

Supplementary Information

For

STRUCTURE EFFECTS OF AMPHIPHILIC AND NON-AMPHIPHILIC QUATERNARY AMMONIUM SALTS ON PHOTODEGRADATION OF ALIZARIN RED-S CATALYZED BY TITANIUM DIOXIDE

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Fig. S1. Absorption spectra of the ARS photodegradation with TiO₂ recorded in the presence of various CTABr concentrations at pH 12. S2

Fig. S2. Absorption spectra of the ARS photodegradation with TiO₂ recorded in the presence of various CTBABr concentrations at pH 12. S2

Table S1, S2 and S3: numerical values corresponding to Fig. 1, Fig. 2 and Fig. 3, respectively. S3

Table S4 and S5: numerical values corresponding to Fig. 4 and Fig. 5, respectively. S4

Fig. S3. Photodegradation of ARS with TiO₂ at pH 12 after 15 min of irradiation as a function of ObisDTABr and DTABr concentration. S5

Table S6: numerical values corresponding to Fig. S3. S5

LCMS-ESI analysis of the ARS photodegradation with TiO₂ in the presence of of CTABr at pH 12 after 15 min of irradiation. S6

FT-IR analysis of the CTABr photodegradation in the presence of TiO₂ at pH 12. S7

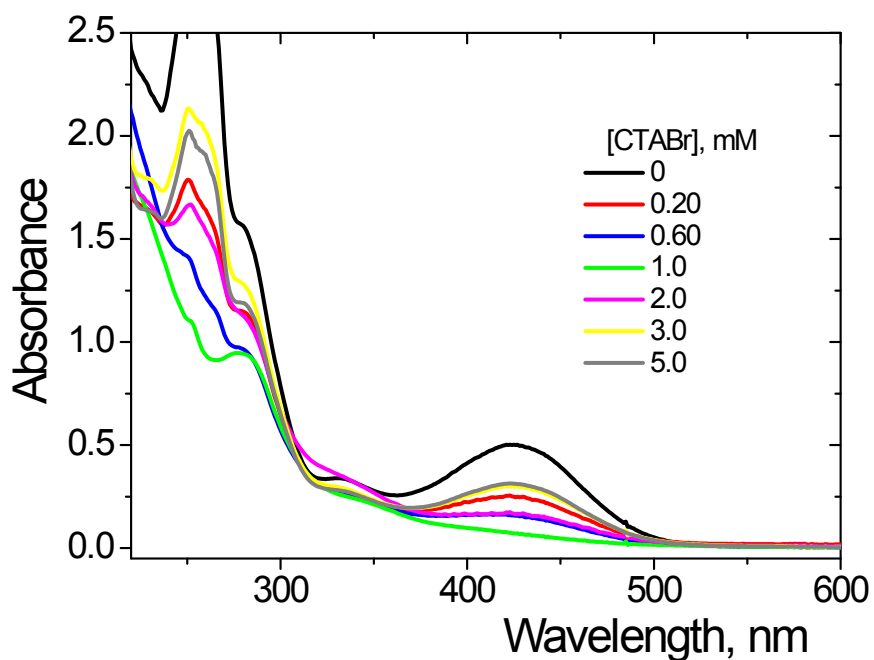


Fig. S1. Absorption spectra of the ARS photodegradation (0.20 mM) in TiO₂ aqueous dispersion (0.4 g/l) after 15 min irradiation in the presence of various CTABr concentrations at pH 12.

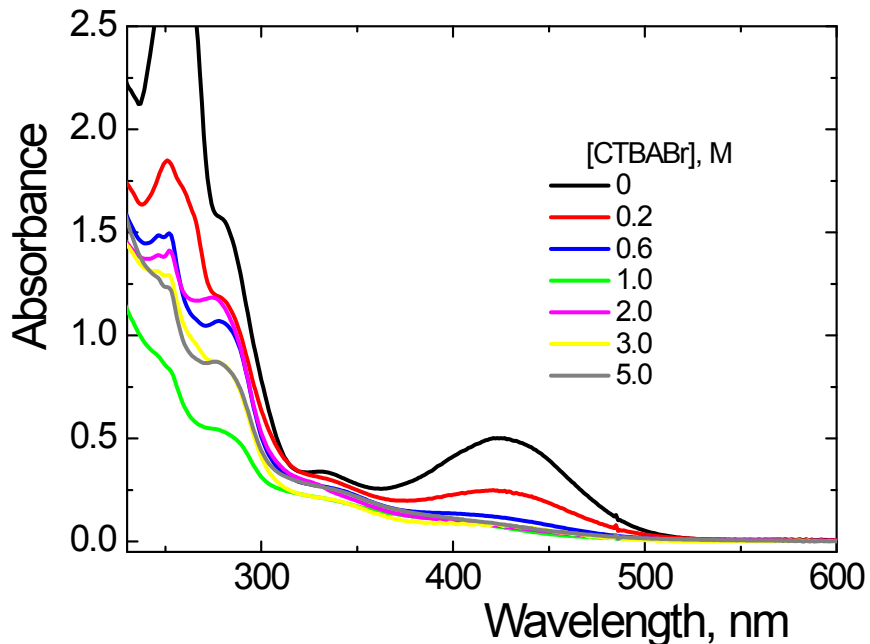


Fig. S2. Absorption spectra of the ARS photodegradation (0.20 mM) in TiO₂ aqueous dispersion (0.4 g/l) after 15 min irradiation in the presence of various CTBABr concentrations at pH 12.

Table S1

Numerical values corresponding to Fig. 1

[CTABr], M	C_{15}/C_0	[CTEABr], M	C_{15}/C_0	[CTPABr], M	C_{15}/C_0	[CTBABr], M	C_{15}/C_0
0	0.857	0	0.857	0	0.857	0	0.857
0.2	0.55861	0.2	0.67	0.2	0.7	0.2	0.54553
0.6	0.30116	0.6	0.22	0.6	0.41186	0.6	0.23257
1	0.135	1	0.104	1	0.16	1	0.15
2	0.38	2	0.18	2	0.12	2	0.16
3	0.58	3	0.37	3	0.18	3	0.17
5	0.6	5	0.4	5	0.21	5	0.17

Table S2

Numerical values corresponding to Fig. 2

[ObisCTABr], M	C_{15}/C_0	[CTEABr], M	C_{15}/C_0
0	0.857	0	0.857
0.0467	0.825	0.2	0.55861
0.0986	0.686	0.6	0.30116
0.15	0.437	1	0.15
0.2	0.35	2	0.38
0.607	0.593	3	0.58
1	0.755	5	0.6
2	0.866		
3.01	0.838		
4	0.825		
5	0.825		

Table S3

Numerical values corresponding to Fig. 3

[TMABr], M	C_{15}/C_0	[TBABr], M	C_{15}/C_0	[TPABr], M	C_{15}/C_0	[TEABr], M	C_{15}/C_0
0	0.924	0	0.924	0	0.924	0	0.924
0.221	0.90105	0.211	0.824	0.05	0.9265	0.5	0.945
0.61	0.92341	0.608	0.762	0.4	0.862	5	0.777
1.08	0.90816	1.04	0.729	1	0.855	10	0.6737
2.01	0.91378	2.02	0.705	4	0.729	25	0.55
3	0.89849	3.04	0.642	7	0.67897	50	0.422
5.04	0.8954	5.01	0.523	10	0.642	100	0.427
30	0.8686	10	0.444	25	0.45699		
50	0.842	25	0.231	50	0.242		
100	0.81534	50	0.103	100	0.24796		

Table S4

Numerical values corresponding to Fig. 4

[TPABr], M	C_{15}/C_0	[ASBr], M	C_{15}/C_0	[BQBr], M	C_{15}/C_0	[BPyBr], M	C_{15}/C_0
0	0.924	0	0.924	0	0.924	0	0.924
0.05	0.9265	0.05	0.879	0.056	0.877	0.05	0.992
0.4	0.862	0.4	0.794	0.403	0.857	0.4	0.931
1	0.855	0.7	0.7065	1	0.68984	1	0.87329
4	0.729	1	0.5988	5	0.459	5	0.774
7	0.67897	4	0.43068	10	0.15181	10	0.688
10	0.642	10	0.117	30	0.14295	30	0.625
30	0.5373	30	0.108	50	0.1497	50	0.579
50	0.45699	50	0.1143				

Table S5

Numerical values corresponding to Fig. 5

[ASBr], M	C_{15}/C_0	[DASBr], M	C_{15}/C_0
0	0.924	0	0.924
0.05	0.879	0.05	0.928
0.4	0.794	0.4	0.682
0.7	0.7065	1	0.417
1	0.599	4	0.16989
4	0.43068	7	0.15
10	0.117	10	0.13317
30	0.113	30	0.13622

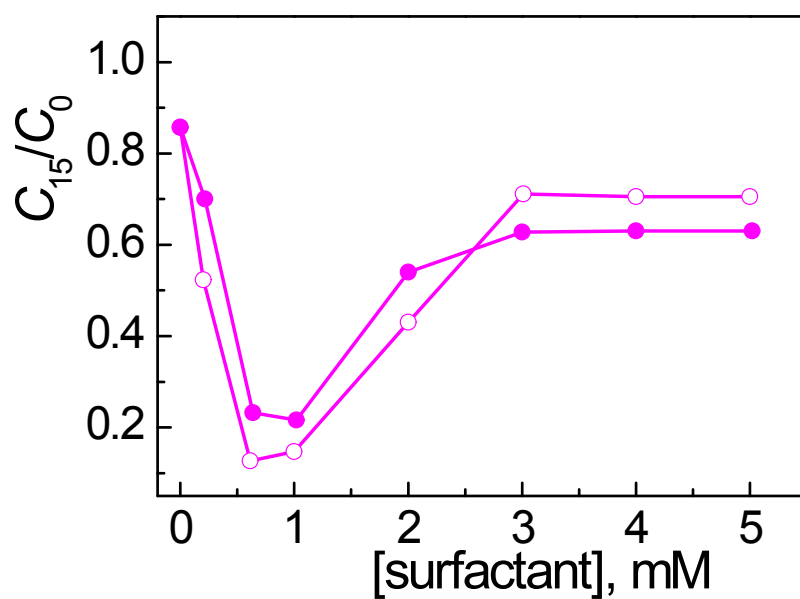


Fig. S3. Photodegradation of ARS (0.20 mM) with TiO₂ (0.4 g/l) at pH 12 after 15 min of irradiation as a function of ObisDTABr (○) and DTABr (●) concentration.

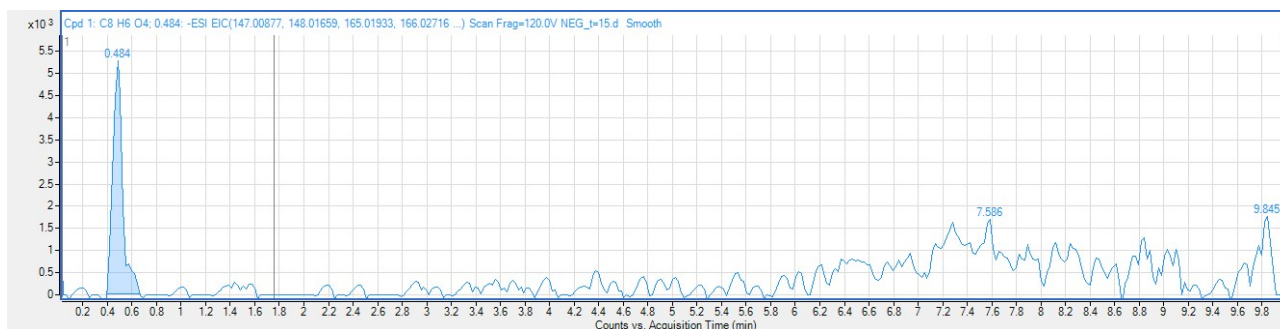
Table S6

Numerical values corresponding to Fig. S3

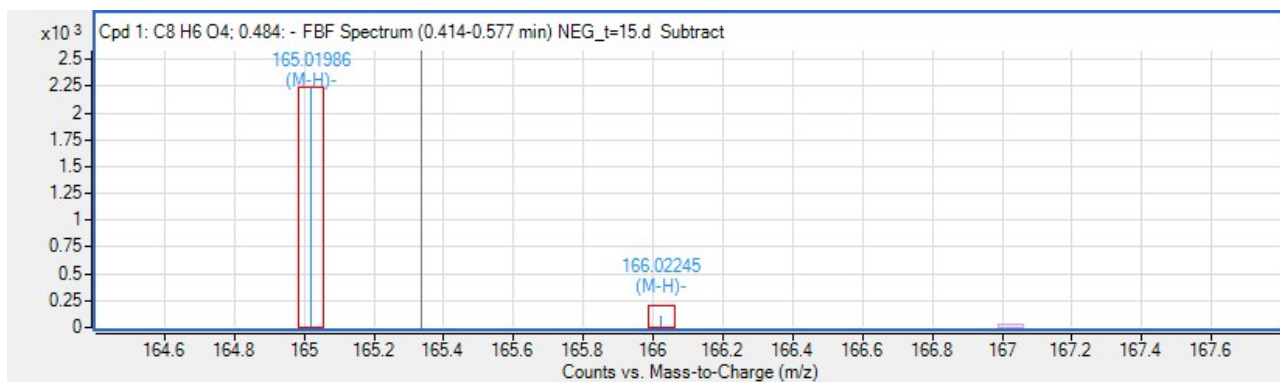
[ObisDTABr], M	C ₁₅ /C ₀	[DTABr], M	C ₁₅ /C ₀
0	0.857	0	0.857
0.201	0.523	0.214	0.7
0.614	0.127	0.636	0.232
1	0.147	1.02	0.216
2	0.43	2	0.5401
3.01	0.711	3	0.628
4	0.705	4	0.63
5	0.705	5.02	0.63

LCMS-ESI analysis (negative ion acquisition) of the photodegradation of ARS (0.20 mM) with TiO₂ (0.4 g/l) in the presence of 1.0 mM CTABr at pH 12 after 15 min of irradiation.

Extract Ion Chromatogram:

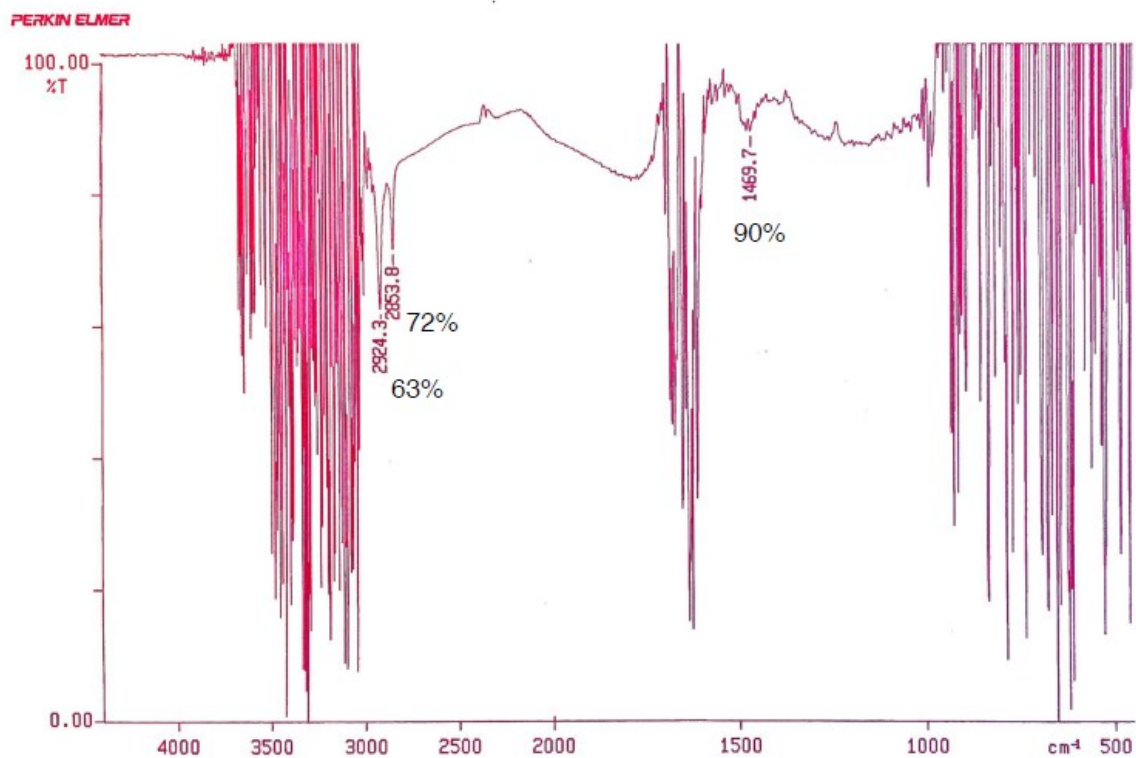


MS spectrum:



FT-IR analysis of the photostability of CTABr (50 mM) in the presence of TiO₂ (0.4 g/l) in 0.01 M NaOH.

FT-IR spectrum at initial time:



FT-IR spectrum after 30 min of irradiation:

