Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

SUPPLEMENTARY INFORMATION

Efficacy of Titanium doped-Indium Tin Oxide (Ti/TiO_2-ITO) Films in Rapid Oxygen Generation under Photocatalysis and their Suitability for Bio-medical Application

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Preliminary Studies

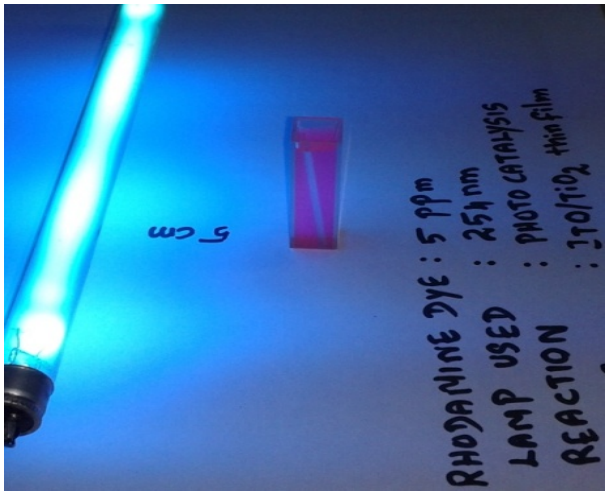
Photocatalytic degradation of Rhodamine B was studied using the prepared ITO/TiO2 catalysts under UV (254 nm) irradiation. The following are the experimental conditions and preliminary results obtained in the detailed study.

Table S1. Experimental conditions

Parameters	Quantity	Remarks
Rhodamine B	5 ppm	Catalyst 1
Irradiation time	5 hrs	Cat 1 and Cat 2 UV source 6W 365 nm
Variations done Irradiation time Concentration of dye	0,1,2,3,4 and 5 hrs	Kinetic studies
Isopropanol	1 % isopropanol (2-propanol)	To trap the hydroxyl radical(·OH) formed in the irradiated system [2,3, 4]
1,4-benzoquinone	10 %, 20% and 30% variation	For competitive inhibition of superoxide generated in the reaction medium [5]

Photocatalytic Experiment

The photocatalytic efficiency of the prepared catalysts were determined using aqueous Rhodamine B Dye (of different concentrations) under the irradiations of 254 nm incident ligh. The dye concentration was taken as 5 ppm and the pH of the medium pH 6.5; the temperature is maintained at 300 K throughout the experiment. The degradation of the dye without the catalyst has been evaluated under nearly identical conditions. A 3.5 ml of the dye solution was taken in a quartz cuvettes and the catalyst was placed in the cuvette containing the dye solution and was irradiated perpendicularly to the surface of the films for the 5 hours under the UV light (6 watt) of wavelength 254 nm.



Photograph S1: The UV irradiation source and the dye solution with catalytic film C_1 under photodegradation experiment.

Photodegradation of Rhodamine B by ITO film C_2

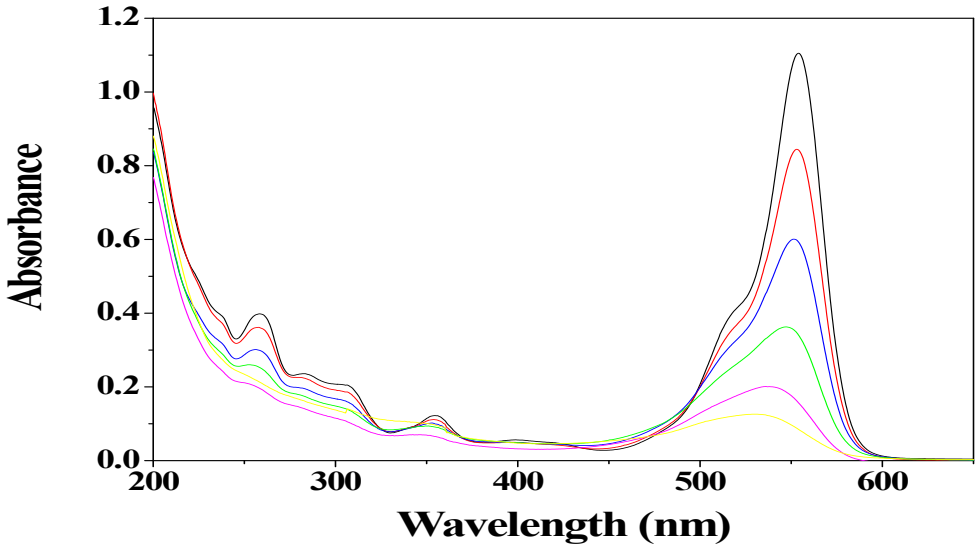


Fig. S1 Absorption spectrum of the photodegradation of Rhodamine B by ITO film C_2 under UV light (0 hr -black line, and 5 hrs- yellow line).

Photodegradation of Rhodamine B by ITO film C_3

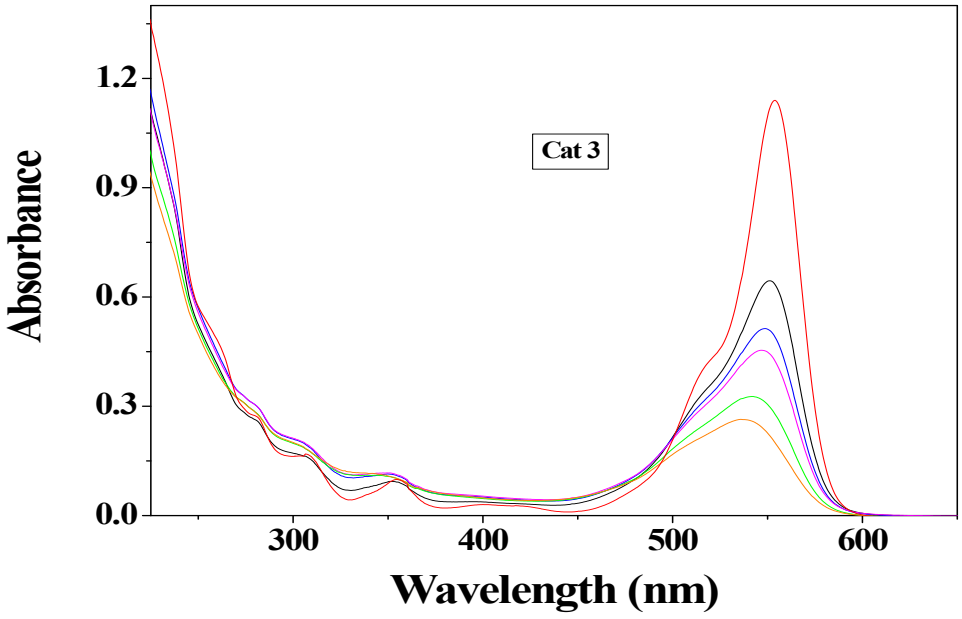


Fig. S2 Absorption spectrum of the photodegradation of Rhodamine B by ITO film C_3 under UV light (0 hr –red line, and 5 hrs- orange line).

Photodegradation of Rhodamine B by ITO film C_4

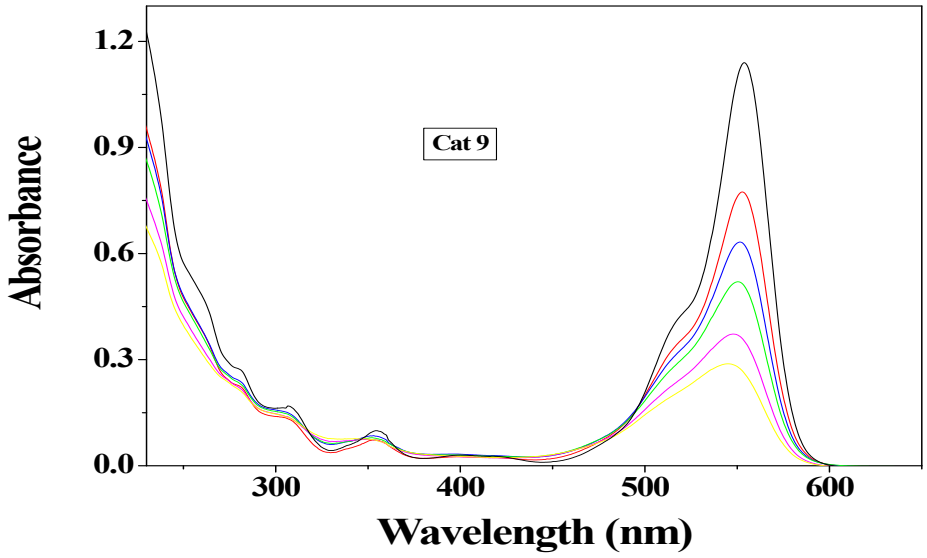


Fig. S3 Absorption spectrum of the photodegradation of Rhodamine B by ITO film C_4 under UV light (0 hr –black line, and 5 hrs- yellow line).

Effect of Concentration on the photodegradation of the RhB by Ti/TiO_2-ITO film C_1

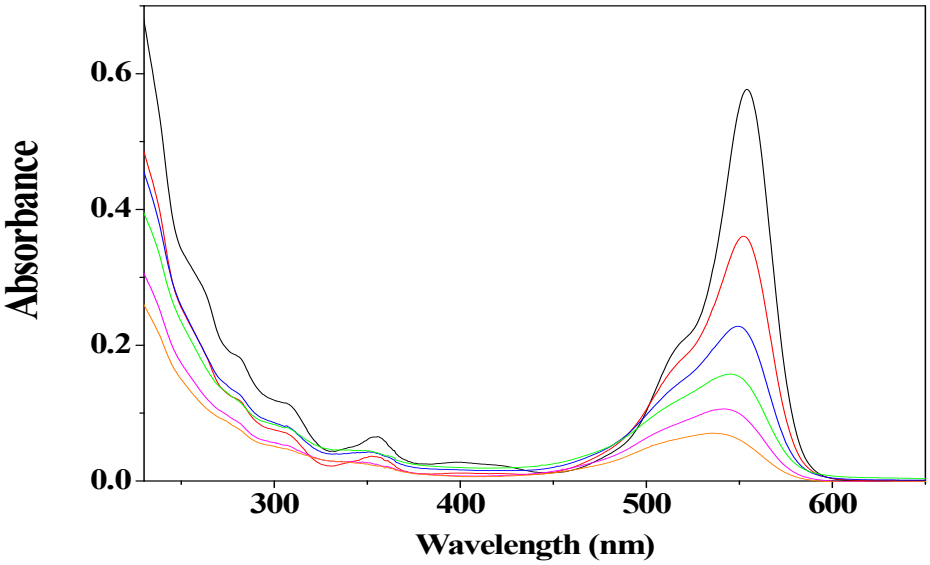


Fig. S4 Absorption spectra for the photodegradation of 2.5 ppm RhB by ITO film C_1 under various time (0 hr -black line, and 5 hrs- orange line).

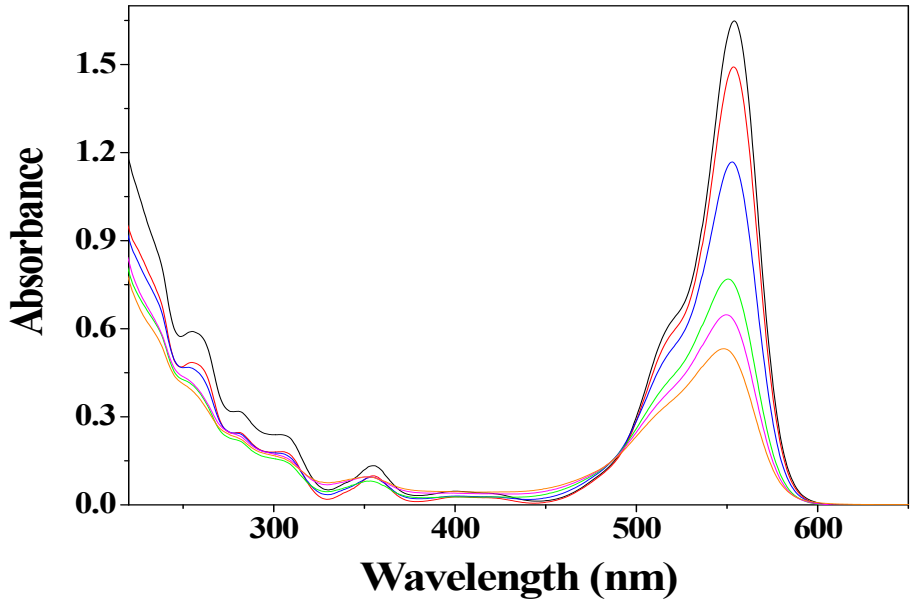


Fig. S5 Absorption spectra for the photodegradation of 7.5 ppm RhB by ITO film C_1 under various time (0 hr -black line, and 5 hrs- orange line).

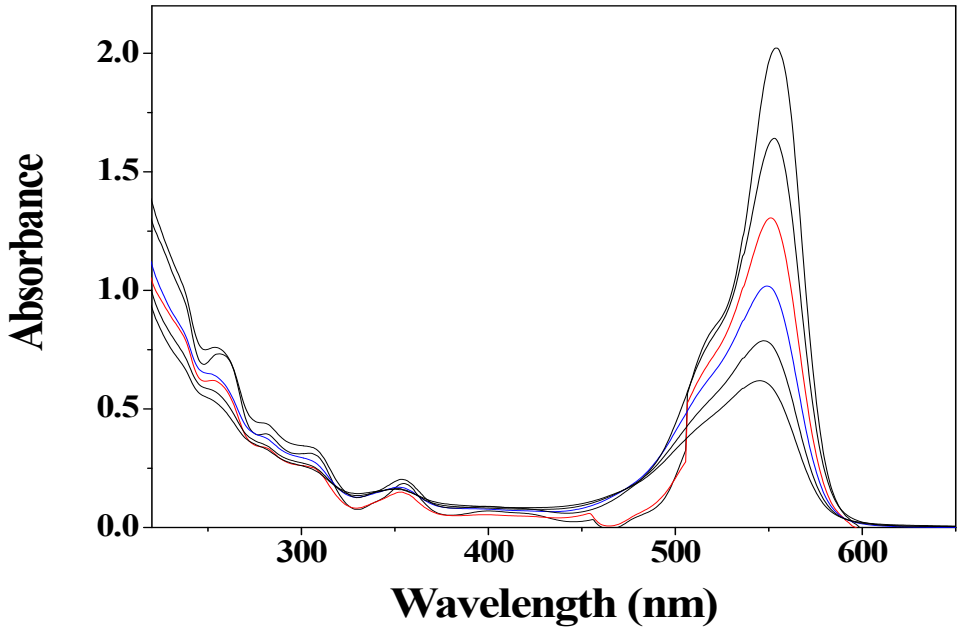


Fig. S6 Absorption spectra for the photodegradation of 10 ppm RhB by ITO film C_1 under various time (0 hr -black line, and 5 hrs- orange line).

Photodegradation Kinetics of the RhB with different Ti/TiO_2-ITO film catalysts

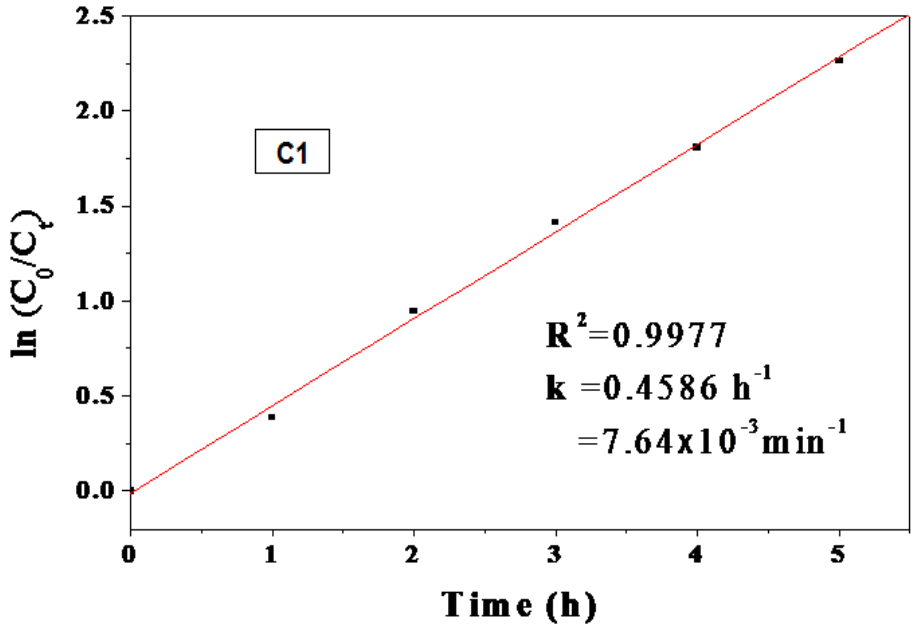


Fig. S7 ln (C_0/C_t) vs time plot of Rhodamine B degradation by ITO film C_1 (5 ppm, pH 6.5)

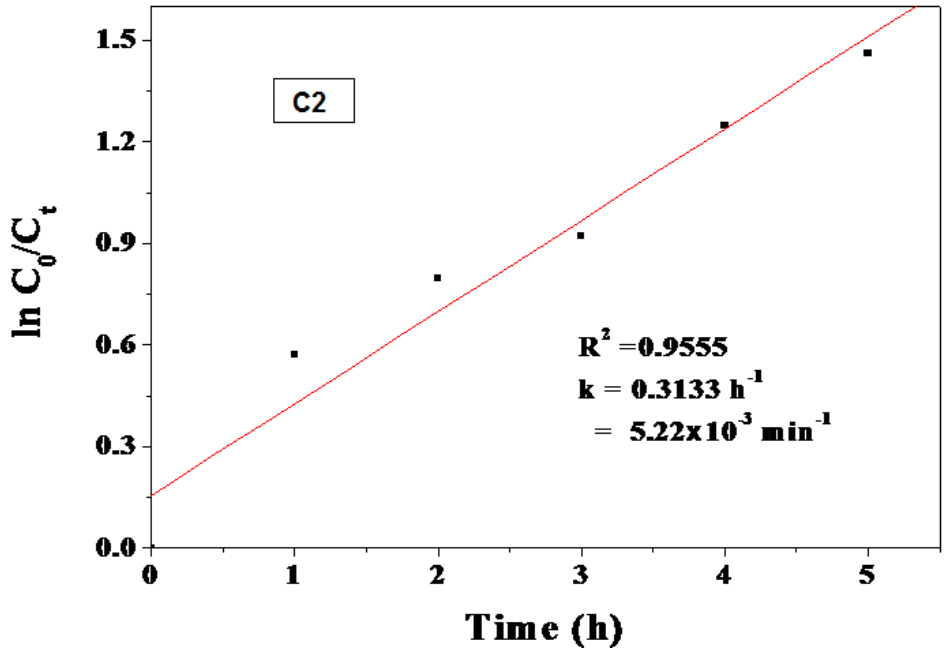


Fig. S8 ln (C_0/C_t) vs time plot of Rhodamine B degradation by ITO film C_2 (5 ppm, pH 6.5)

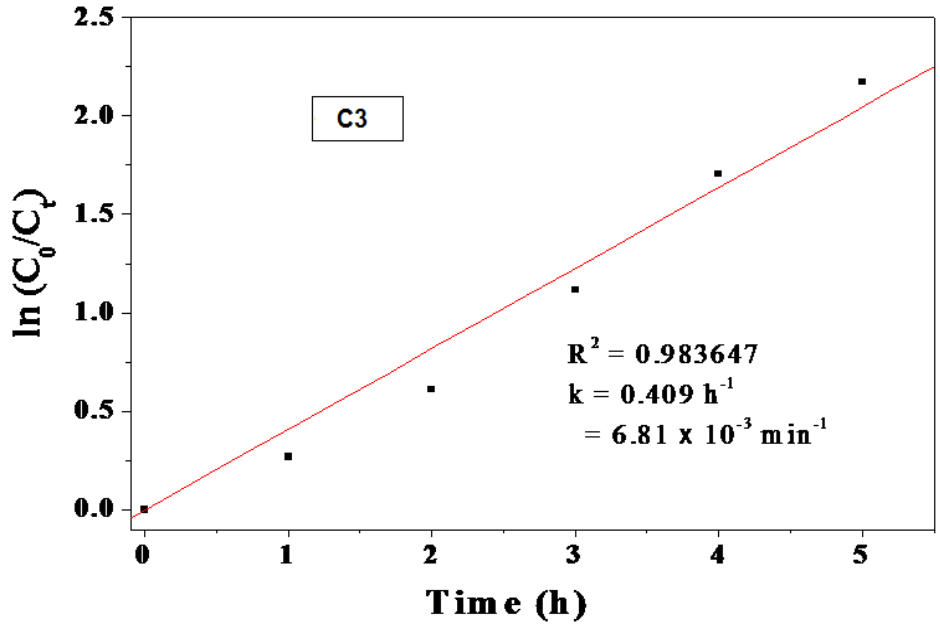


Fig. S9 ln (C_0/C_t) vs time plot of Rhodamine B degradation by ITO film C_3 (5 ppm, pH 6.5)

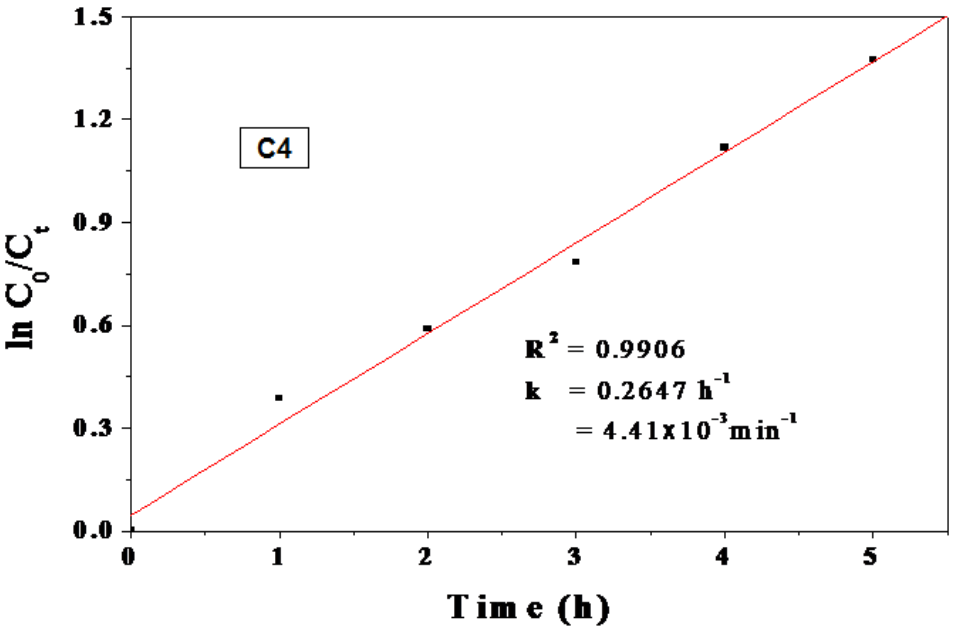


Fig. S10 ln (C_0/C_t) vs time plot of Rhodamine B degradation by ITO glass plate C_4 (5 ppm, pH 6.5).

Photolysis of RhB in the absence of catalyst under UV and visible light (control studies)

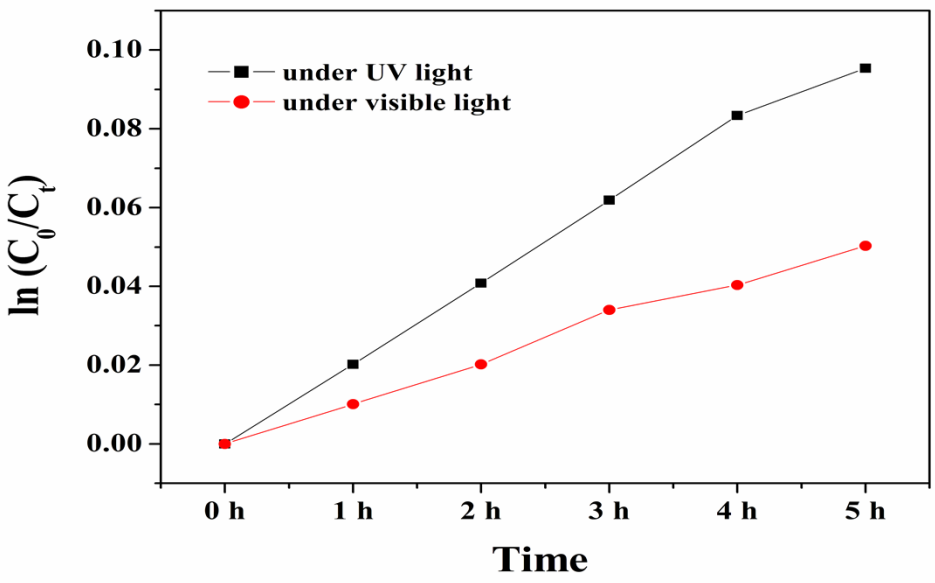


Fig. S11 ln (C_0/C_t) vs time plot of Rhodamine B (5 ppm, pH 6.5) degradation in absence of catalyst under UV and visible light.

Determination of oxygen species in the photodegradation

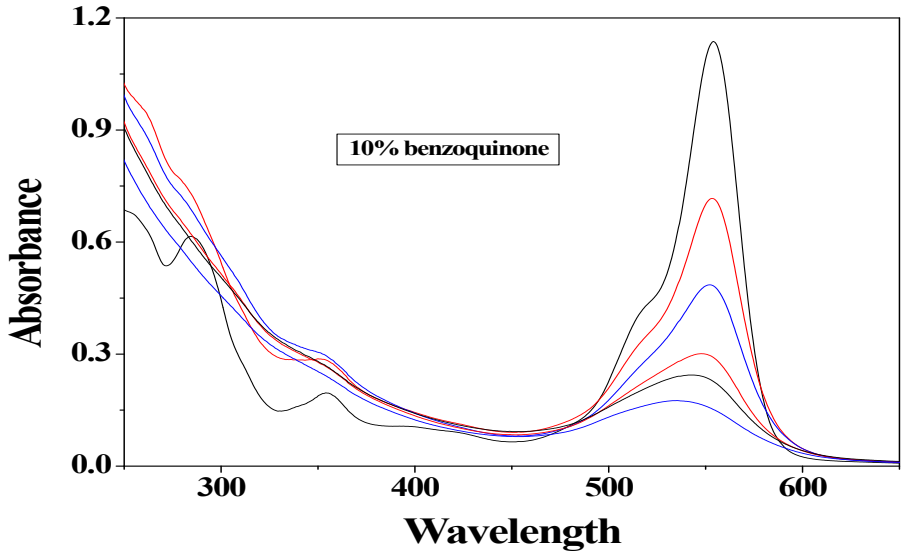


Fig. S12. Absorption spectra of Rhodamine B during photodegradation by ITO film C_1 with 10% benzoquinone

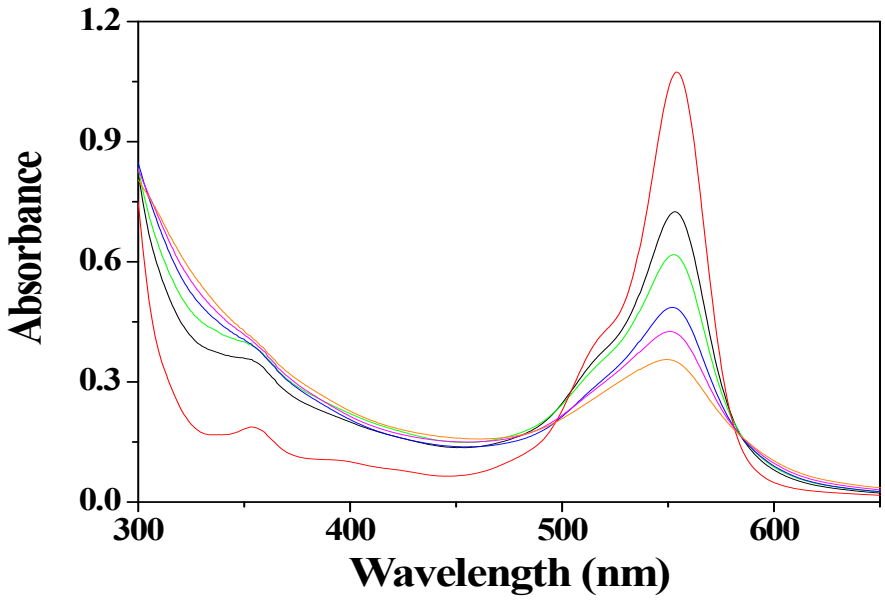


Fig. S13 Absorption spectra of Rhodamine B during photodegradation by ITO film C_1 with 20% benzoquinone

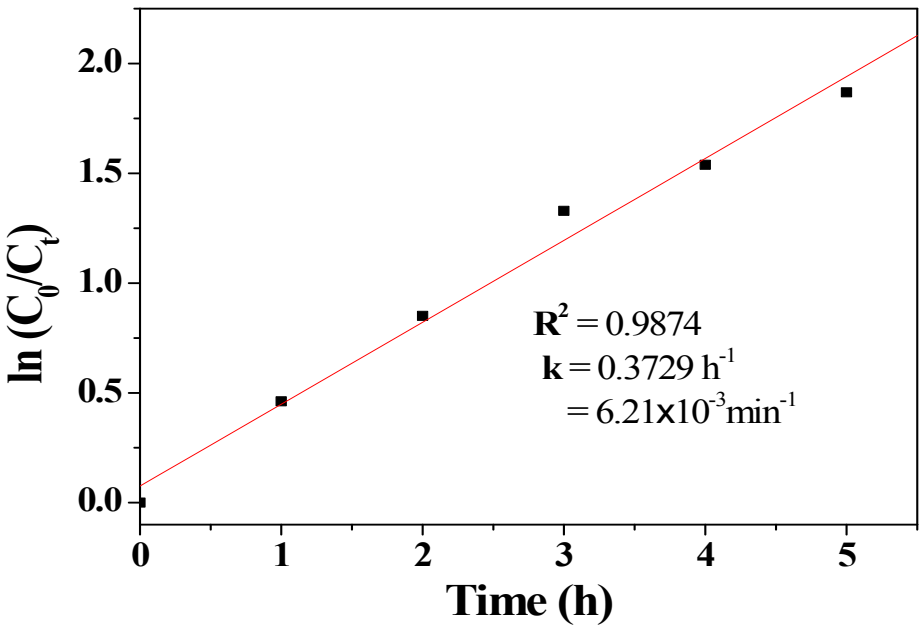


Fig. S14 ln (C_0/C_t) vs time plot of Rhodamine B (5 ppm, pH 6.5) degradation by ITO film C_1 with 10% benzoquinone

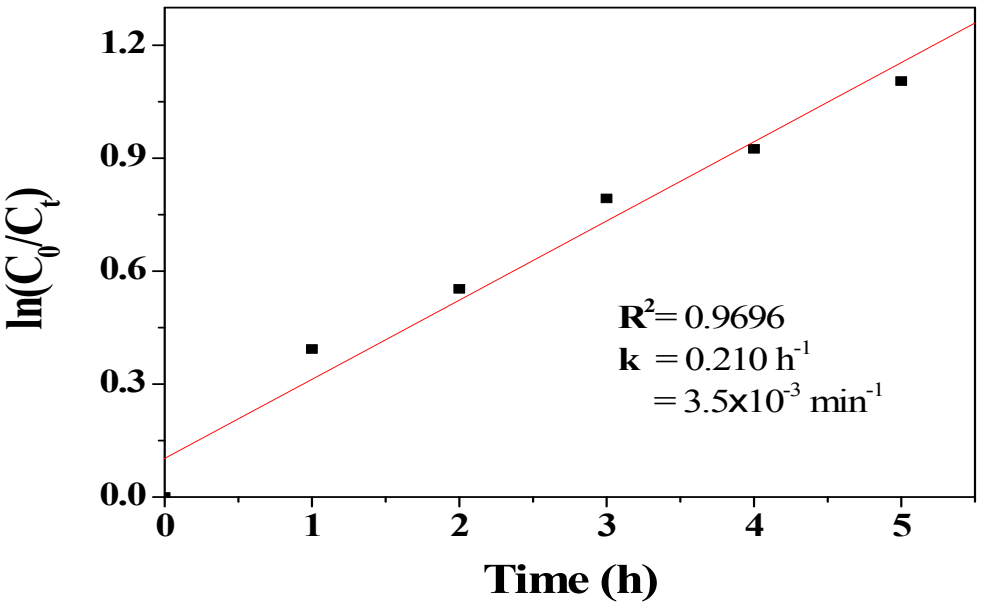


Fig. S15 ln (C_0/C_t) vs time plot of Rhodamine B (5 ppm, pH 6.5) degradation by ITO film C_1 with 20% benzoquinone

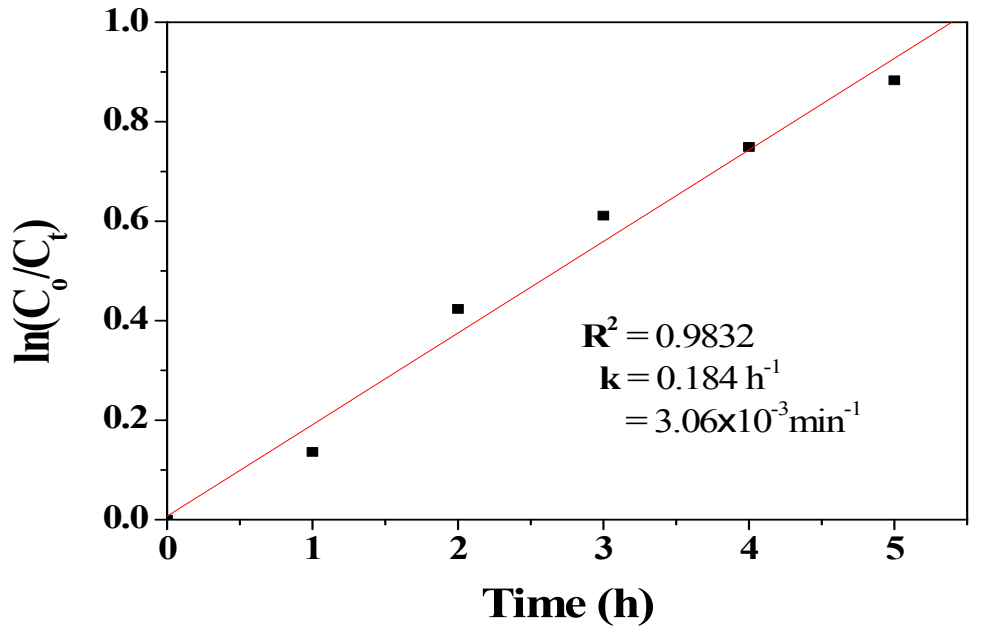


Fig. S16 ln (C_0/C_t) vs time plot of Rhodamine B (5 ppm, pH 6.5) degradation by ITO film C_1 with 30% benzoquinone

Effect of dissolved oxygen in the photodegardation of RhB

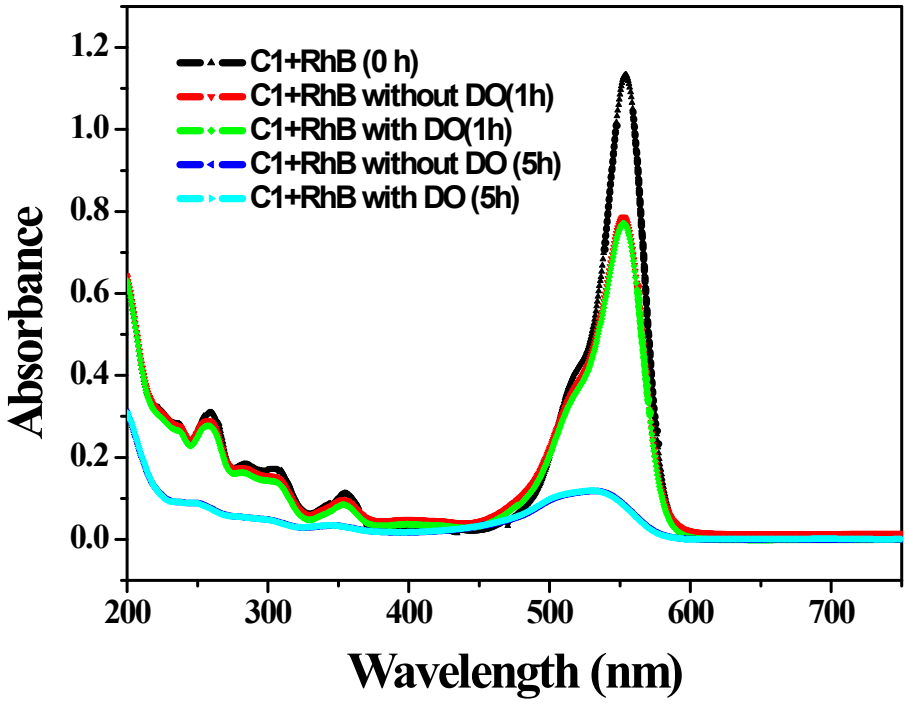


Fig. S17 Absorption spectrum for the effect of oxygen during photodegradation of Rhodamine B by ITO film C_1 under UV irradiation (periodically).

The results of important photocatalytic studies were presented inside the main manuscript and the details were discussed in brief.