Electronic Supplementary Material (ESI) for Nanoscale.

Supporting Information

Electron Transfer Mediation by Aqueous C_{60} Aggregates in H_2O_2/UV Advanced Oxidation of Indigo Carmine

Ling Ge[1], Kyle Moor[2], Bo Zhang[1], Yiliang He[1], Jae-Hong Kim[2]

[1]School of Environmental Science and Engineering, Shanghai Jiao Tong University, No. 800 Dongchuan Road,Minhang District, Shanghai, 200240, China

[2]Department of Chemical and Environmental Engineering, Yale University, New Haven, CT 06510, USA

S1. Structure and absorption spectrum of indigo carmine (IC).

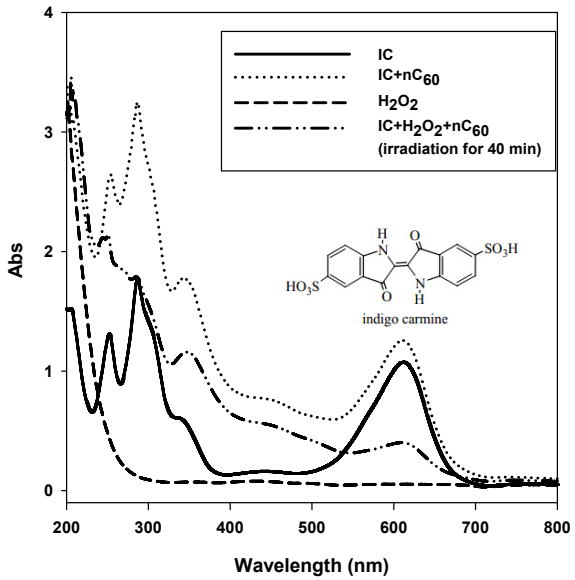

Figure S1. Chemical structure and absorption spectra of indigo carmine with and without nC_{60} and H_2O_2.

S2. nC_{60} size determination by AF4-MALS. An analytical platform coupling asymmetric flow field flow fractionation (AF4, WyattTechnology Corporation, Santa Barbara, CA, USA) with multiangle light scattering (MALS) was established and used to determine the size variation of nC_{60} nanoparticles before and after photoreaction. Data from the light scattering detectors were processed using ASTRA V software (version 5.3.2.15, Wyatt Technology Corporation, Santa Barbara, CA, USA). The trapezoidal AF4 channelwas 27.5 cm long from tip to tip with tapered inlets and outlets. Fractionation was accomplished using a 350μm spacer and 5kD a polyethersulfone membrane. The AF4 elution program consisted of a 2 min elution and focusing process, followed by a 6 min injection and focusing period in which the tip flow was 0.5 mL/min. Next, the cross flow was set to decrease linearly from 0.9 to 0 mL/min over 40 min, while the detector flow was held constant at 1 mL/min. The cross flow remained at 0 mL/min for an additional 10 min to clear and balance the system. The total number of nC_{60} before and after IC degradation remained nearly unchanged, with 5.03×10^9 and 5.54×10^9 nC_{60} particles before and after photoreaction, respectively (Fig. S2).

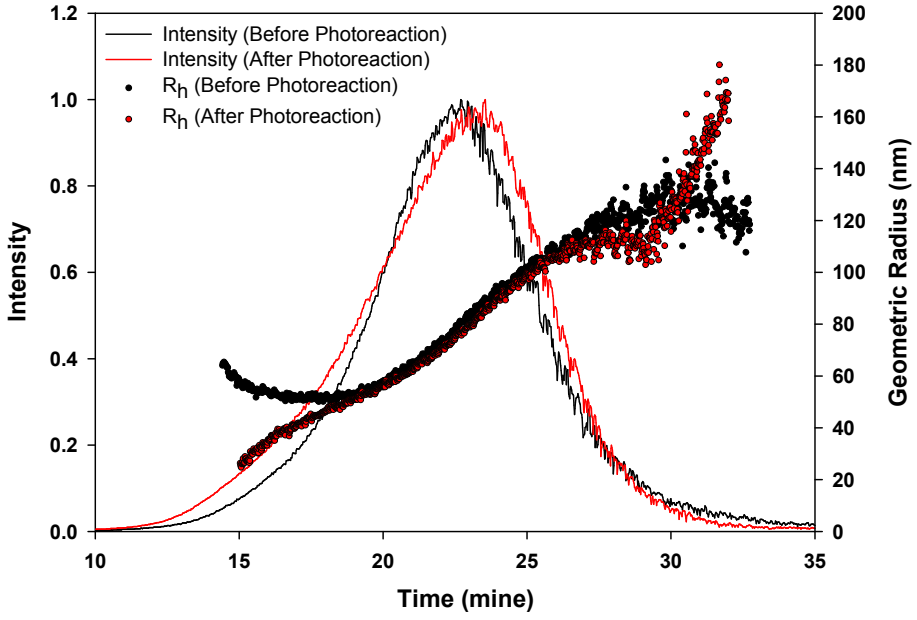

Fig. S2 Intensity of scattered light and aggregate size distribution as a function of time for nC_{60} before and after IC photoreaction.

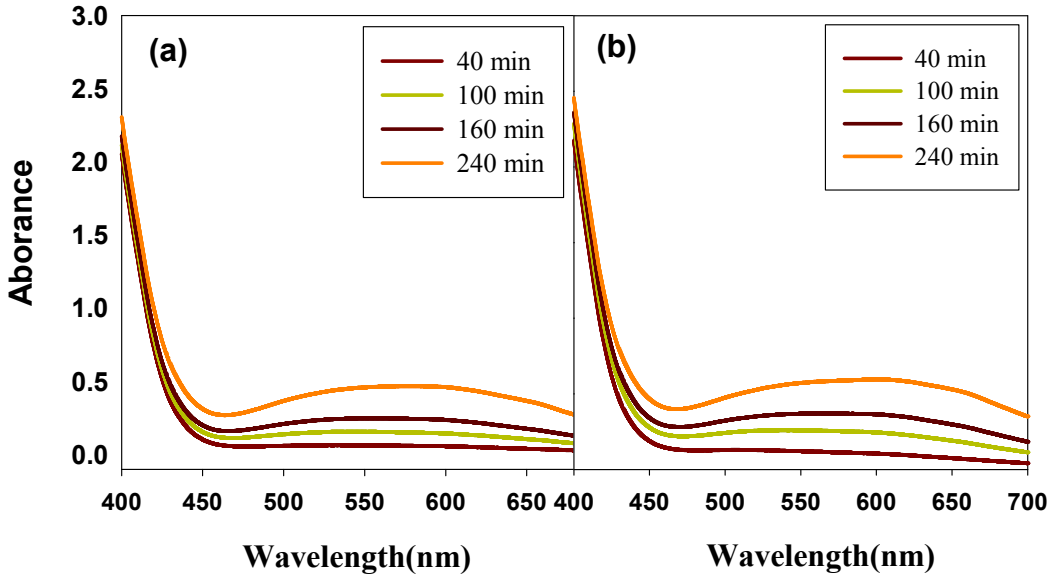

Fig. S3 UV-vis absorption spectra of removed reactor aliquots as a function of time under UV illumination for various solutions. (a) TEA+NBT+nC_{60}, (b) NBT+H_2O_2+nC_{60}.

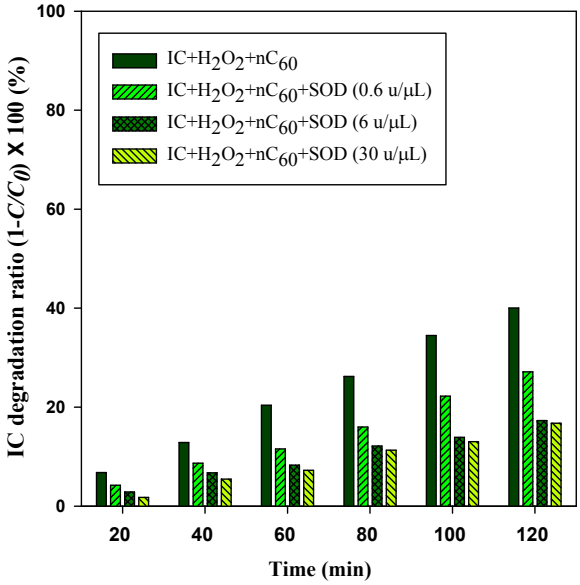

Fig. S4 IC degradation ratio (1-C/C_o) as a function of UV irradiation time for various concentrations of SOD addition.