Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C

Supporting Information

Single Component Photoacid/Photobase Generators: Potential Applications in Double Patterning Photolithography

Geniece L. Hallett-Tapley,[a‡] Tse-Luen (Erika) Wee,[a‡] Hoang Tran,[b] Shankar B. Rananavare,[b] James M. Blackwell[c] and Juan C. Scaiano[a]*

[a]*Department of Chemistry, University of Ottawa, 10 Marie Curie, Ottawa, ON, K1N 6N5, Canada*

[b]*Department of Chemistry, Portland State University, 1719 SW 10th Avenue, Portland, OR, 97207, USA*

[c]*Components Research, Intel Corporation, 2511 NW 229th Avenue, Hillsboro, OR, 97124, USA*

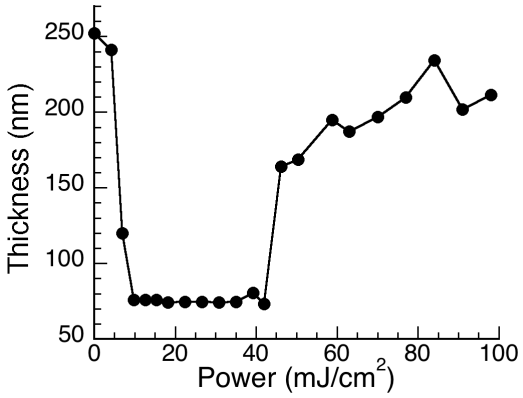

Figure S1. Contrast curve thickness measurements of 5% w/w DupD01 polymer resists containing 2.5 mM 4NSI following 193 nm laser excitation and film development.

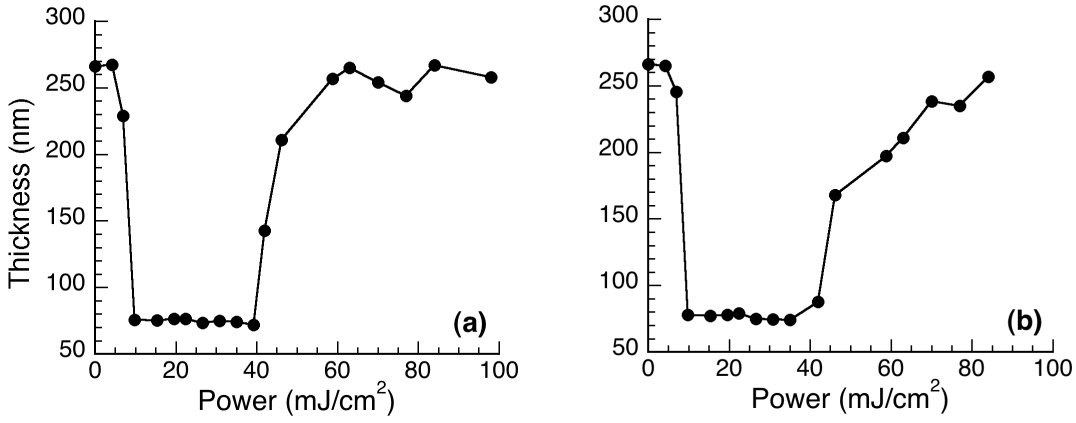

Figure S2. Contrast curve thickness measurements of 5% w/w DupD01 polymer resists containing 2.5 mM 4NSI and (a) 10 mol% TOA and (b) 10 mol% HDA amine quenchers.

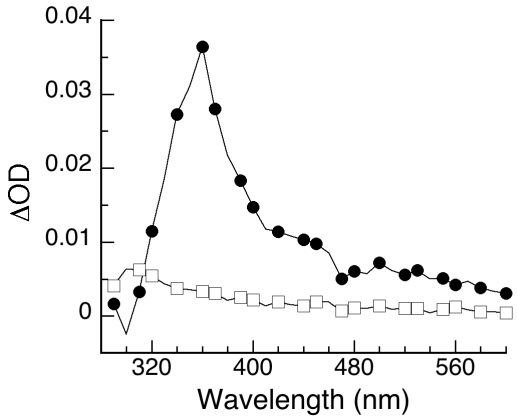

Figure S3. Transient absorption spectra generated 0.56 ms after 266 nm irradiation of 0.87 mM 4NSS in N_2 (●) and O_2 (□) saturated CH_3CN.

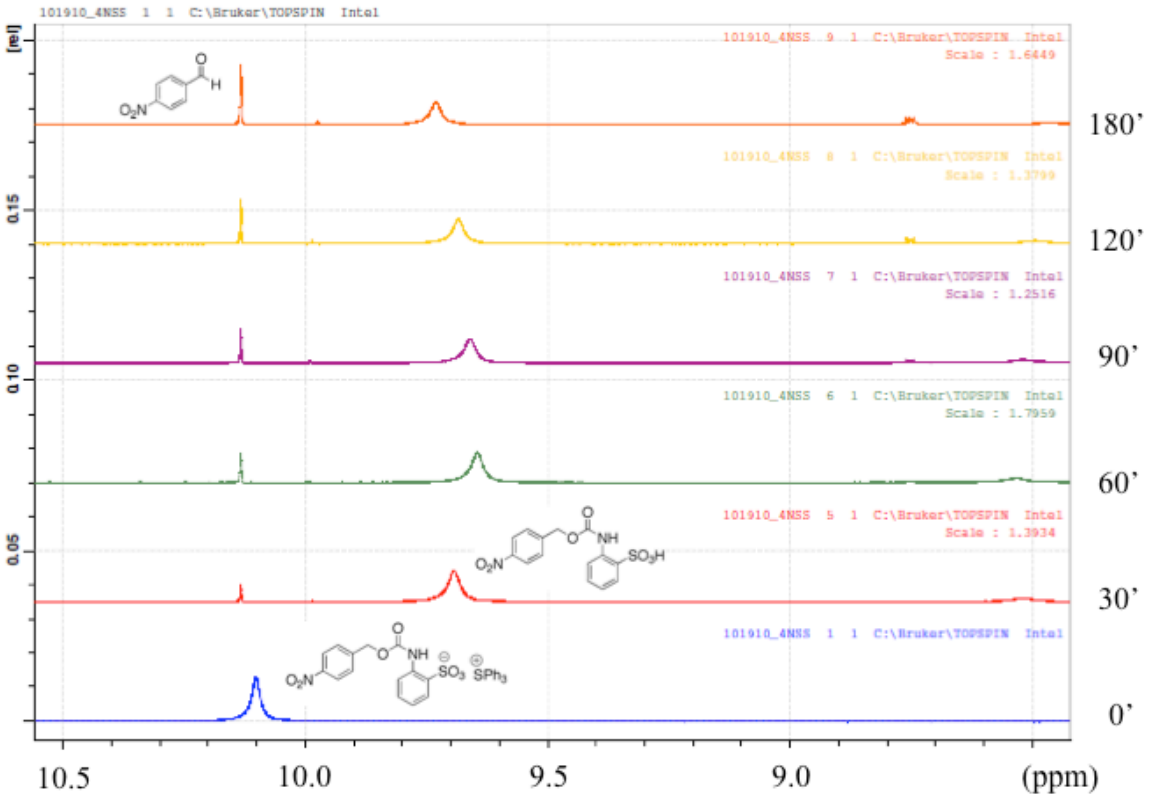

Figure S4. ^1H NMR spectra of an irradiated (λ_{max} = 254 nm) 5 mM 4NSS in CD_3CN under atmospheric conditions illustrating the formation of both the photoacid and 4-nitrobenzaldehyde as photoproducts.

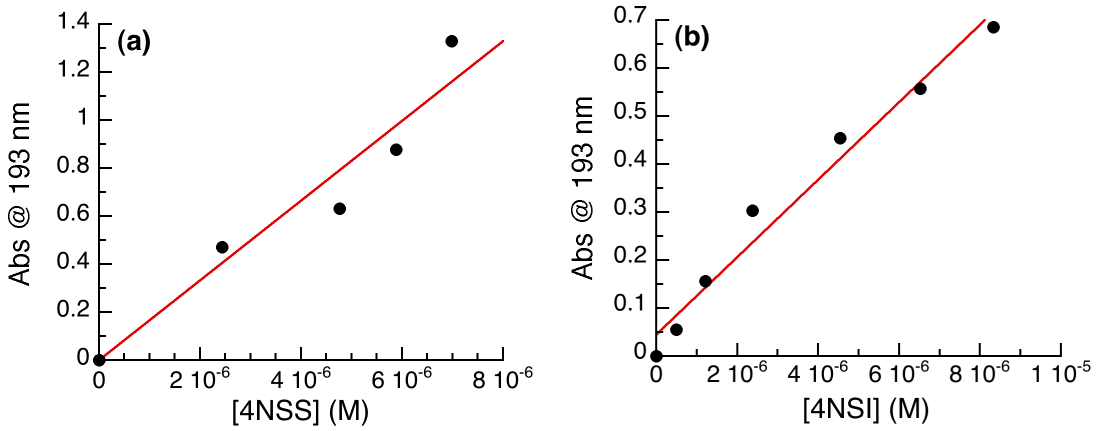

Figure S5. Calibration curves used to determine the extinction coefficients of (a) 4NSS and (b) 4NSI at 193 nm.

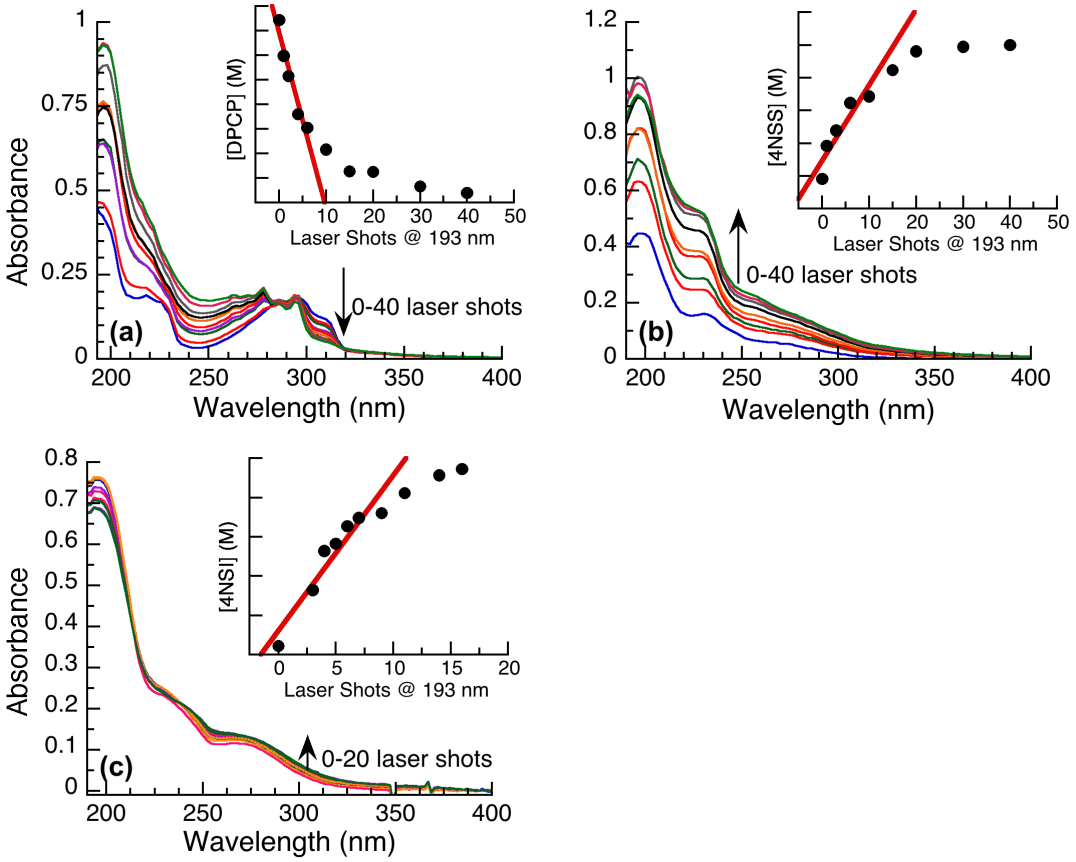

Figure S6. Plots of absorbance versus laser dose for (a) DPCP actinometer, (b) 4NSS and (c) 4NSI. Insets show the decay or growth of the molecule as a function of increasing 193 nm laser exposure. The linear fit in red indicates the values used to extract the approximate rate constants for decay or growth used for calculating the approximate quantum yield of photoacid formation as described in the text.

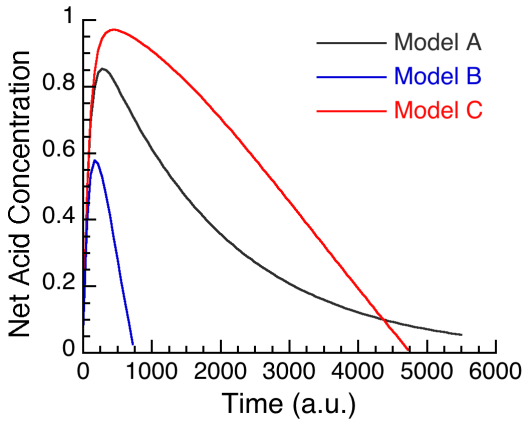

Figure S7. Two-dimensional representation of net acid concentration as a function of time ([PBG]:[PAG] = 3)