SUPPORTING INFORMATION

Photodegradation of 2,4,4'-tribrominated diphenyl ether in various surfactant solutions: Kinetics, mechanisms and intermediates

Kaibo Huang[1], Guining Lu[1,2*], Zhiqiang Zheng[1], Rui Wang[1], Ting Tang[1], Xueqin Tao[3], Ruibing Cai[3], Zhi Dang[1,4], Pingxiao Wu[1,2], Hua Yin[1,4]

1. School of Environment and Energy, South China University of Technology, Guangzhou 510006, China
2. Guangdong Provincial Engineering and Technology Research Center for Environmental Risk Prevention and Emergency Disposal, Guangzhou 510006, China
3. School of Environmental Science and Engineering, Zhongkai University of Agriculture and Engineering, Guangzhou 510225, China
4. The Key Lab of Pollution Control and Ecosystem Restoration in Industry Clusters, Ministry of Education, Guangzhou 510006, China

* Corresponding author: School of Environment and Energy, South China University of Technology, Guangzhou 510006, China; Tel: +86-20-39380569, Fax: +86-20-39380508; E-mail address: GNLu@foxmail.com

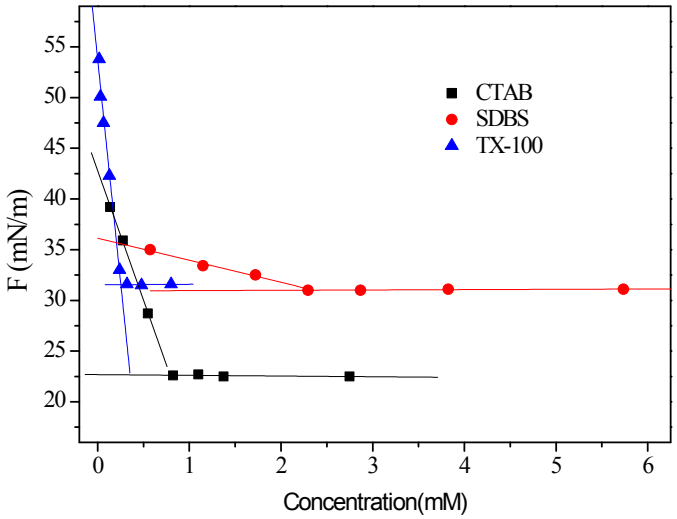


Figure S1. Plots surface tension (F) versus surfactants concentration of various surfactants at 25℃.

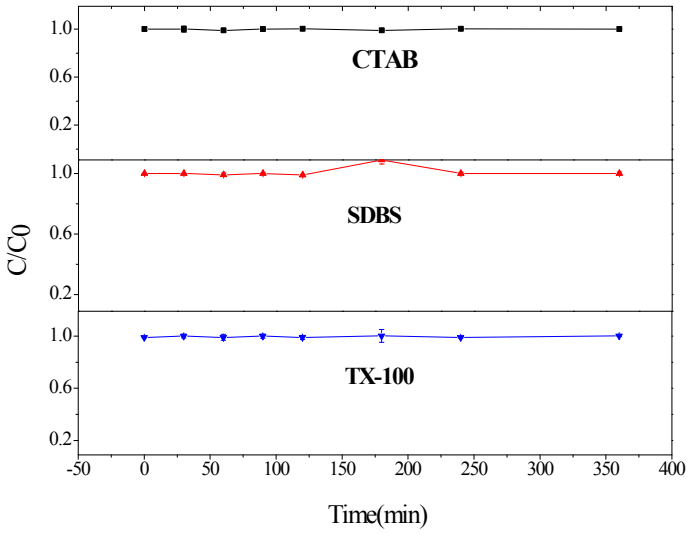


Figure S2. the dark experiment of BDE-28 photodegradation in TX-100, SDBS and CTAB

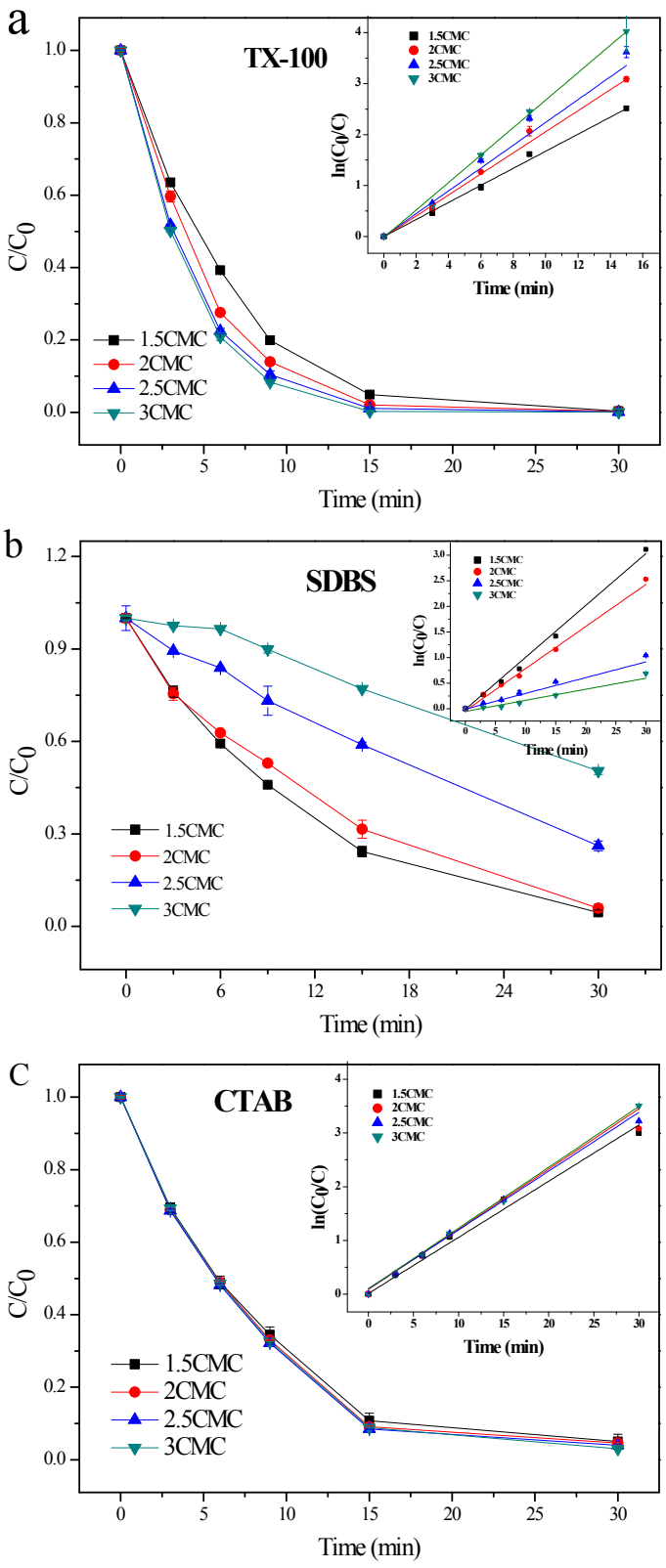


Figure S3. BDE-28 photodegradation in various concentrations of TX-100 (a), SDBS(b) and CTAB(c)

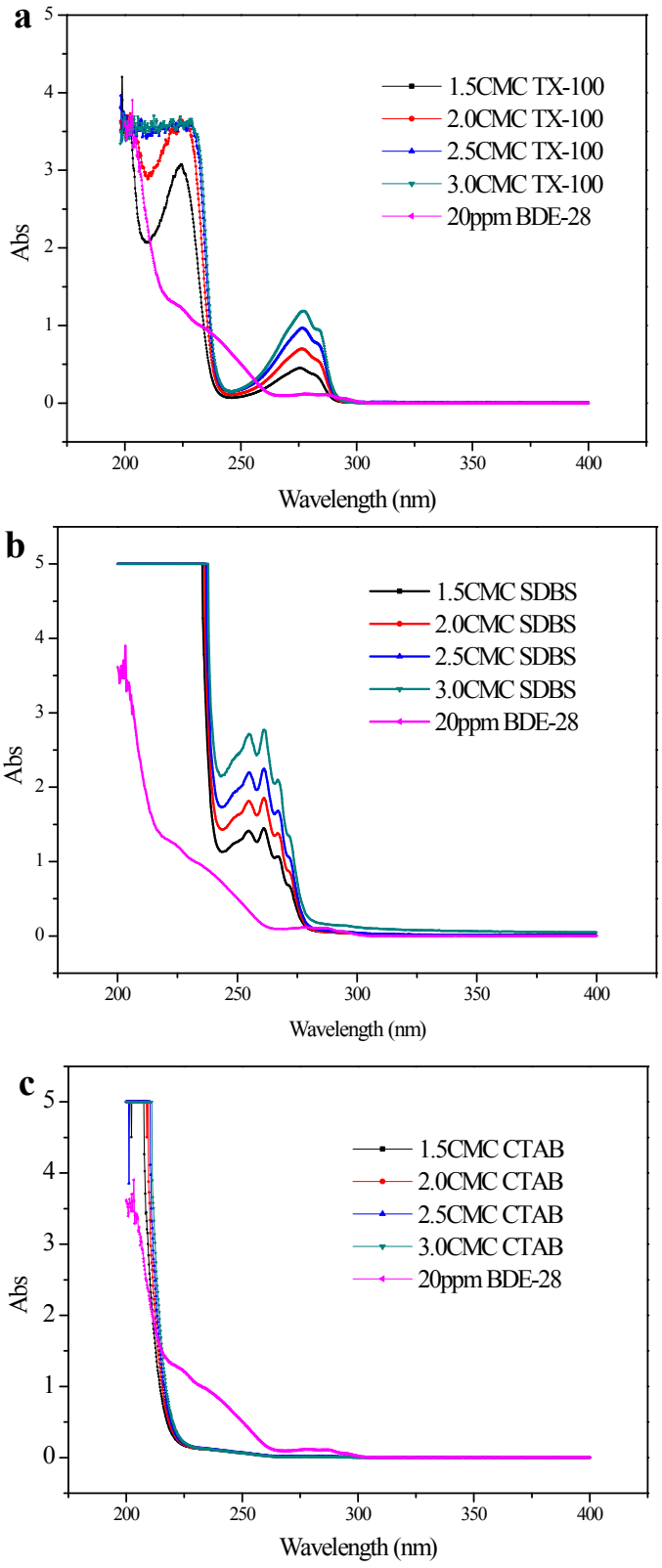
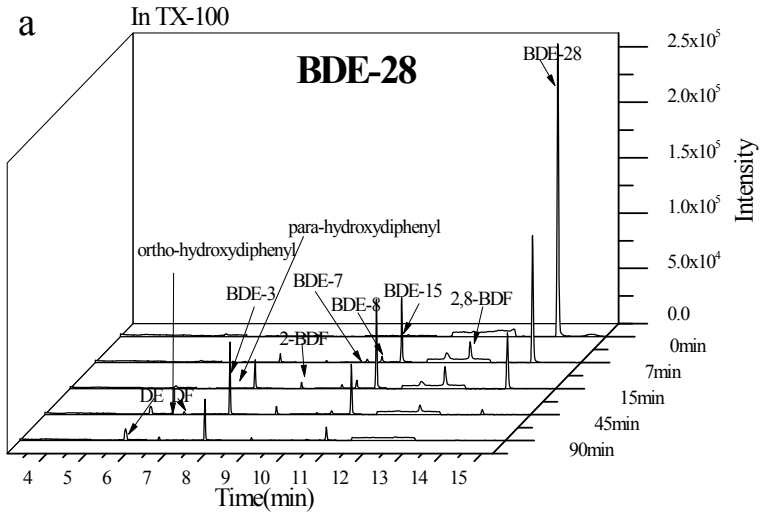
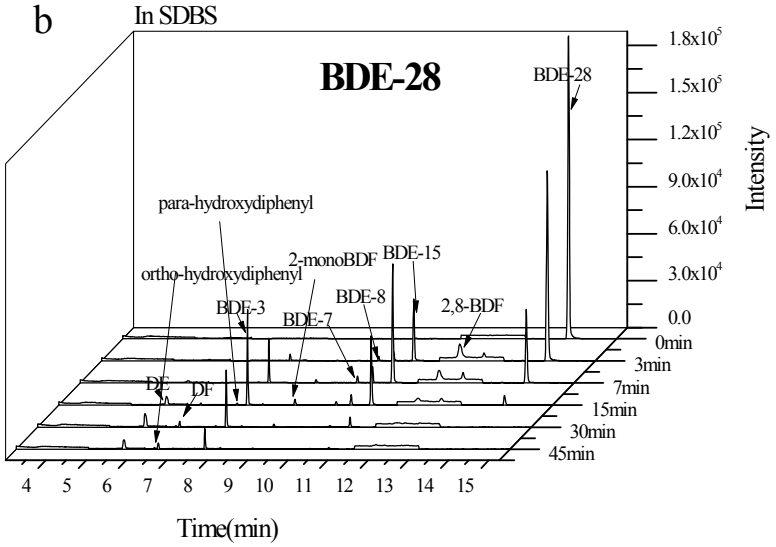


Figure S4. The ultraviolet spectrum of TX-100 (a), SDBS (b) and CTAB (c)


a
In TX-100
BDE-28
BDE-28
2.5x10^5
2.0x10^5
1.5x10^5
1.0x10^5
5.0x10^4
0.0
Intensity
para-hydroxydiphenyl
ortho-hydroxydiphenyl
BDE-3
BDE-7
BDE-8
BDE-15
2,8-BDF
2-BDF
DE
DF
0min
7min
15min
45min
90min
4 5 6 7 8 9 10 11 12 13 14 15
Time(min)


b
In SDBS
BDE-28
BDE-28
1.8x10^5
1.5x10^5
1.2x10^5
9.0x10^4
6.0x10^4
3.0x10^4
0.0
Intensity
para-hydroxydiphenyl
2-monoBDF
BDE-15
ortho-hydroxydiphenyl
BDE-8
BDE-3
BDE-7
2,8-BDF
DE
DF
0min
3min
7min
15min
30min
45min
4 5 6 7 8 9 10 11 12 13 14 15
Time(min)

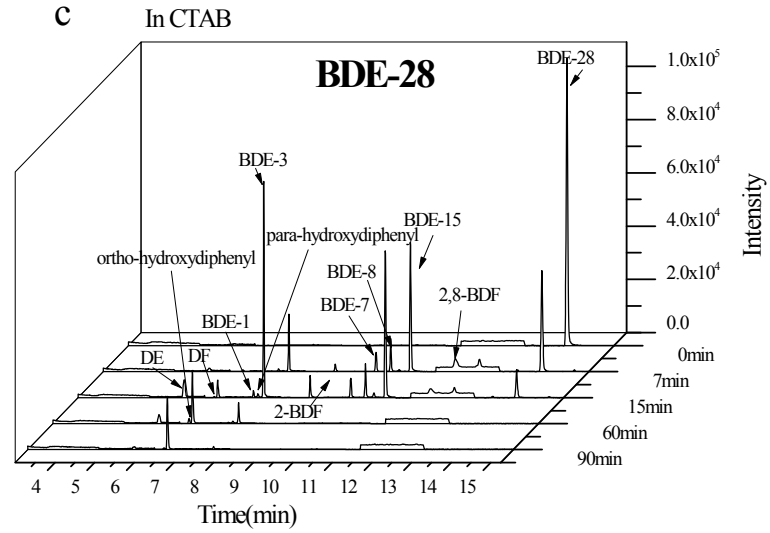


Figure S5. the chromatogram of BDE-28 photodegradation in TX-100(a), SDBS(b) and CTAB(c)

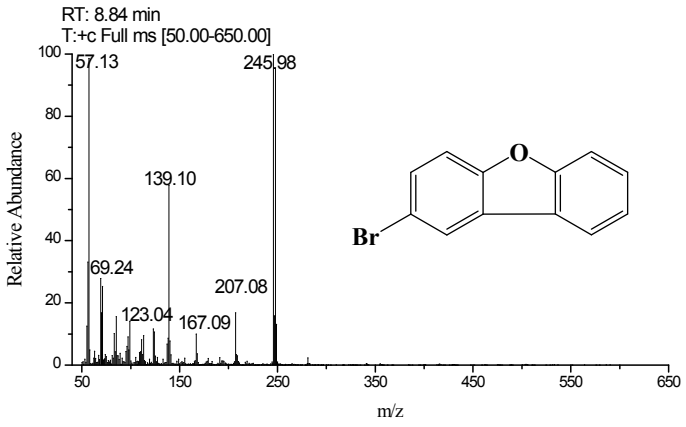


Figure S6. Mass spectra of 2-BDF

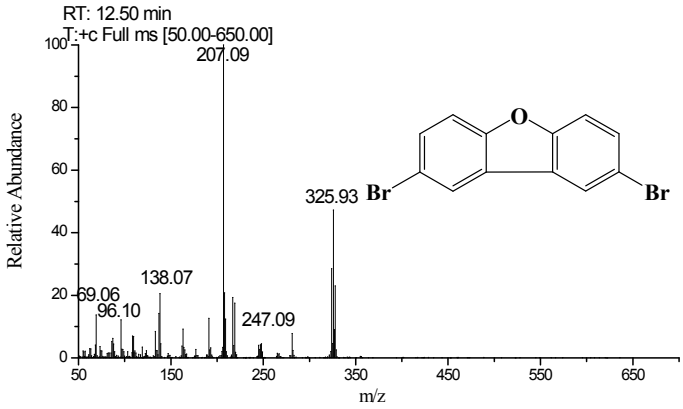
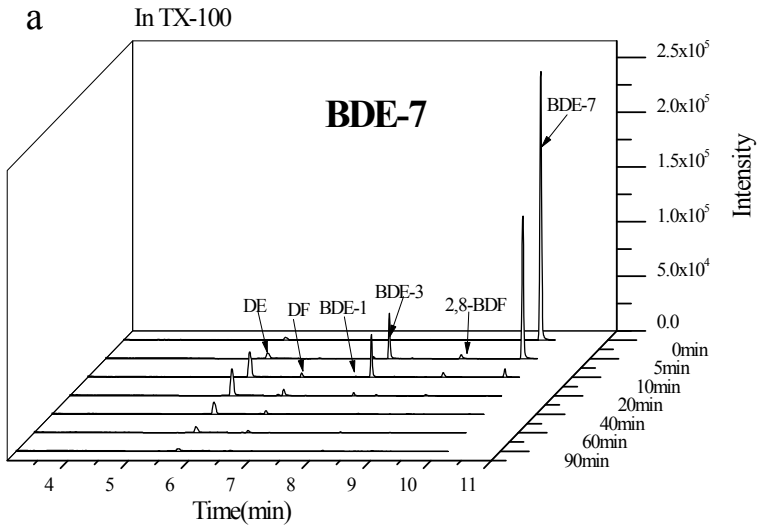
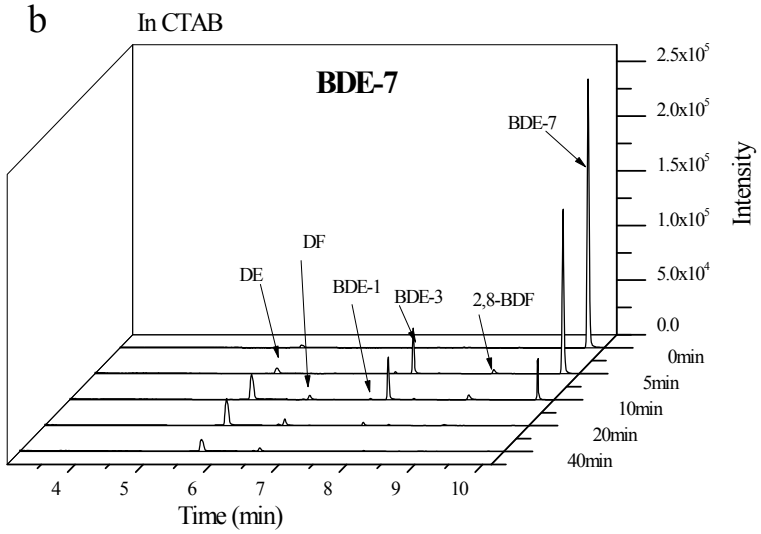


Figure S7. Mass spectra of 2,8-BDF





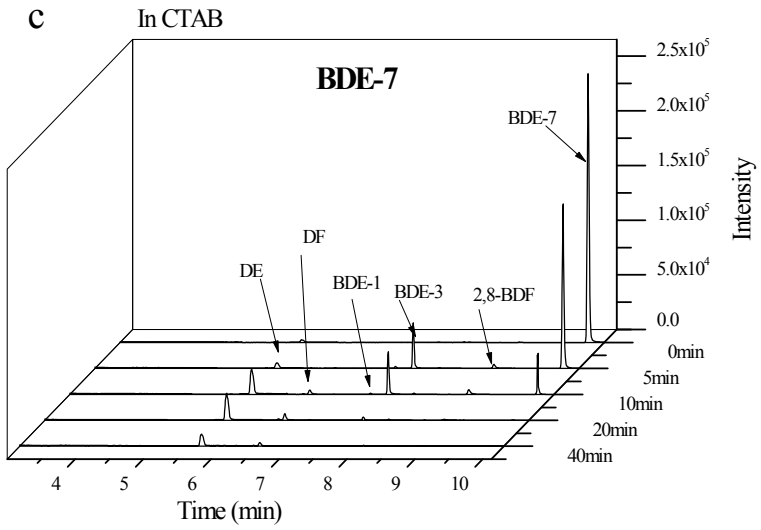
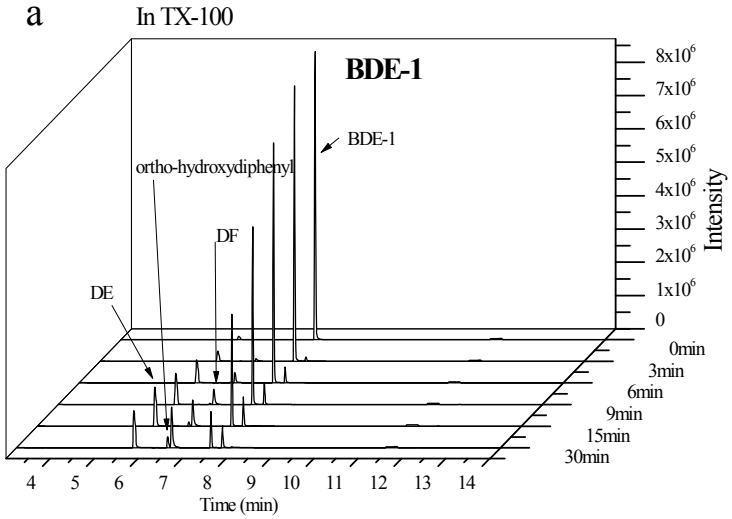
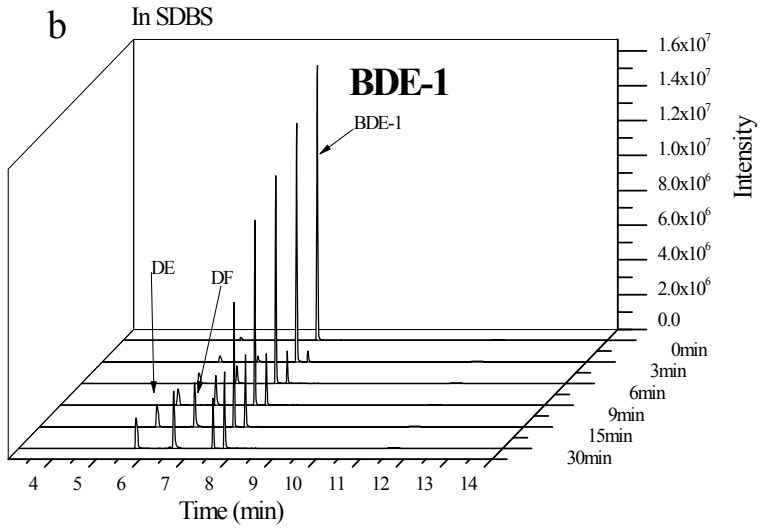


Figure S8. the chromatogram of BDE-7 photodegradation in TX-100(a), SDBS(b) and CTAB(c)





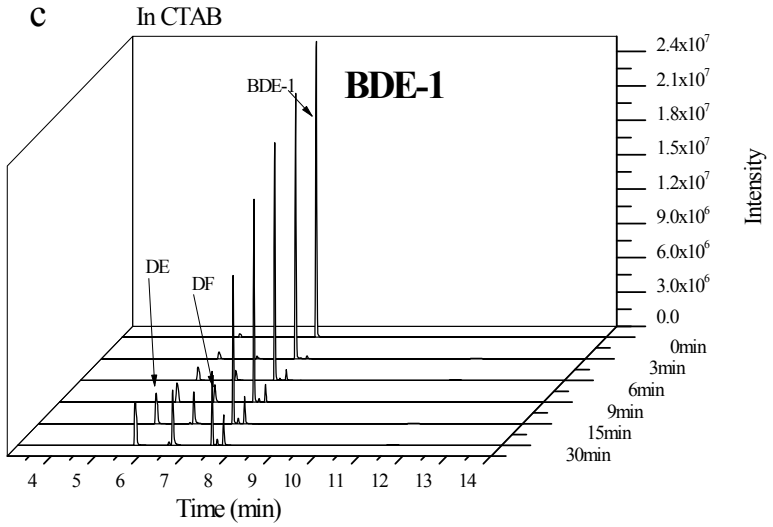
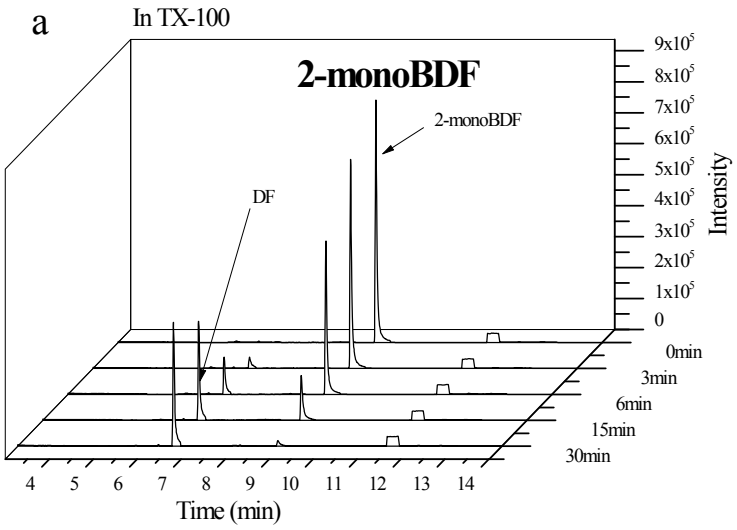
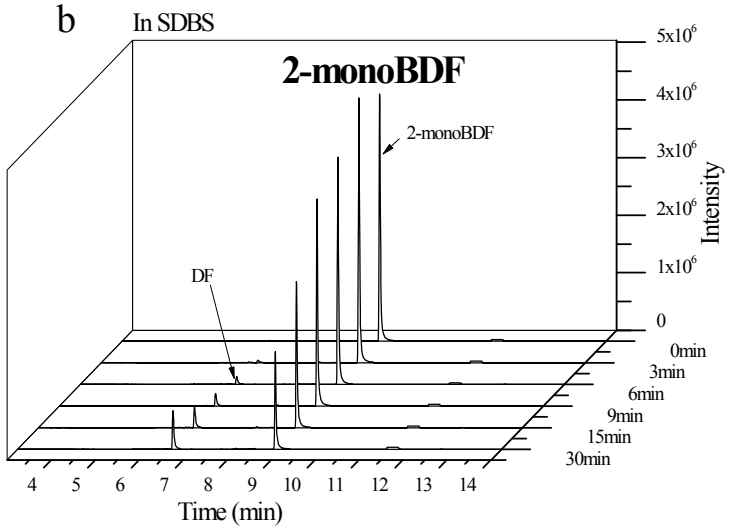


Figure S9. the chromatogram of BDE-1 photodegradation in TX-100(a), SDBS(b) and CTAB(c)


a
In TX-100
2-monoBDF
2-monoBDF
DF
9x10^5
8x10^5
7x10^5
6x10^5
5x10^5
4x10^5
3x10^5
2x10^5
1x10^5
0
Intensity
0min
3min
6min
15min
30min
4 5 6 7 8 9 10 11 12 13 14
Time (min)


b
In SDBS
2-monoBDF
2-monoBDF
DF
5x10^6
4x10^6
3x10^6
2x10^6
1x10^6
0
Intensity
0min
3min
6min
9min
15min
30min
4 5 6 7 8 9 10 11 12 13 14
Time (min)

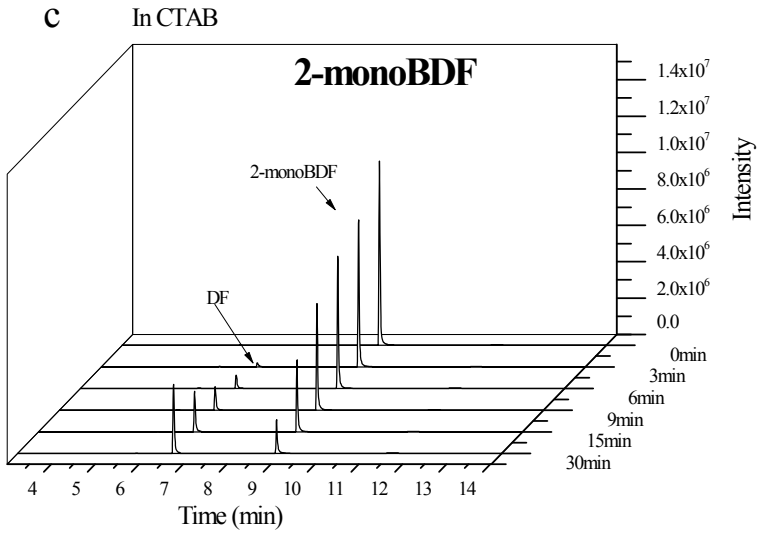
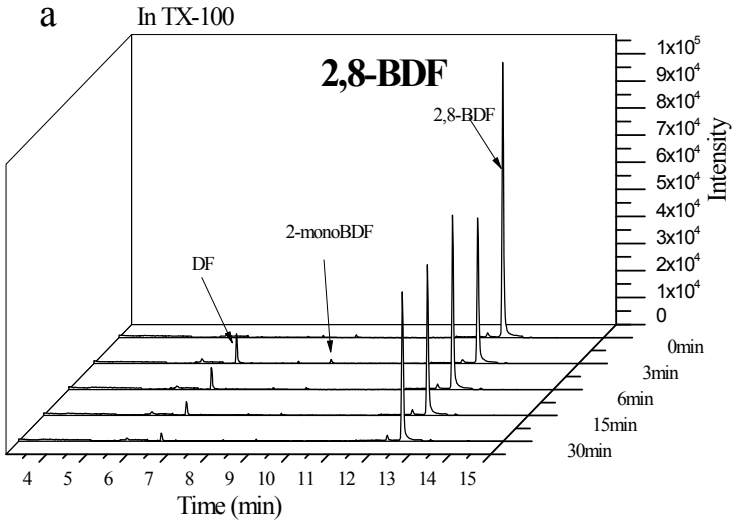
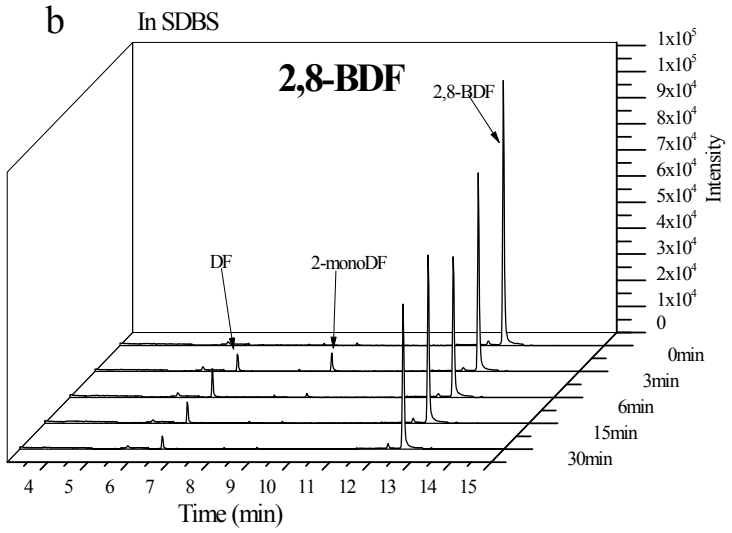


Figure S10. the chromatogram of 2-BDF photodegradation in TX-100(a), SDBS(b) and CTAB(c)





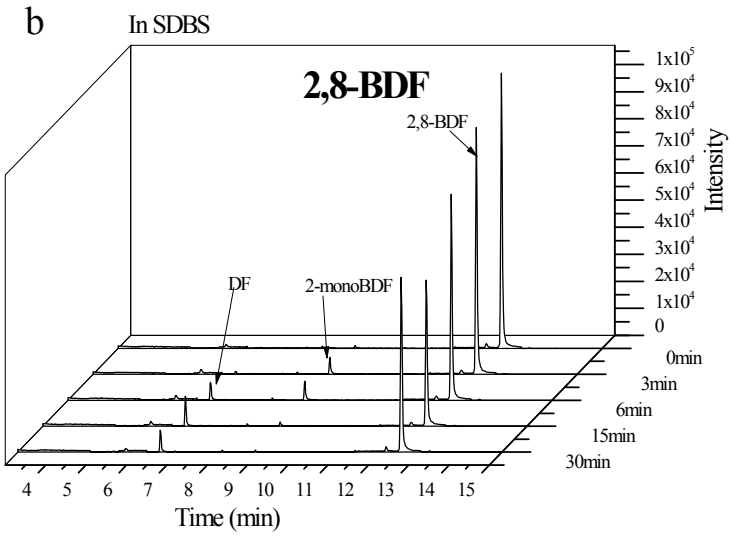
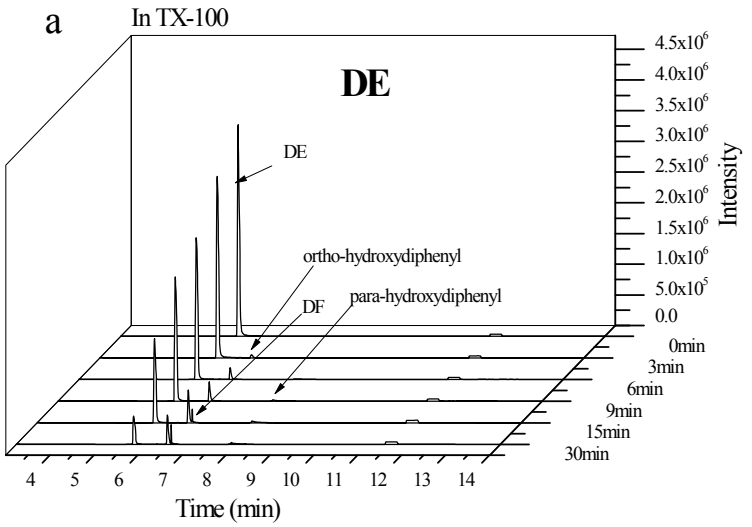
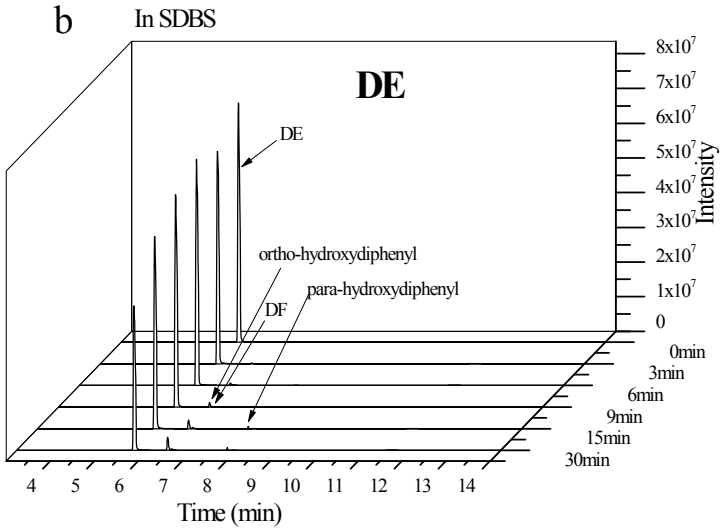


Figure S11. the chromatogram of 2,8-BDF photodegradation in TX-100(a), SDBS(b) and CTAB(c)


a
In TX-100
DE
DE
ortho-hydroxydiphenyl
DF
para-hydroxydiphenyl
4.5x10^6
4.0x10^6
3.5x10^6
3.0x10^6
2.5x10^6
2.0x10^6
1.5x10^6
1.0x10^6
5.0x10^5
0.0
Intensity
0min
3min
6min
9min
15min
30min
4 5 6 7 8 9 10 11 12 13 14
Time (min)


b
In SDBS
DE
DE
ortho-hydroxydiphenyl
para-hydroxydiphenyl
DF
8x10^7
7x10^7
6x10^7
5x10^7
4x10^7
3x10^7
2x10^7
1x10^7
0
Intensity
0min
3min
6min
9min
15min
30min
4 5 6 7 8 9 10 11 12 13 14
Time (min)

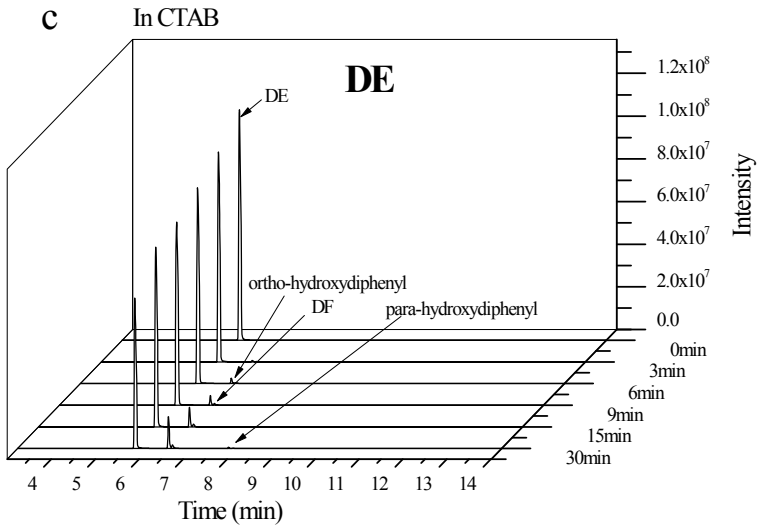


Figure S12. the chromatogram of BDE-15 photodegradation in TX-100(a), SDBS(b) and CTAB(c)

Table S1: The mass spectrometry parameters of BDE-28 product

Compounds	Retention Time	Fragment ion
DE	5.51	115, 141, 170
Ortho-hydroxydiphenyl	6.24	115, 141, 170
DF	6.32	139, 168
BDE-1	7.18	115, 141, 169, 220, 248
BDE-3	7.43	115, 141, 169, 220, 248
Para-hydroxydiphenyl	7.48	115, 141, 170
2-monoBDF	8.44	139, 167, 246, 248
BDE-7	9.40	139, 168, 328
BDE-8	9.75	139, 168, 328
BDE-15	10.22	140, 168, 219, 328
2,8-BDF	11.74	138, 163, 219, 245, 326
BDE-17	12.68	139, 167, 248, 406
BDE-28	13.27	139, 167, 248, 406