Electronic Supplementary Information (ESI) for

Photoactivatable Aggregation-induced Emission of Triphenylmethanol

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Experimental Section

Materials and instrumentation

All chemicals were purchased either from J&K (Beijing, China) or TCI (Shanghai, China) and used as received without further purification. TPOH was from J&K, and $TPM^+BF_4^-$ salt was from TCI. The purity of TPOH was calculated from elemental analysis (Table S1) to be 99.7%. However, the elemental analysis of $TPM^+BF_4^-$ failed because of the high content of fluoride that strongly interferes the instrument setup for elemental analysis. The purity of $TPM^+BF_4^-$ was ≥98% according to TCI's product manual (Product# T1173).

All absorption spectra were measured on a JASCO V-550 UV visible spectrometer (Tokyo, Japan). All fluorescence spectra were recorded with a JASCO FP-8500 fluorescence spectrometer (Tokyo, Japan). All NMR spectra were recorded using a JOEL JNM-ECA300 spectrometer (Tokyo, Japan) operated at 300 MHz. All mass spectra were obtained on an ion trap time-of-fight mass spectrometry (Shimadzu MS-IT-TOF, Japan).

Photoactivatable fluorescence of TPOH on solid surface

Stock solution of TPOH (10 mM) was prepared in DMSO. In a typical experiment, 10 μL of the stock solution was dropped on a silica gel plate. After complete evaporation and dried, the silica gel plate was irradiated by a 12 W hand-held UV lamp at 254 or 365 nm for a desired time. Excitation was performed at 365 nm.

Photoactivatable fluorescence of TPOH in solution and aggregate state

Stock solution of TPOH (10 mM) was prepared in acetonitrile. In a typical experiment, the colloid solution (fw%= 60) was prepared by placing 1 mL of the stock solution into 3 mL acetonitrile and 6 mL water with rigorous mixing. The solutions were irradiated by a 30 W hanging UV lamp (2 cm above the solutions) at 254 nm for a desired time, then absorption and fluorescence spectra were recorded at 25°C. Excitation was at 320 nm.

Photopatterning and light-printing rewritable material

Stock solution of TPOH (10 mM) was prepared in DMSO. A silica gel plate was sprayed using a sprinkling can filled with stock solution, and dried by a hair dryer. A hollow cardboard engraved with the words "CHEMISTRY" and some Chinese Paper-cut were used as photomasks. The photopatterning was taken place by using a 12 W hand-held UV lamp at 254 or 365 nm irradiation for the sprayed silica gel plate covered by a photomask. The visualization of the fluorescent images was through the excitation by a 365 nm UV lamp (12W) for a short time (within 10 s) to minimize unwanted activation.

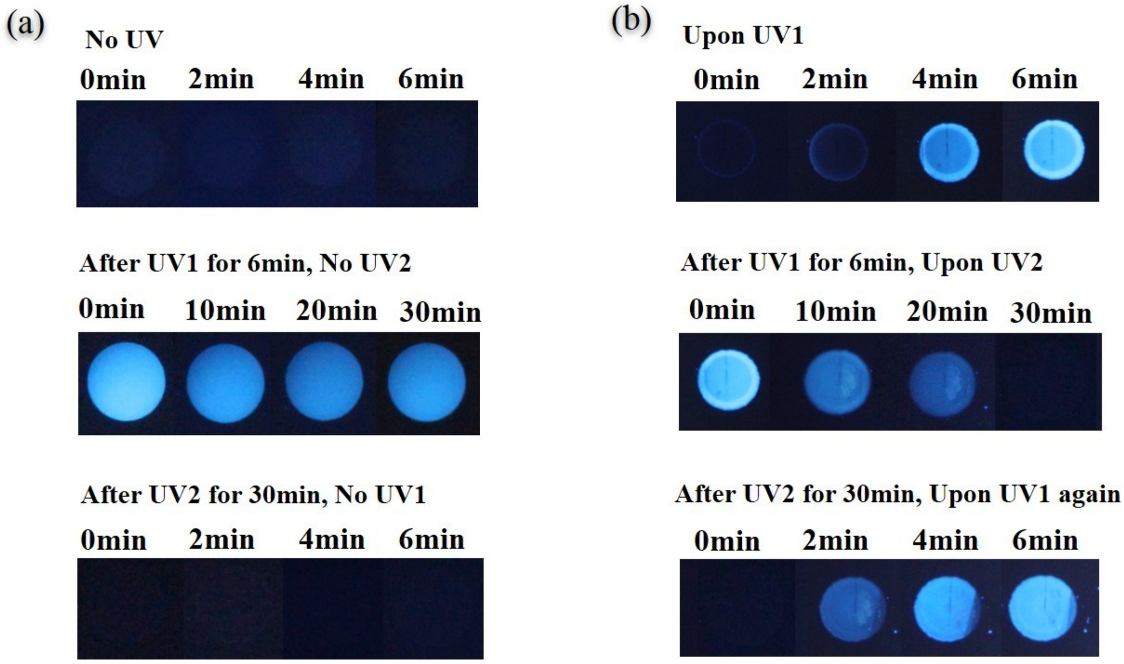


Figure S1 Photographs showing the time-dependent solid-state fluorescence of TPOH without UV irradiation (a) or upon UV irradiation (b). The pictures were taken under excitation by a 365 nm UV (UV2) lamp.

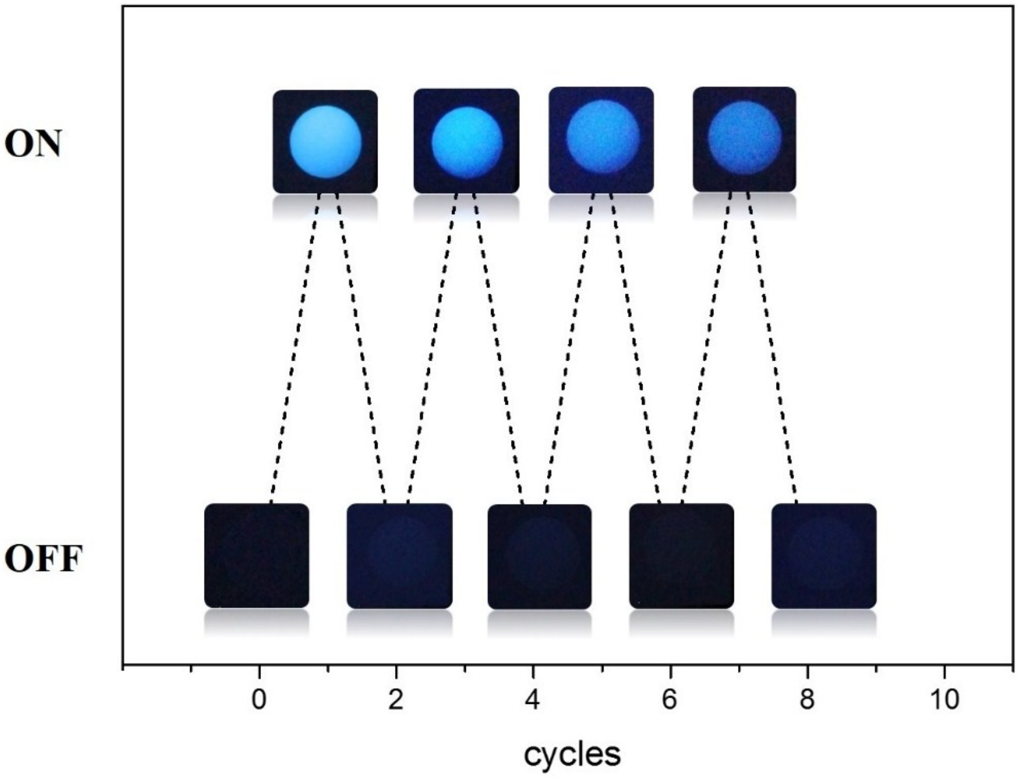


Figure S2 Quenching-recovering cycles of TPOH on silica gel plate upon UV1 and UV2 irradiation.

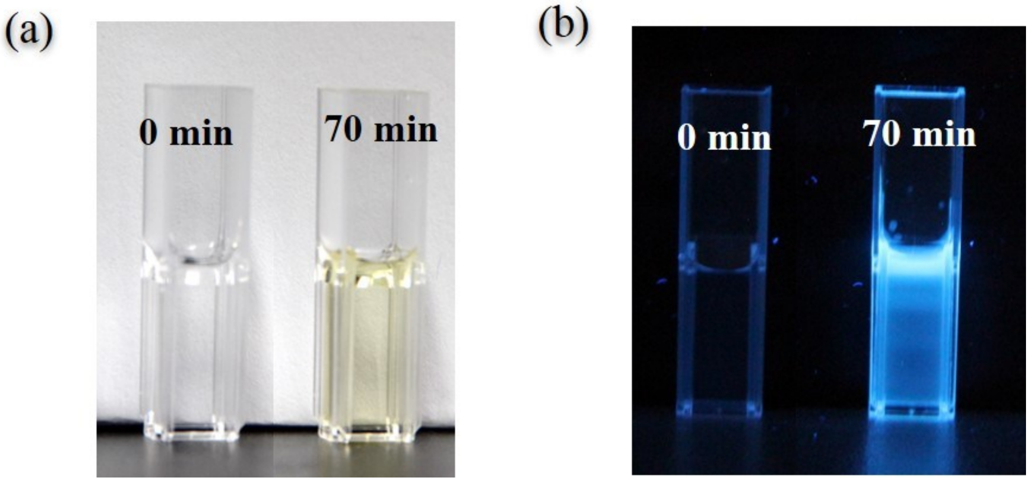


Figure S3 Photographs of TPOH before and after UV1 irradiation (fw%= 60 in acetonitrile, 1 mM). The pictures were taken under visible light (a) or under excitation by a 365 nm UV (UV2) lamp (b).

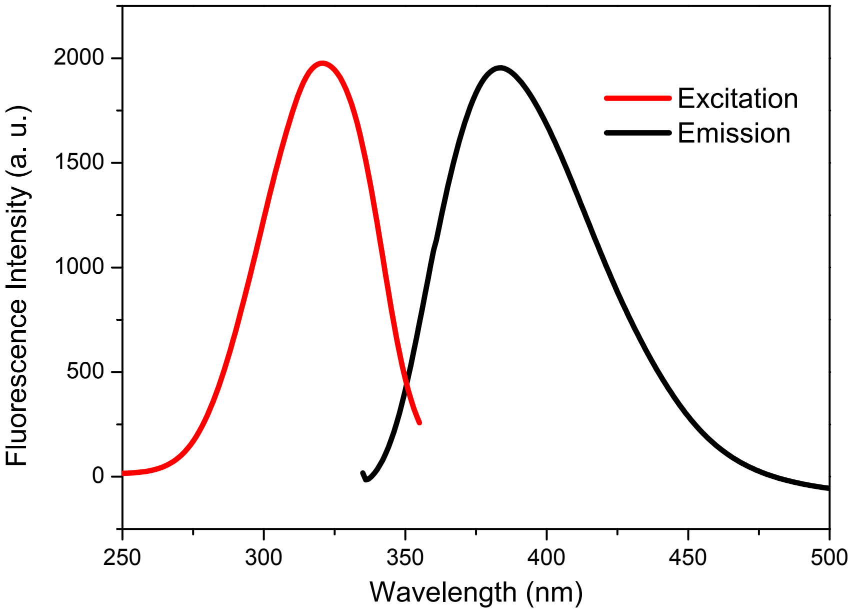


Figure S4 Fluorescence spectra of TPOH after UV1 irradiation (fw%= 60 in acetonitrile, 1 mM). λex=320 nm, λem=381 nm.

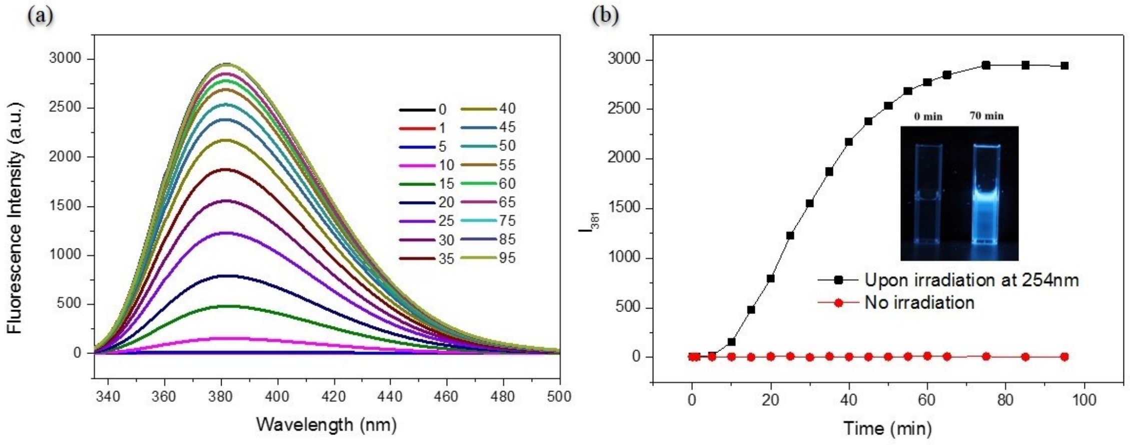


Figure S5 (a) Fluorescence spectra with different irradiation times (minutes) of UV1 for TPOH (fw%= 60 in acetonitrile, 1 mM). (b) Fluorescence emission intensity with time at the maximum emission wavelength of 381 nm

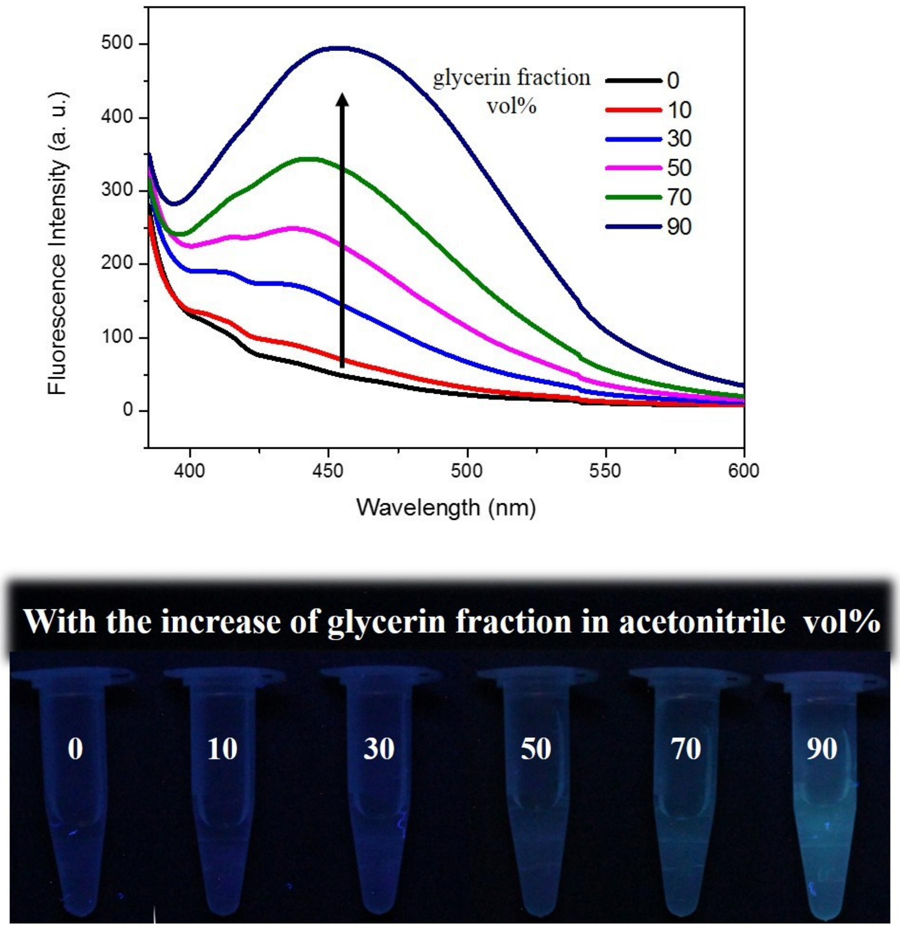


Figure S6 *Top*: Fluorescence spectra of Triphenylcarbenium tetrafluoroborate (TPM^+) in acetonitrile with different glycerin fractions. *Bottom*: Photographs showing the fluorescent enhancement of TPM^+ according to the viscosity increase

Sample Name	**(N) %**	**(C) %**	**(H) %**
TPOH	**0.125**	**87.841**	**6.236**
TPOH	**0.199**	**87.726**	**6.159**
TPOH	**0.179**	**87.898**	**6.19**
TPM^+	**0.146**	**65.544**	**6.198**
TPM^+	**0.146**	**69.513**	**5.598**
TPM^+	**0.113**	**58.003**	**5.071**

Table S1 Elemental analysis results of TPOH and $TPM^+BF_4^-$. The elemental analysis of $TPM^+BF_4^-$ failed (large variation among three tests) because of the high content of fluoride that strongly interferes the instrument setup for elemental analysis.

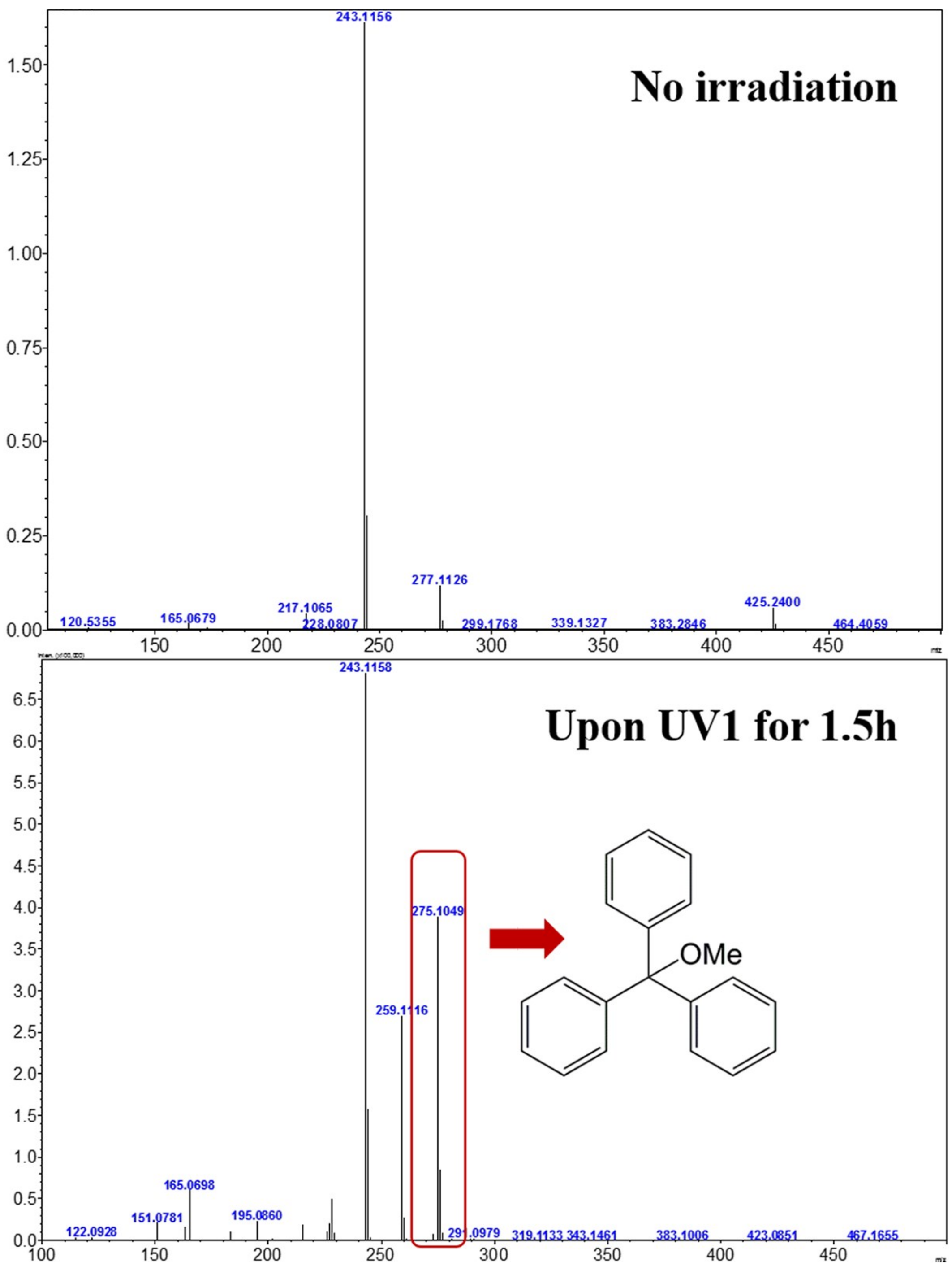


Figure S7 ESI-MS spectra of TPOH before and after UV1 irradiation for 1.5h (10mM in methanol).

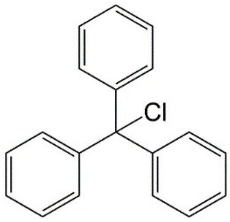
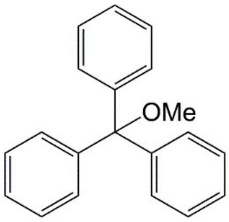
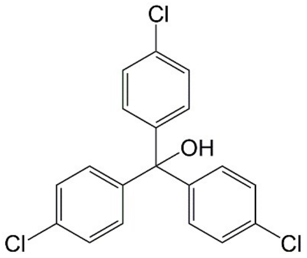
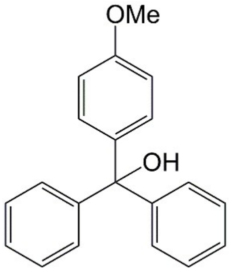
1	2	3	4
			

Table S2 Structures of compound 1-4.

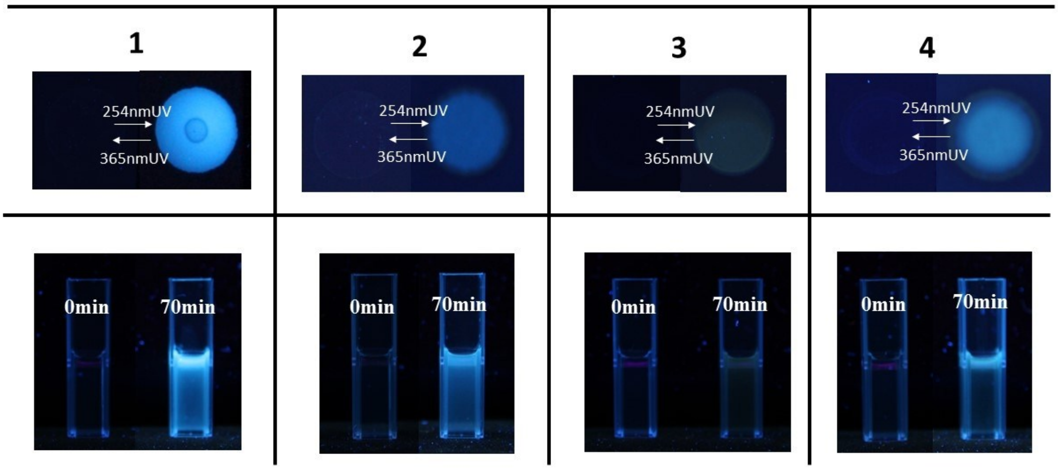


Figure S8 Photographic images of luminescence of compound 1-4 (see Table S2 for structures) on silica surface and in 60% water-40% acetonitrile cosolvent before and after UV irradiation. Visualization of fluorescence was by a flash excitation at 365 nm within 10 seconds to avoid any irradiation effect.

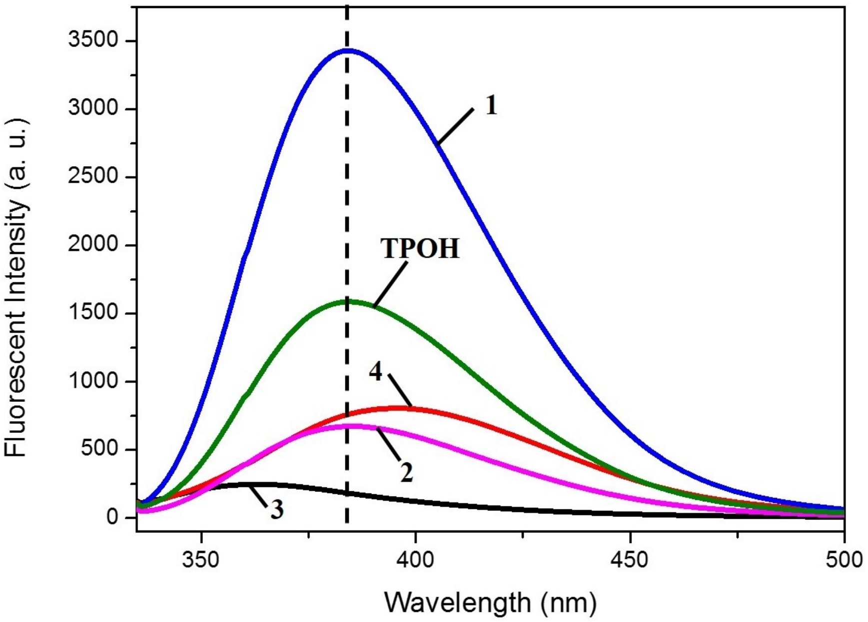


Figure S9 Fluorescence spectra of compound 1-4 and TPOH after UV1 irradiation for 70 min (1 mM compound in 60% water-40% acetonitrile cosolvent). λex=320 nm.