

Electronic supplementary information for
Influence of light wavelength on the photoactivity, physicochemical
transformation, and fate of graphene oxide in aqueous media

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Batch adsorption experiment

The batch adsorption experiments were conducted as follows: 20 mL of GO samples (25 mg/L GO colloidal solution, pH = 7) were filled into an 60 mL EPA bottle, then a certain volume of pollutants was injected into the EPA bottle with a micro syringe, to give a range of concentrations of 1 ~ 300 $\mu\text{g/L}$. The sample tubes were sealed with open-top caps lined with gastight PTFE septa, and mixed on the rotary mixer (XH-2T, Shanghai QiangYun Technology Co., Ltd., China) for 7 days in dark, so that the pollutant in the aqueous phase could reach equilibrium with the adsorbent. The adsorbent is composed of glass optical fibers coated with polyacrylate, which were purchased from Polymicro Technologies (Phoenix, AZ). After adsorption equilibrium, a 3 cm fiber was placed inside the bottle and then rotated sealed for 30 days, after which the pollutants reached distribution equilibrium between the fiber and water phase. The fibers were then removed, cut into 4-6 segments, and then a certain volume of methanol was added to fill 2 mL, 16 ml and 20 ml EPA vials. After closing the seal, the vials were vortex oscillated for 10 s, and finally allowed to stand overnight. The fiber was fully immersed in methanol during this time. After the fiber reached equilibrium with the pollutant in methanol, the concentration of pollutants were determined using the Waters e2695 HPLC connected to a Waters 2475 fluorescence detector. The concentration of pollutants in the aqueous phase was calculated by the distribution of contaminants in fiber and water phase.

Table S1. Binding energy and FWHM of GOs

Sample	C-C/ C=C		C-OH/C-O-C		C=O		O-C=O	
	Binding energy (eV)	FWHM (eV)	Binding energy (eV)	FWHM (eV)	Binding energy (eV)	FWHM (eV)	Binding energy (eV)	FWHM (eV)
GO	284.52	1.54	286.62	1.52	287.82	1.51	288.82	1.52
GO _{full}	284.59	1.56	286.59	1.56	287.80	1.54	288.83	1.54
GO _{UV}	284.57	1.53	286.58	1.54	287.84	1.56	288.84	1.56
GO _{vis}	284.55	1.57	286.59	1.56	287.84	1.56	288.84	1.56

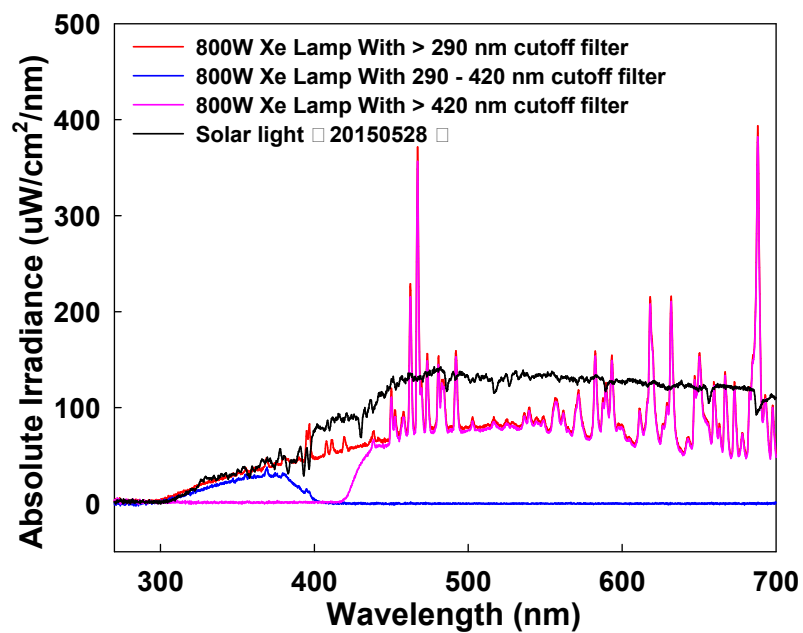


Fig. S1 A comparison of the solar spectra with the spectral distribution of different light fractions produced by filtering the irradiation produced from an 800 W xenon lamp.

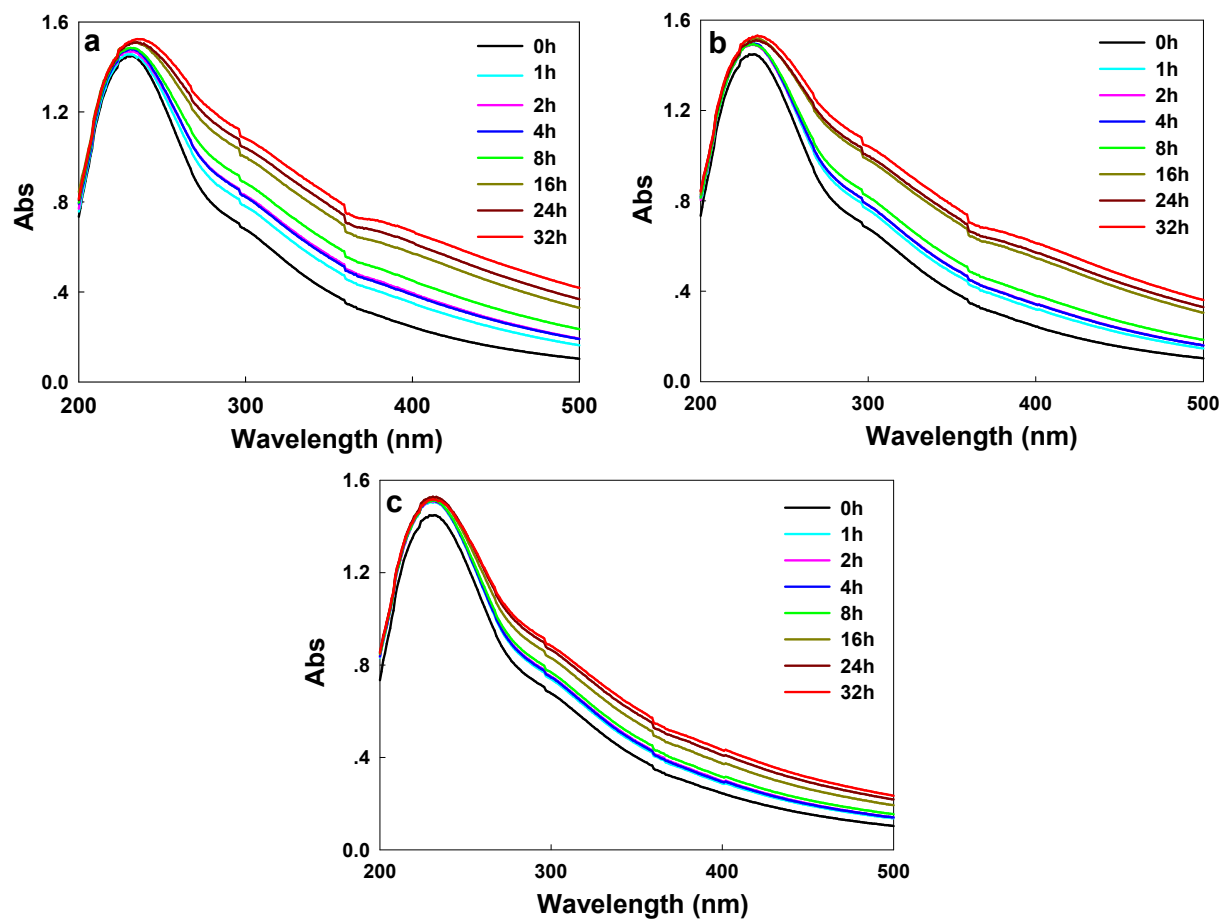


Fig. S2 UV-visible absorption time-series spectra of graphene oxide suspension irradiated with (a) full solar spectrum (GO_{full}), (b) UV (GO_{UV}), and (c) visible light (GO_{vis}).

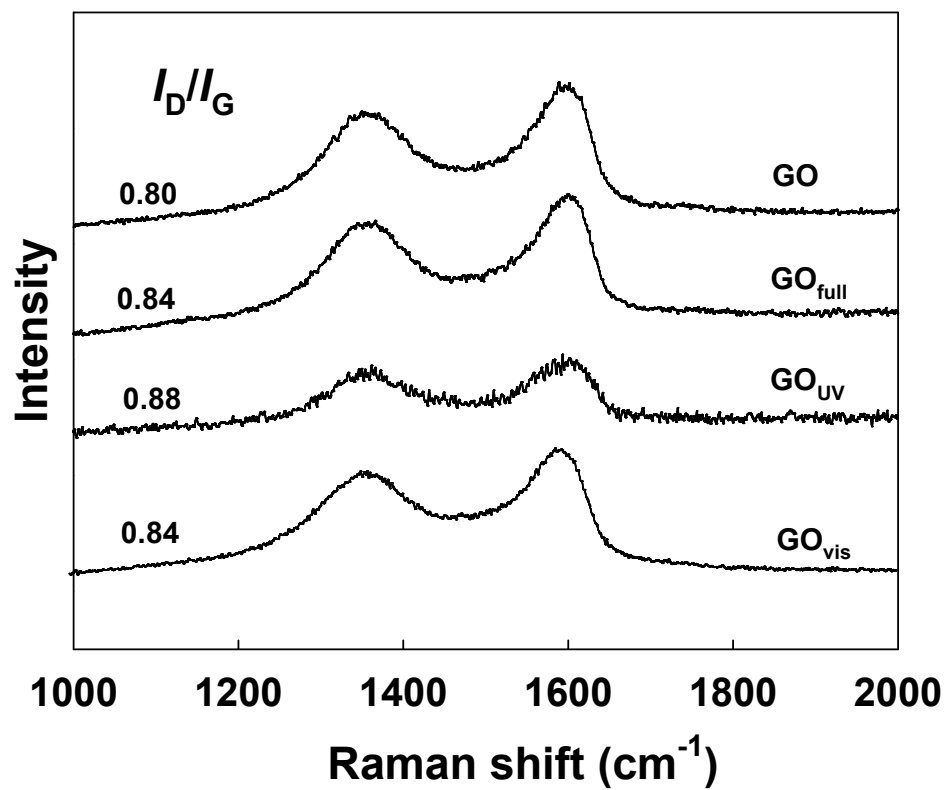


Fig. S3 Raman spectra of pristine graphene oxide (GO) and graphene oxide irradiated for 24 h with full solar spectrum (GO_{full}), UV (GO_{UV}), and visible light (GO_{vis}).



Fig. S4 Appearance of (a) pristine GO, (b) GO exposed to full solar spectrum (GO_{full}), (c) GO exposed to UV light (GO_{UV}), and (d) GO exposed to visible light (GO_{vis}).



Fig. S5 Color change of GO with different light irradiation, (1-8) correspond to GO that was irradiated with simulated sunlight (GO_{full}) for 0, 1, 2, 4, 8, 16, 24 and 32 h. (9-16) correspond to GO irradiated with UV light (GO_{UV}) for 0, 1, 2, 4, 8, 16, 24 and 32 h. (17-24) correspond to pristine GO that was irradiated with visible light (GO_{vis}) for 0, 1, 2, 4, 8, 16, 24 and 32 h.

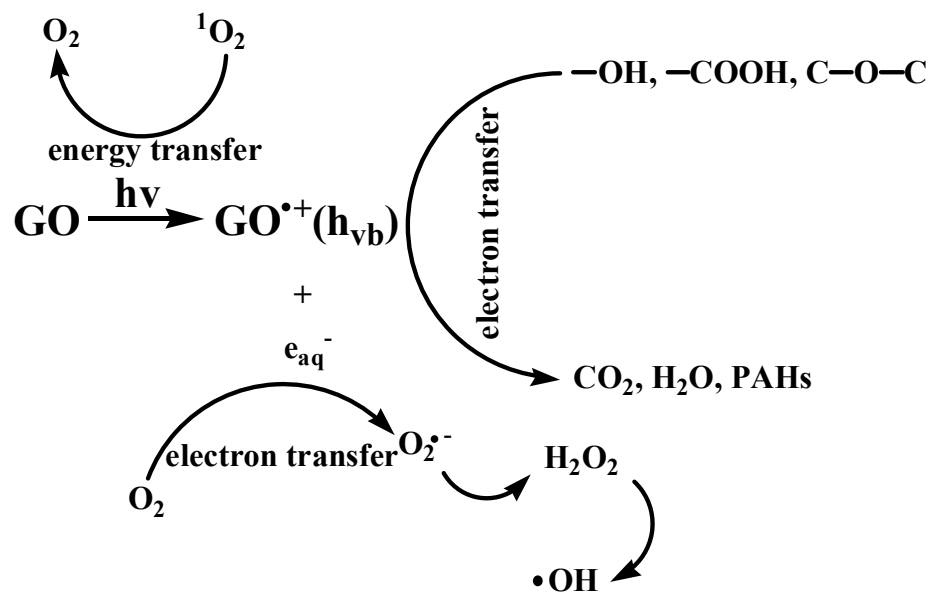


Fig. S6 Proposed mechanism of GO transformation under UV light.

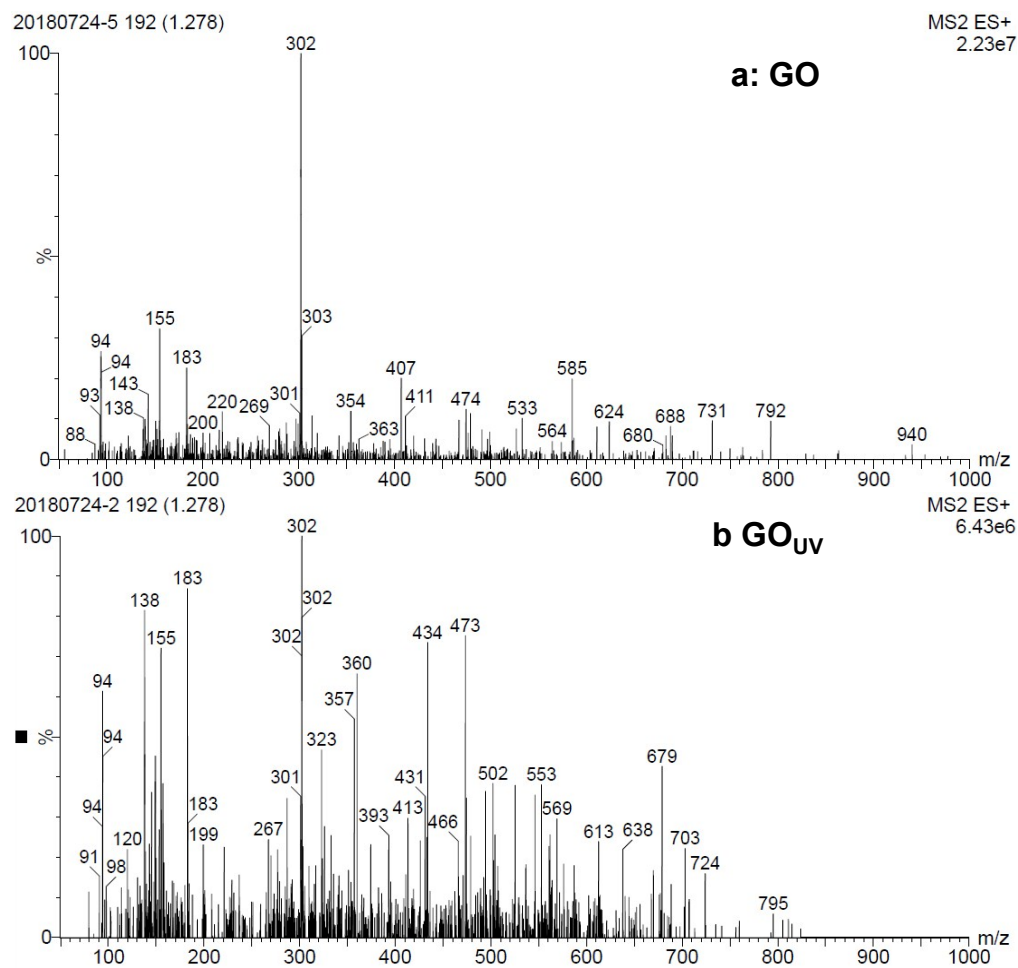


Fig. S7 MS spectra of GO (a) before and (b) after irradiation by UV light.