Supporting Information

Selective Oxygenation of Ring-Substituted Toluenes with Electron Donating and Withdrawing Substituents by Molecular Oxygen via Photoinduced Electron Transfer

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Figure S1. Stern-Volmer plots for the fluorescence quenching of 1,2,4,5-tetracyanobenzene (○), tetrafluoro-\(p\)-dicyanobenzene (△), tetrafluoro-\(o\)-dicyanobenzene (□), tetrafluoro-\(m\)-dicyanobenzene (●) and 1,4-dicyanobenzene (▲) by \(p\)-tolunitrile in MeCN at 298 K.
**Figure S2.** Transient absorption spectra observed by photoexcitation of the argon- (○), air- (△) and oxygen- (●) saturated CHCl₃ solutions of AcrPh⁺ (1.0 x 10⁻⁴ M) and p-xylene (1.0 x 10⁻¹ M) at 1.0 µs after laser excitation at 298 K.
**Figure S3.** Decay time profile of absorbance at 500 nm observed by photoexcitation of an argon-saturated CHCl₃ solution of AcrPh⁺ (1.0 × 10⁻⁴ M) and p-xylene (1.0 × 10⁻¹ M) at 298 K. Inset; second-order plot.
Figure S4. Stern-Volmer plots for the fluorescence quenching of AcrPh$^+$ ($1.0 \times 10^{-5}$ M) by $p$-xylene ($\bigcirc$), $m$-xylene ($\triangle$) and $o$-xylene ($\square$) in MeCN at 298 K.
Figure S5. Dependence of the yield of $p$-tolualdehyde on irradiation time for the photooxygenation of $p$-xylene catalyzed by (1.0 x 10^{-2} \text{ M}) in oxygen-saturated CHCl$_3$ ($\triangle$) and MeCN (○) determined by $^1$H NMR spectroscopy.