

Supporting Information

Dihydroxyanthraquinone Derivatives: Natural Dyes as Blue-Light-Sensitive Versatile Photoinitiators of Photopolymerization

Jing Zhang[‡], Jacques Lalevée[†], Jiacheng Zhao[‡], Bernadette Graff[†], Martina H. Stenzel^{‡, *}, and Pu Xiao^{‡, *}

[‡]Centre for Advanced Macromolecular Design, School of Chemistry, University of New South Wales, Sydney, NSW 2052, Australia.

[†]Institut de Science des Matériaux de Mulhouse IS2M, UMR CNRS 7361, ENSCMu-UHA, 15, rue Jean Starcky, 68057 Mulhouse Cedex, France.

Corresponding Authors: m.stenzel@unsw.edu.au; p.xiao@unsw.edu.au

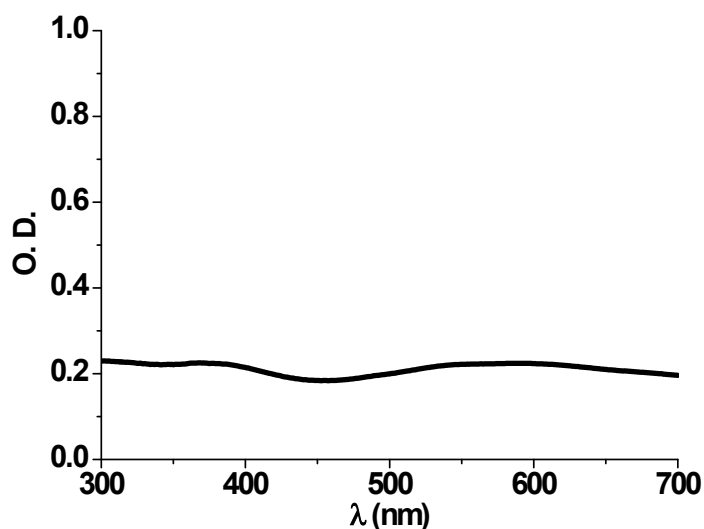


Figure S1. UV-vis absorption of 12-DHAQ in acetonitrile ([12-DHAQ] = 0.016 mM).

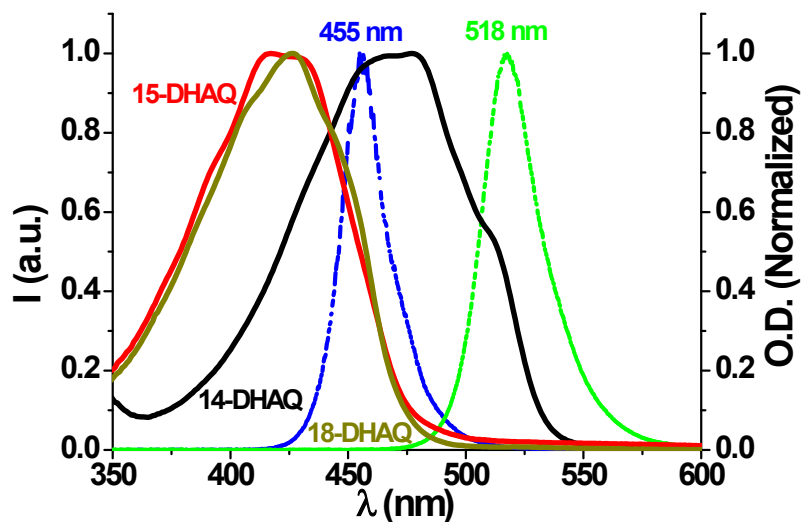


Figure S2. Emission spectra of blue (455 nm) and green (518 nm) LED bulbs, and their overlap with the absorption spectra of 14-DHAQ, 15-DHAQ and 18-DHAQ.

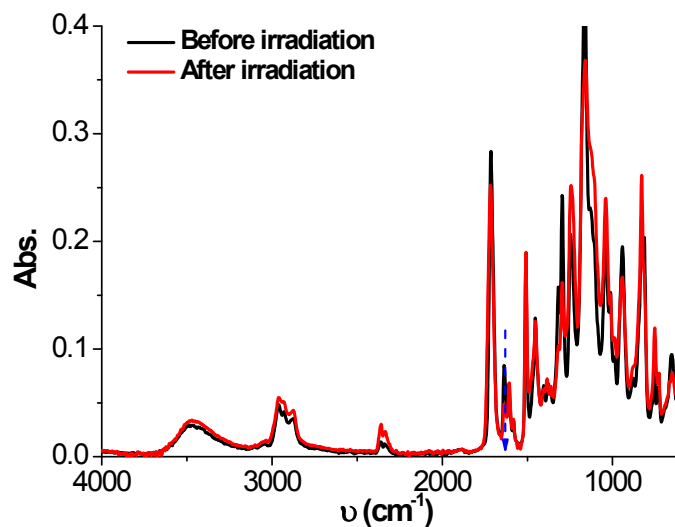


Figure S3. ATR-IR spectra recorded before and after the photopolymerization of Bis-GMA/TEGDMA (70%/30%, w/w) blend in the presence of 18-DHAQ/Iod/NVK (0.5%/2%/3%, wt) in laminate upon exposure to the household blue LED bulb (455 nm). The IR band of the vinyl group is observed at $\sim 1635 \text{ cm}^{-1}$.

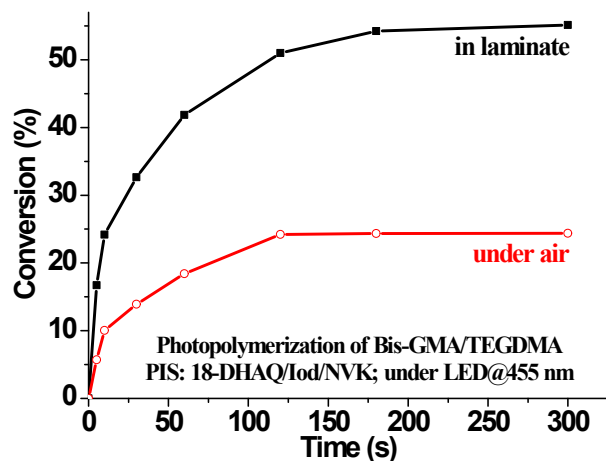


Figure S4. Photopolymerization profiles of Bis-GMA/TEGDMA blend (70%/30%, w/w) in laminate or under air in the presence of 18-DHAQ/Iod/NVK (0.5%/2%/3%, wt%) upon exposure to the blue LED@455 nm.

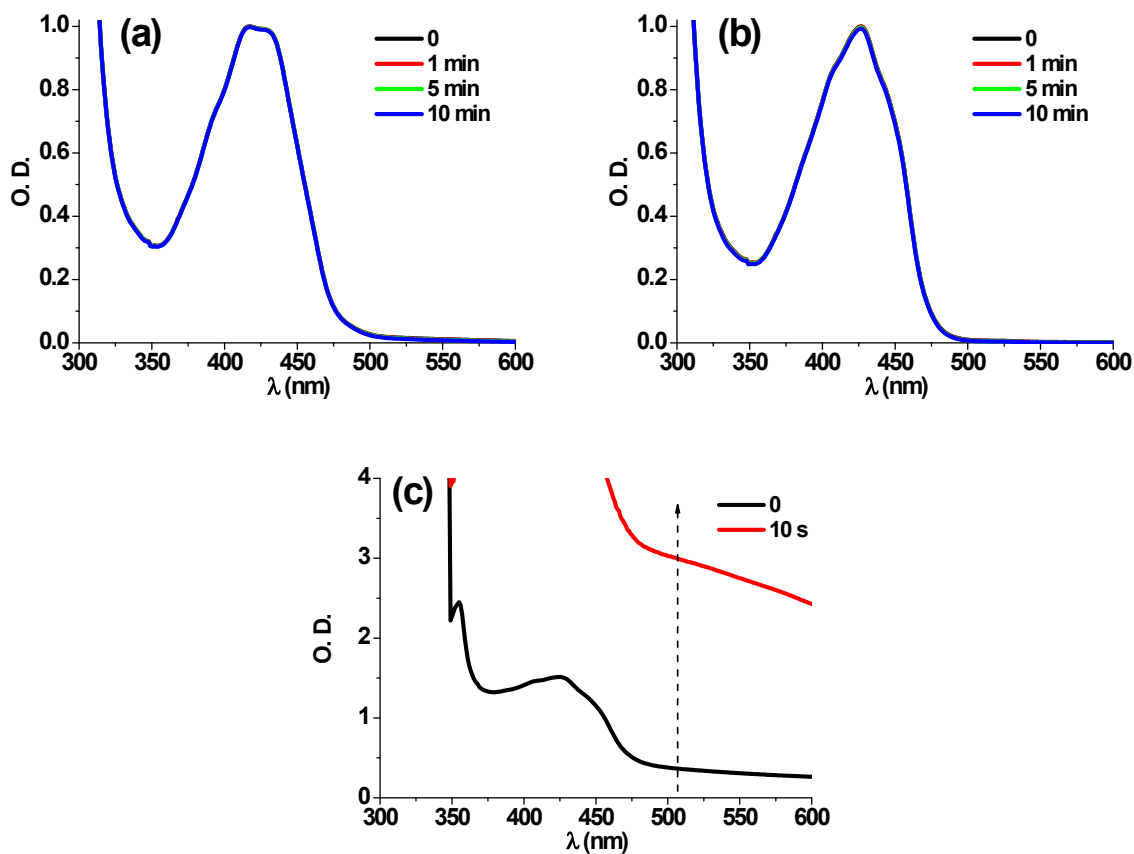


Figure S5. Steady state photolysis of (a) 15-DHAQ/Iod, (b) 18-DHAQ/Iod and (c) 18-DHAQ/Iod/NVK in acetonitrile ([Iod] = 20 mM; [NVK] = 40 mM) under irradiation of blue LED@455 nm; UV-vis spectra recorded at different irradiation time.

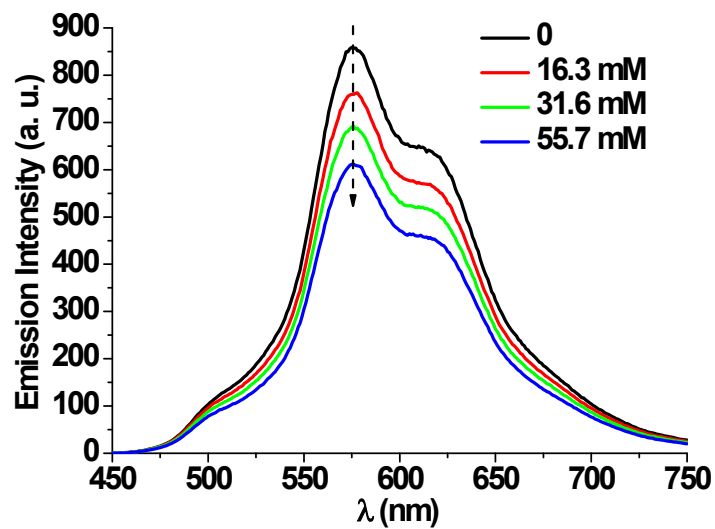


Figure S6. Fluorescence quenching of 15-DHAQ by TEAOH in acetonitrile.

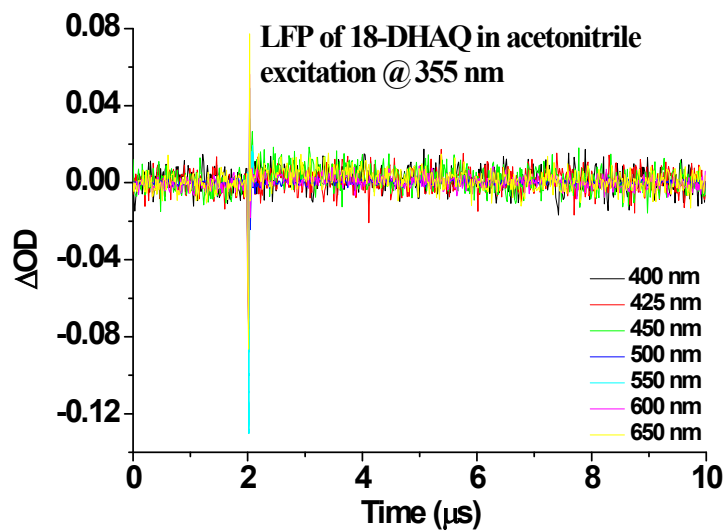


Figure S7. Laser flash photolysis of 18-DHAQ in acetonitrile as monitored at different wavelength immediately after the laser excitation at 355 nm.

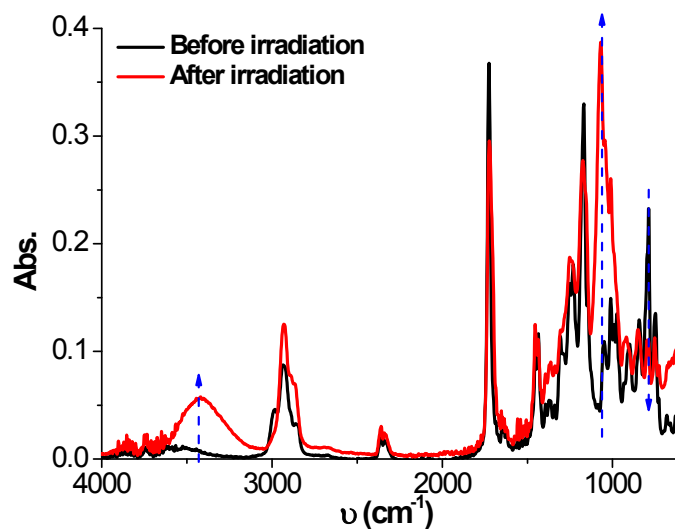


Figure S8. ATR-IR spectra recorded before and after the photopolymerization of EPOX in the presence of 18-DHAQ/Iod/NVK (0.5%/2%/3%, wt) under air upon exposure to the household blue LED bulb (455 nm). The IR bands of the epoxy, polyether, and hydroxyl group are observed at $\sim 790 \text{ cm}^{-1}$, $\sim 1070 \text{ cm}^{-1}$, and $\sim 3430 \text{ cm}^{-1}$, respectively.