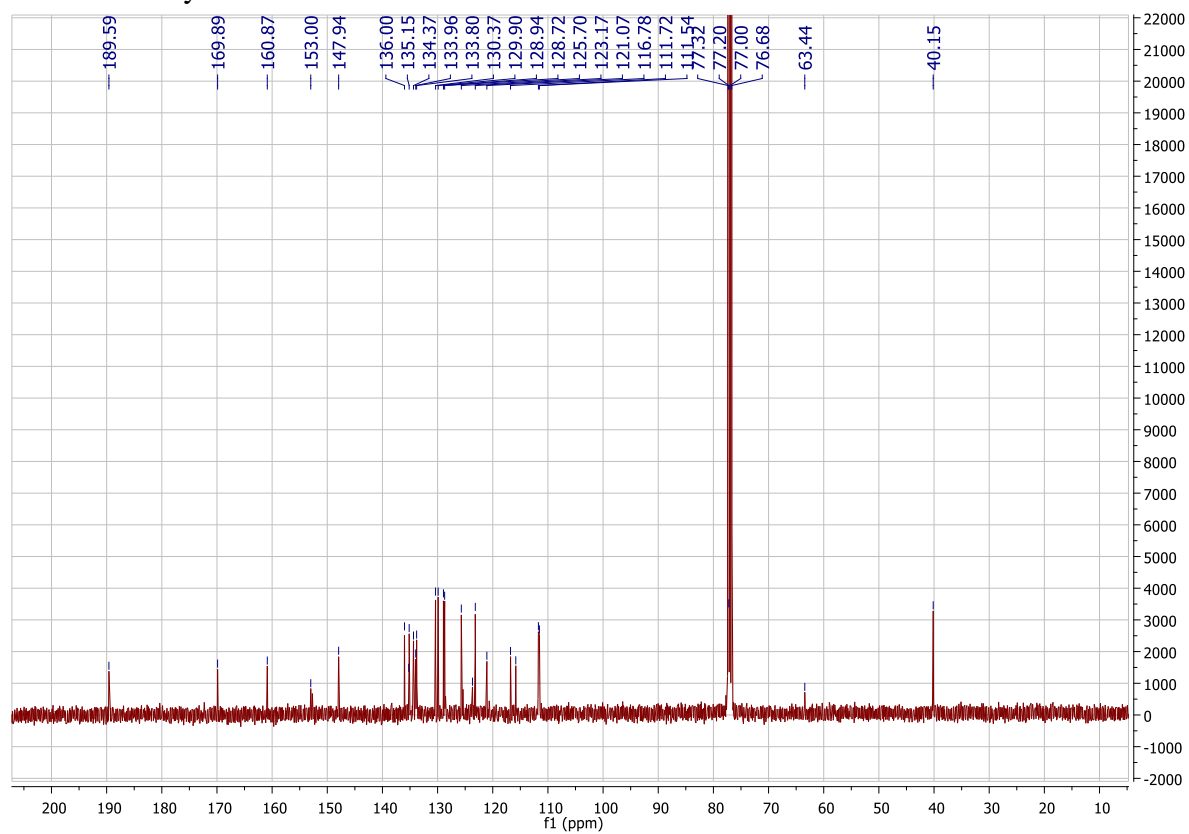


Figure S5. ^1H and ^{13}C NMR spectra of dye 21.