Supporting Information

Visible-Light Photocatalytic Selective Oxidation of Amine and Sulfide with $CsPbBr_3$ as Photocatalyst

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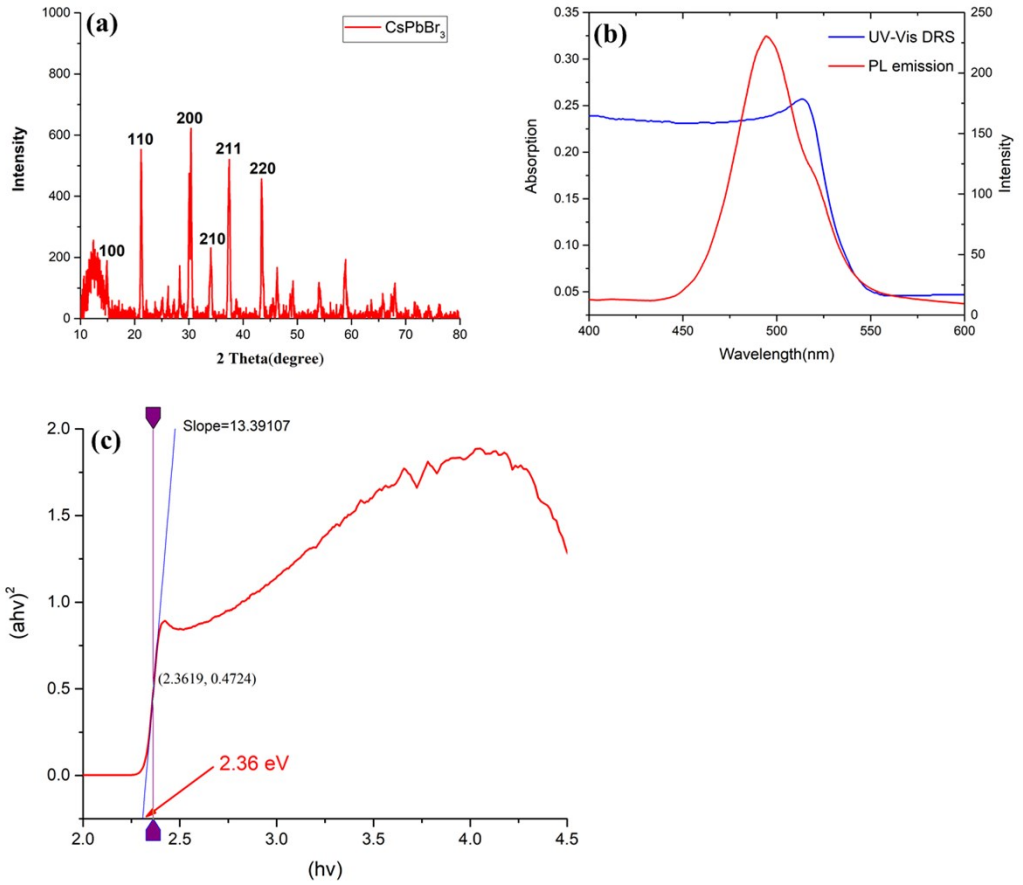
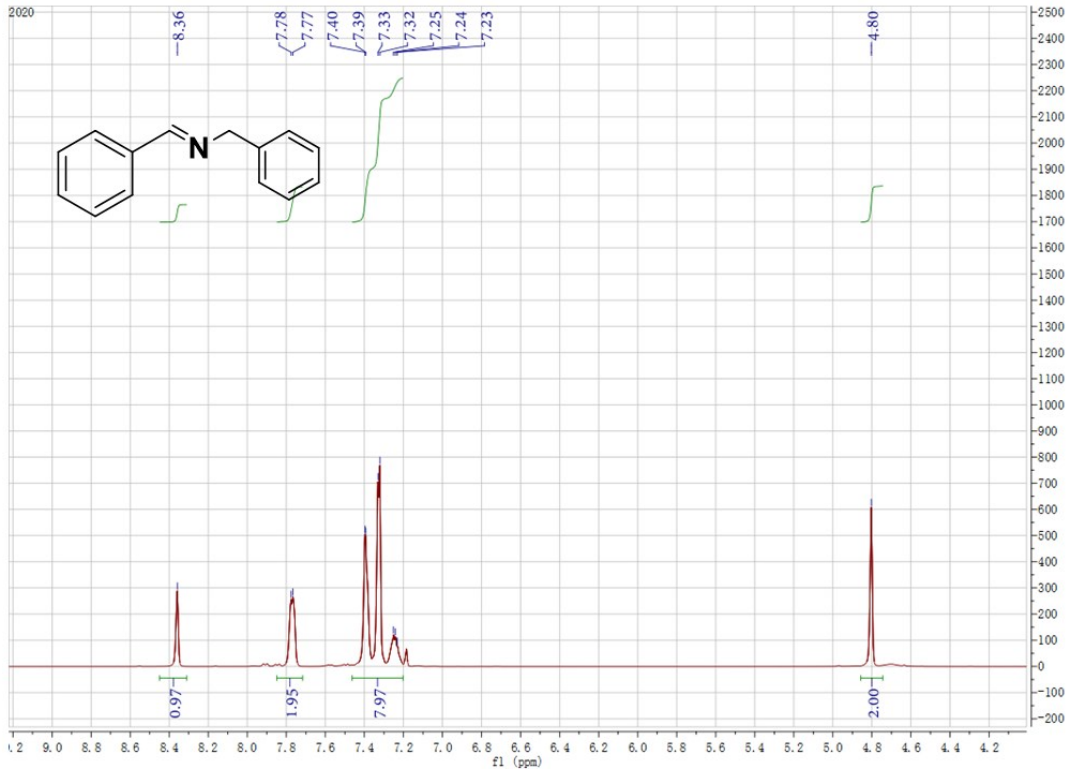


Fig.S1 (a): XRD pattern; **(b)**:UV-Vis DRS and PL emission; **(c)**: a relative curve of $(ahv)^2$ versus photon energy as well as the determined energy gap of $CsPbBr_3$.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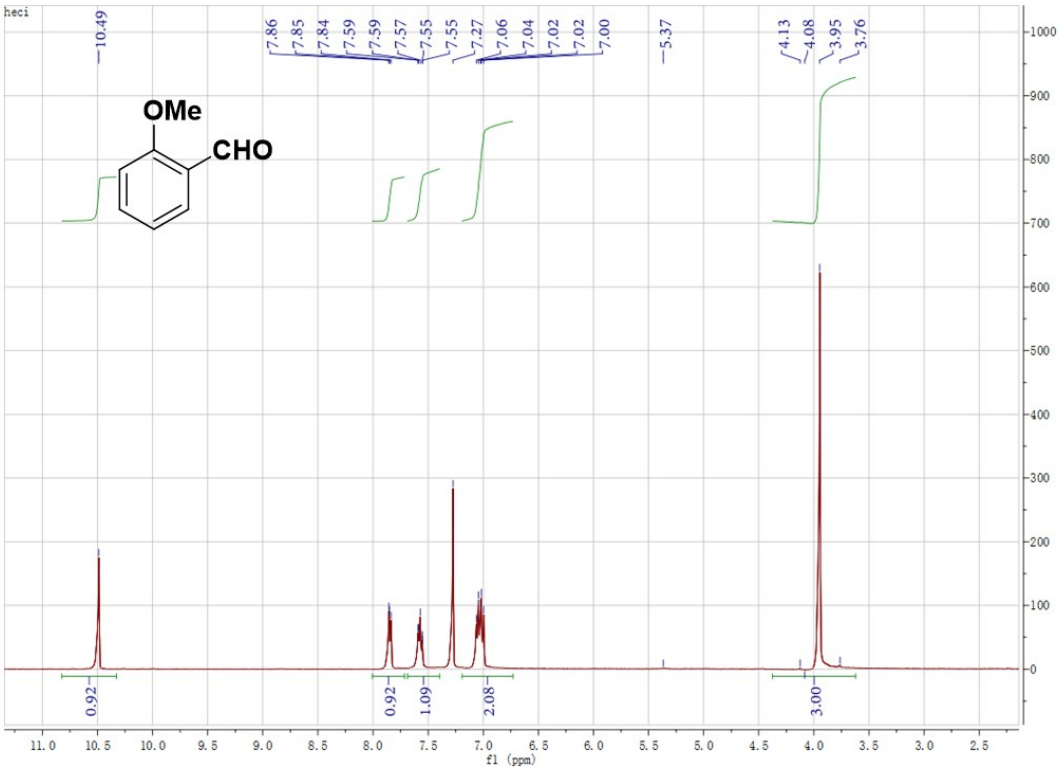
7.78
7.77
7.40
7.39
7.33
7.32
7.25
7.24
7.23
4.80
N
0.97
1.95
7.97
2.00
f1 (ppm)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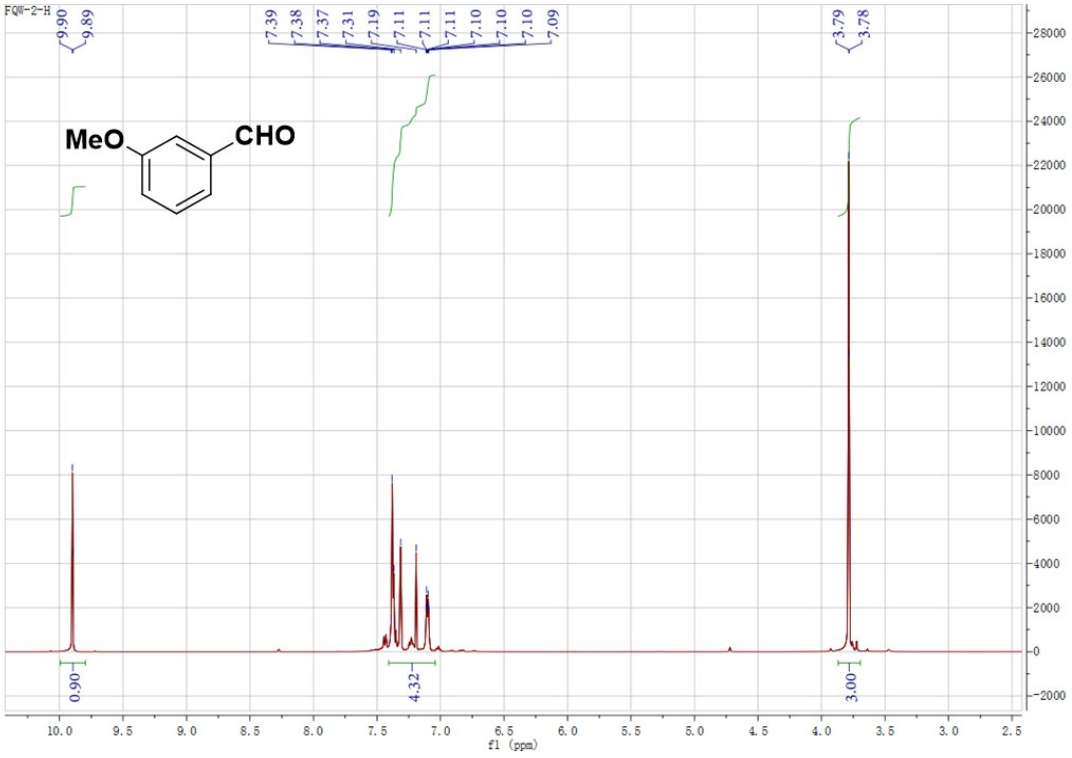
7.86
7.85
7.84
7.59
7.59
7.57
7.55
7.55
7.27
7.06
7.04
7.02
7.02
7.00
5.37
4.13
4.08
3.95
3.76
OMe
CHO
0.92
0.92
1.09
2.08
3.00
f1 (ppm)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9.89
7.39
7.38
7.37
7.31
7.19
7.11
7.11
7.11
7.10
7.10
7.10
7.09
3.79
3.78
MeO
CHO
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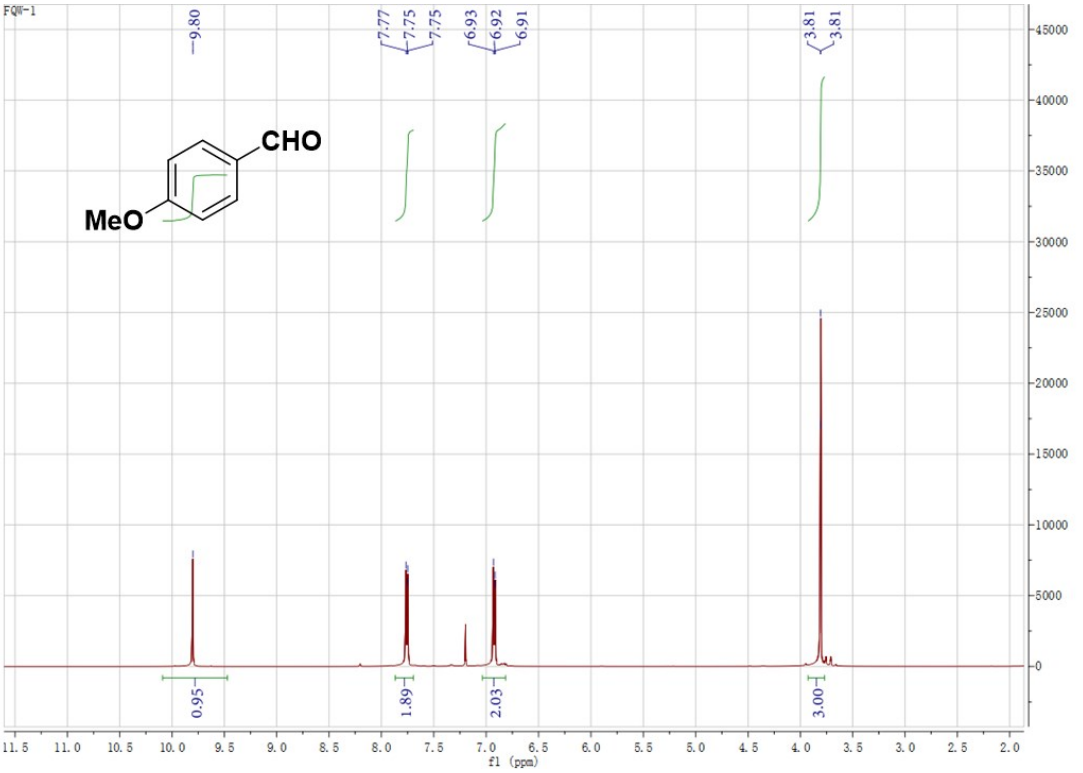
4.32
3.00
f1 (ppm)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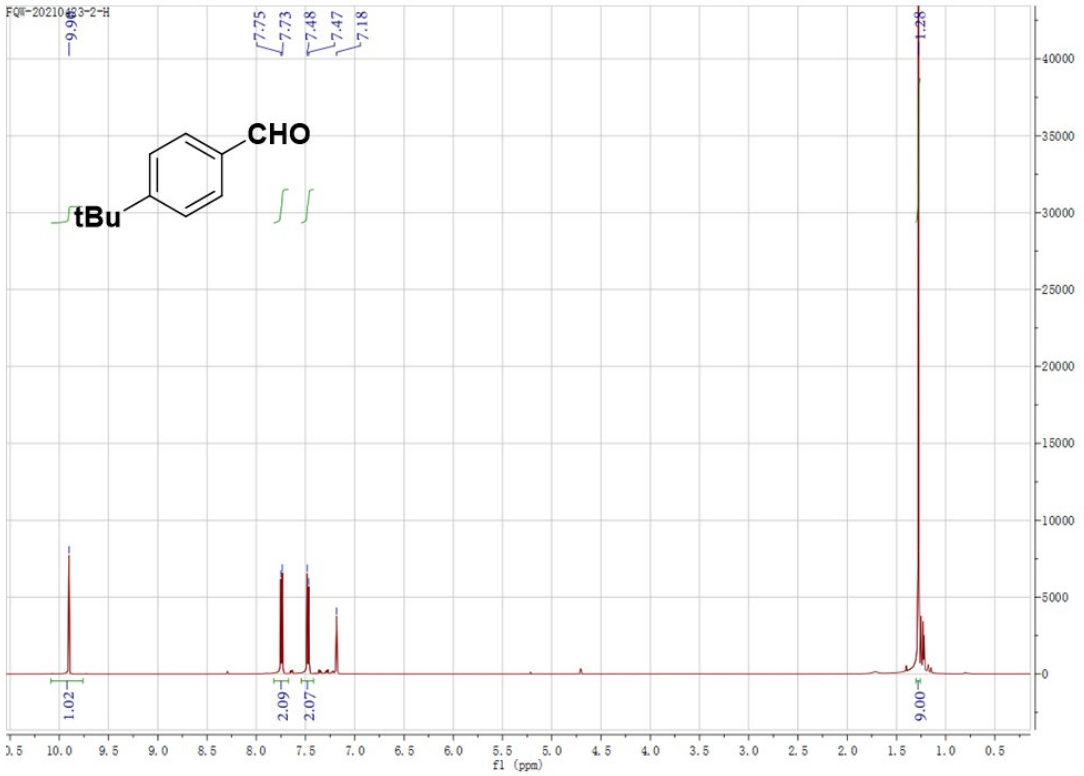
7.77
7.75
7.75
6.93
6.92
6.91
3.81
3.81
CHO
MeO
0.95
1.89
2.03
3.00
f1 (ppm)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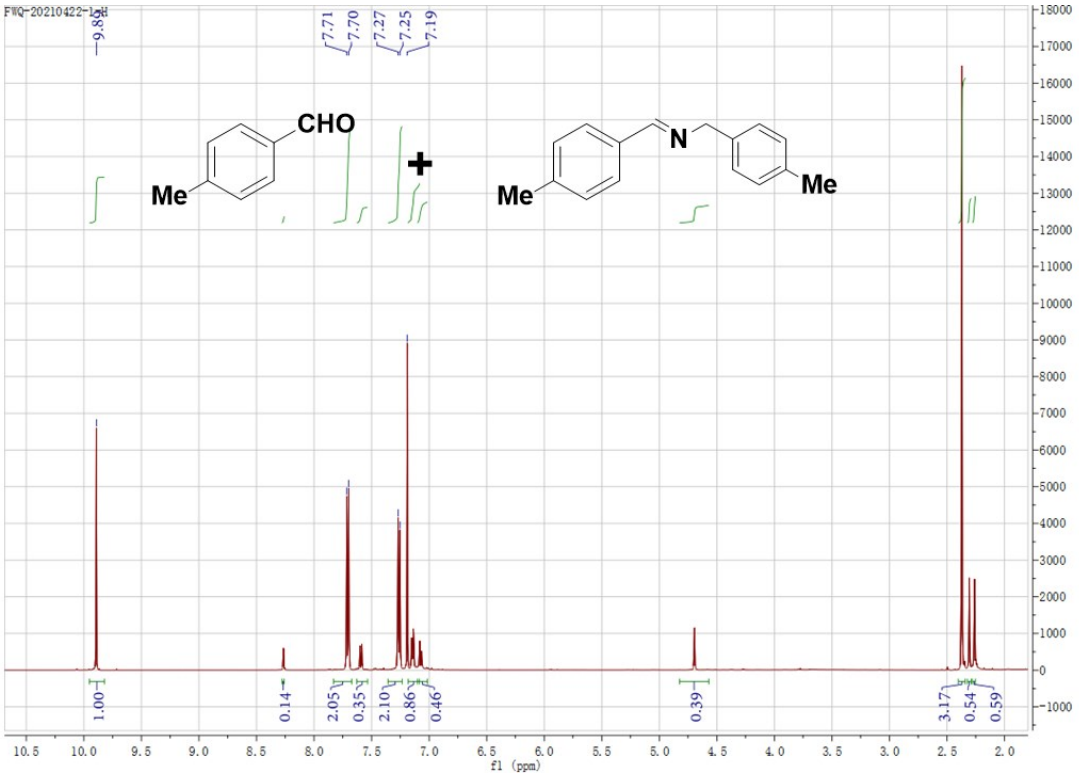
7.47
7.18
1.28
1.02
2.09
2.07
9.00
f1 (ppm)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+
N
Me
Me
7.71
7.70
7.27
7.25
7.19
1.00
0.14
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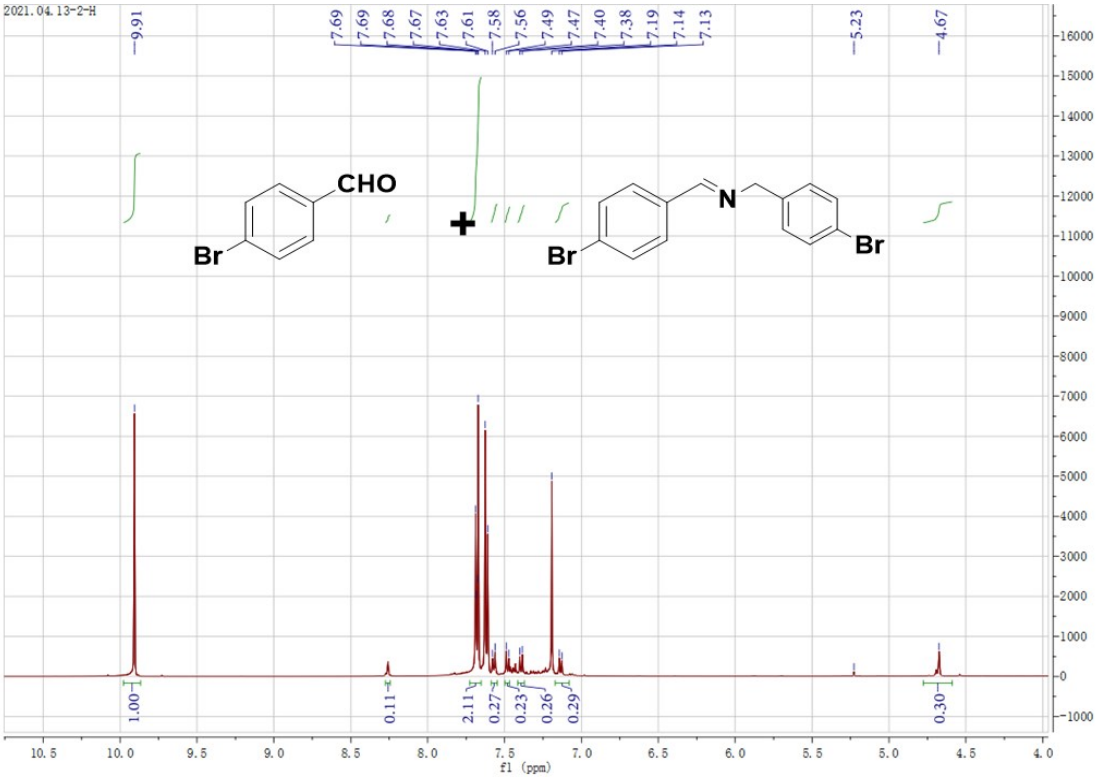
0.35
2.10
0.86
0.46
0.39
3.17
0.54
0.59
f1 (ppm)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7.69
7.68
7.67
7.63
7.61
7.58
7.56
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7.47
7.40
7.38
7.19
7.14
7.13
5.23
4.67
CHO
Br
N
Br
Br
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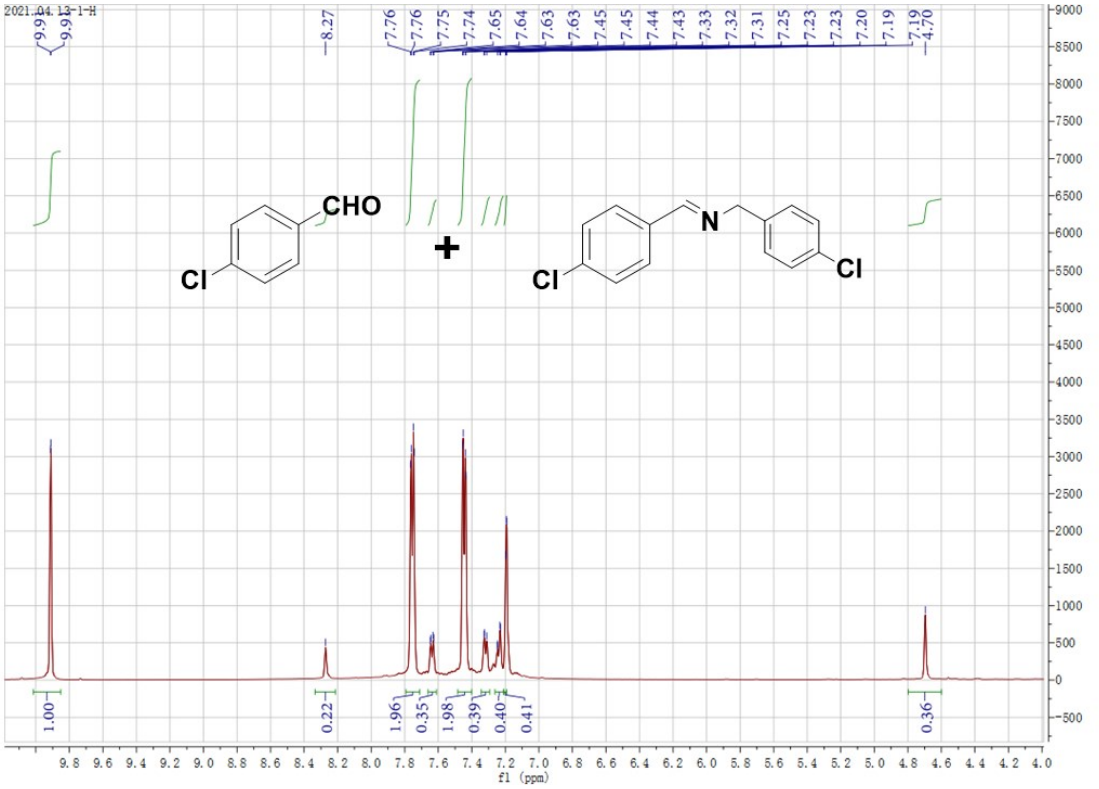
0.11
2.11
0.27
0.23
0.26
0.29
0.30
f1 (ppm)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9.91
8.27
7.76
7.76
7.75
7.74
7.65
7.64
7.63
7.63
7.45
7.45
7.44
7.43
7.33
7.32
7.31
7.25
7.23
7.23
7.20
7.19
7.19
4.70
CHO
Cl
N
Cl
Cl
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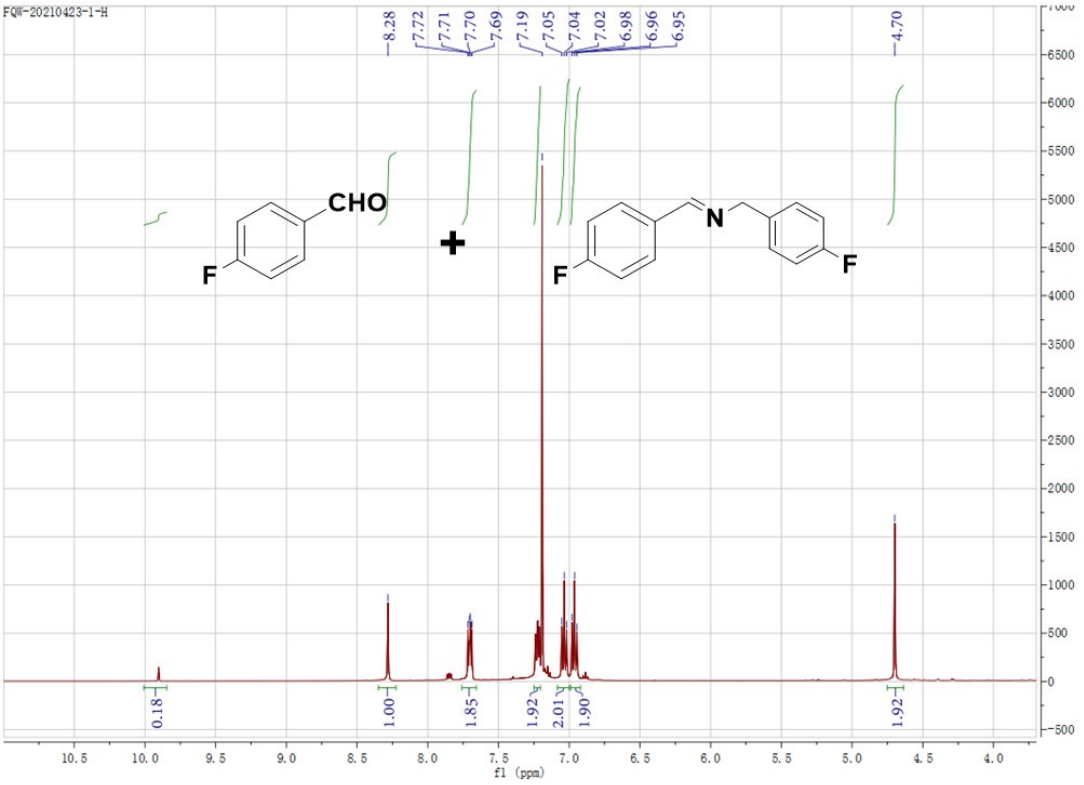
0.22
1.96
0.35
1.98
0.39
0.40
0.41
0.36
f1 (ppm)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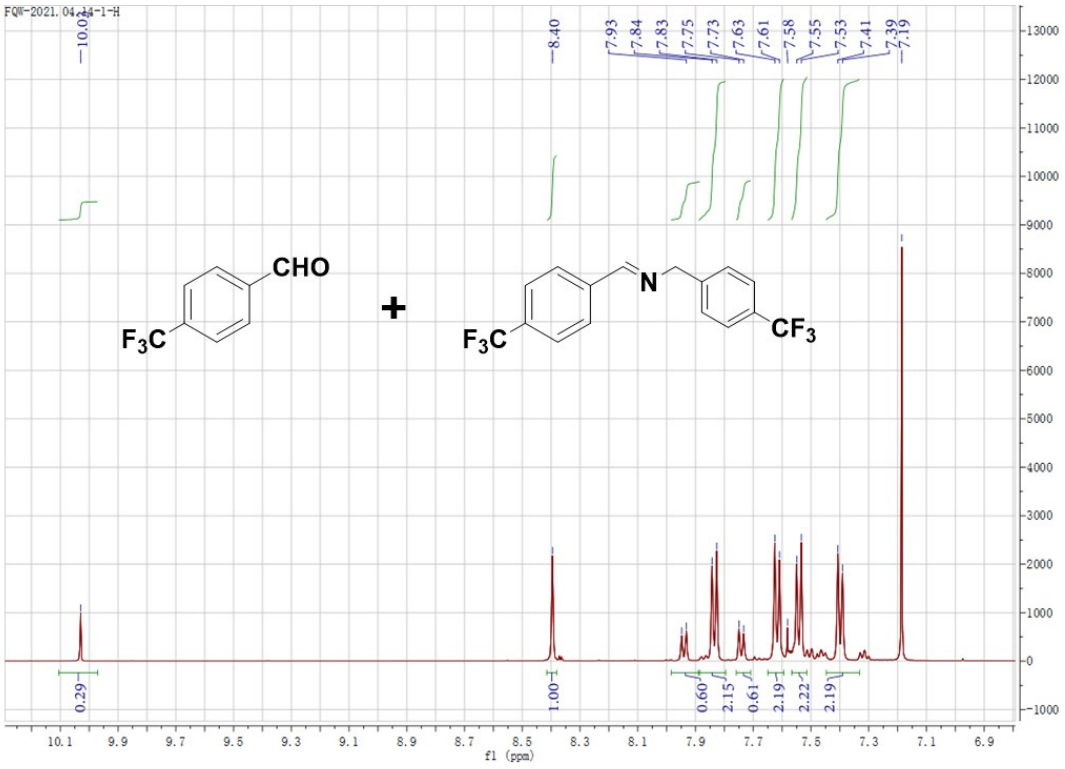
7.72
7.71
7.70
7.69
7.19
7.05
7.04
7.02
6.98
6.96
6.95
4.70
CHO
F
N
F
F
0.18
1.00
1.85
1.92
2.01
1.90
1.92
f1 (ppm)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7.93
7.84
7.83
7.75
7.73
7.63
7.61
7.58
7.55
7.53
7.41
7.39
7.19
CHO
F3C
N
F3C
CF3
0.29
1.00
0.60
2.15
0.61
2.19
2.22
2.19
f1 (ppm)

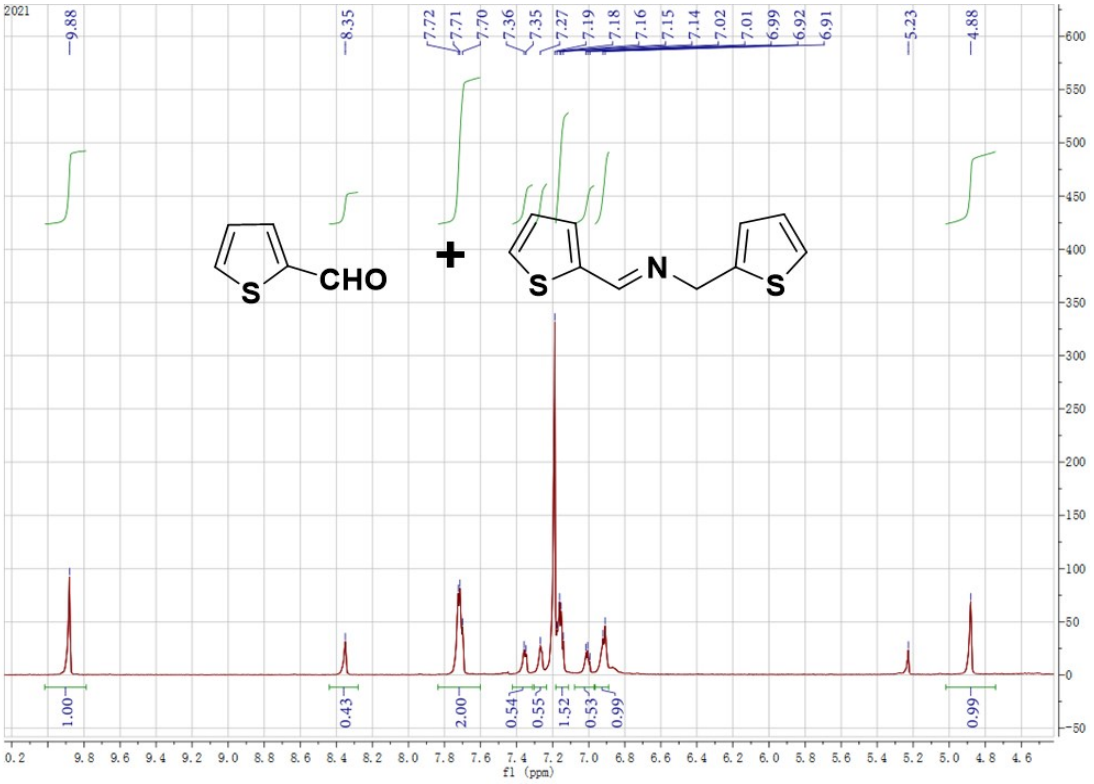
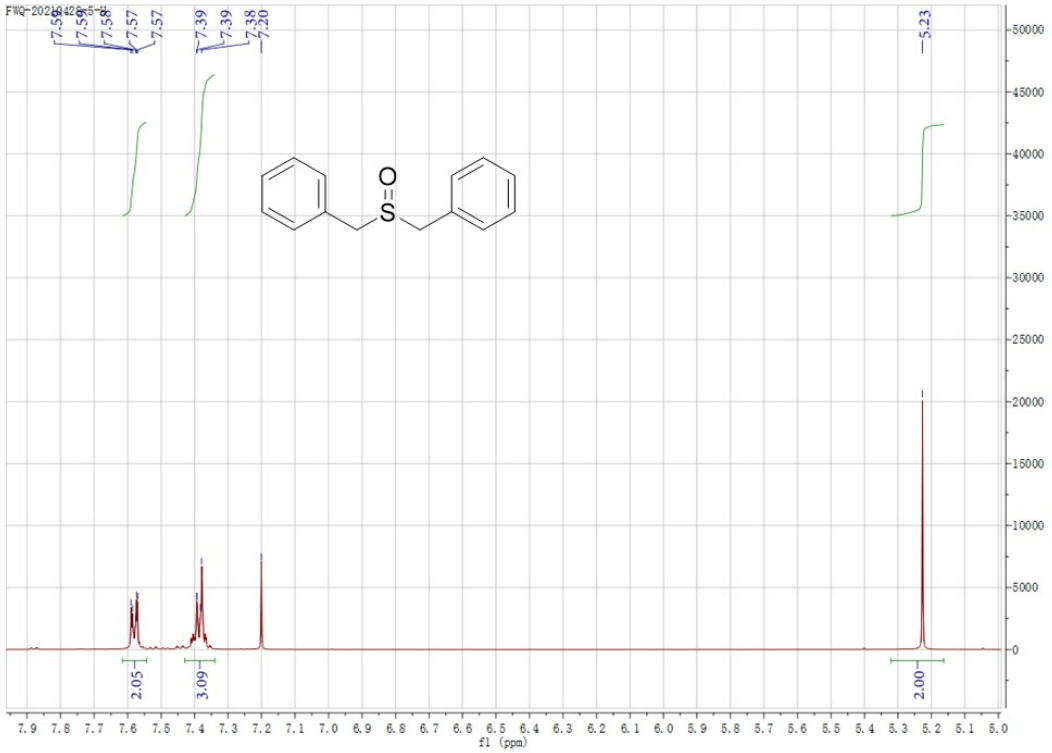
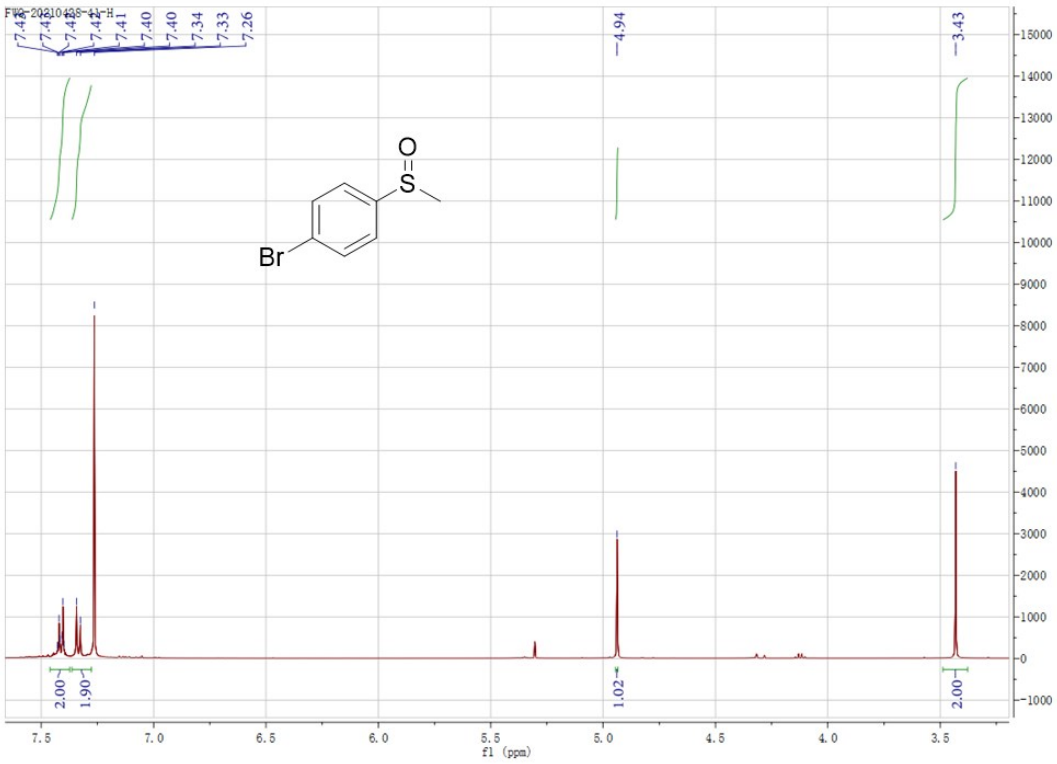
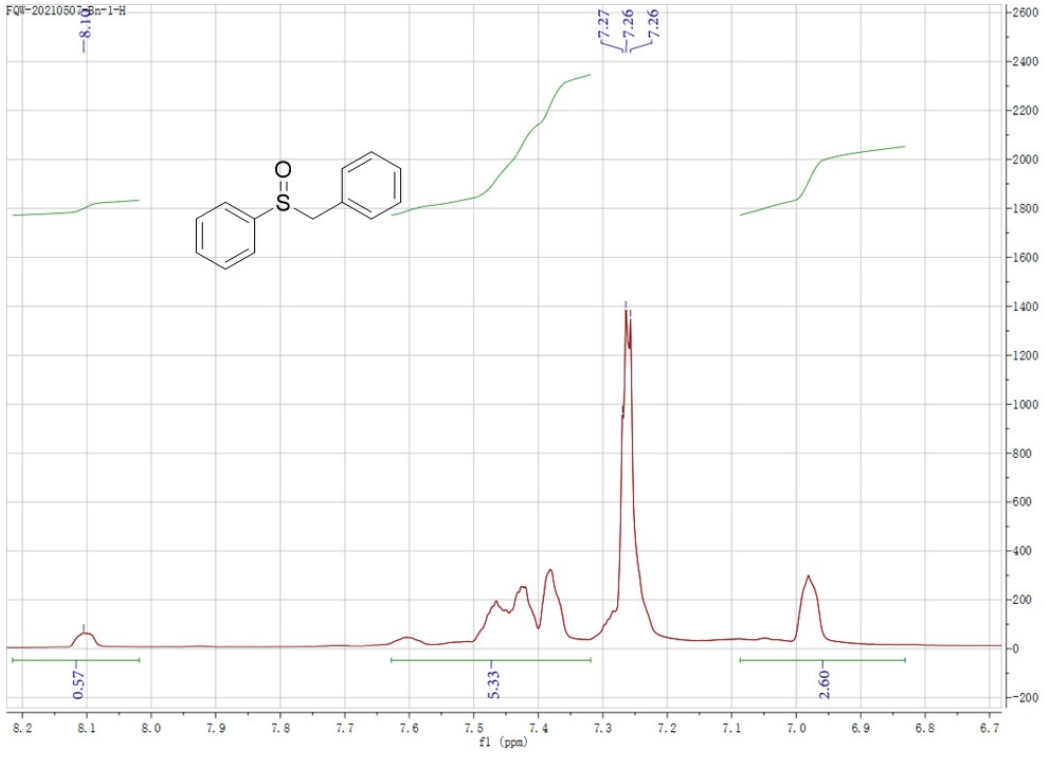
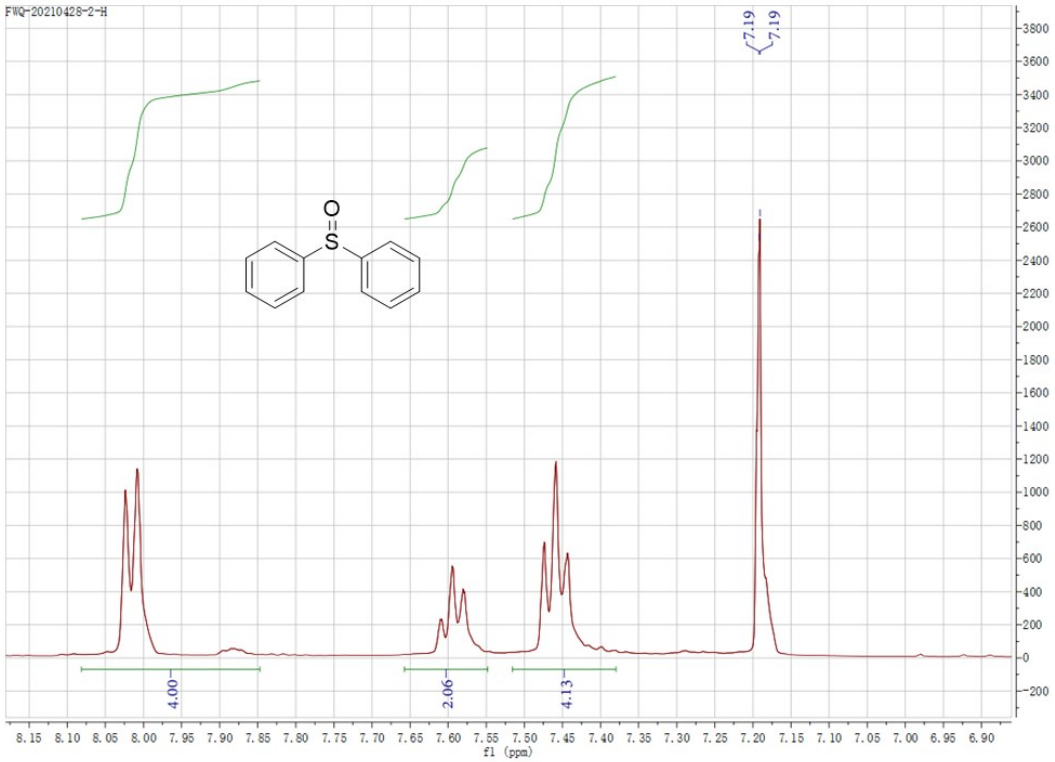


Fig.S2 [1]HNMR spectra of photocatalytic products of amines




7.46
7.41
7.40
7.34
7.33
7.26
4.94
3.43
O
S
Br
2.00
1.90
1.02
2.00
f1 (ppm)


8.10
7.27
7.26
7.26
O
S
0.57
5.33
2.60
f1 (ppm)


FWQ-20210428-2-H
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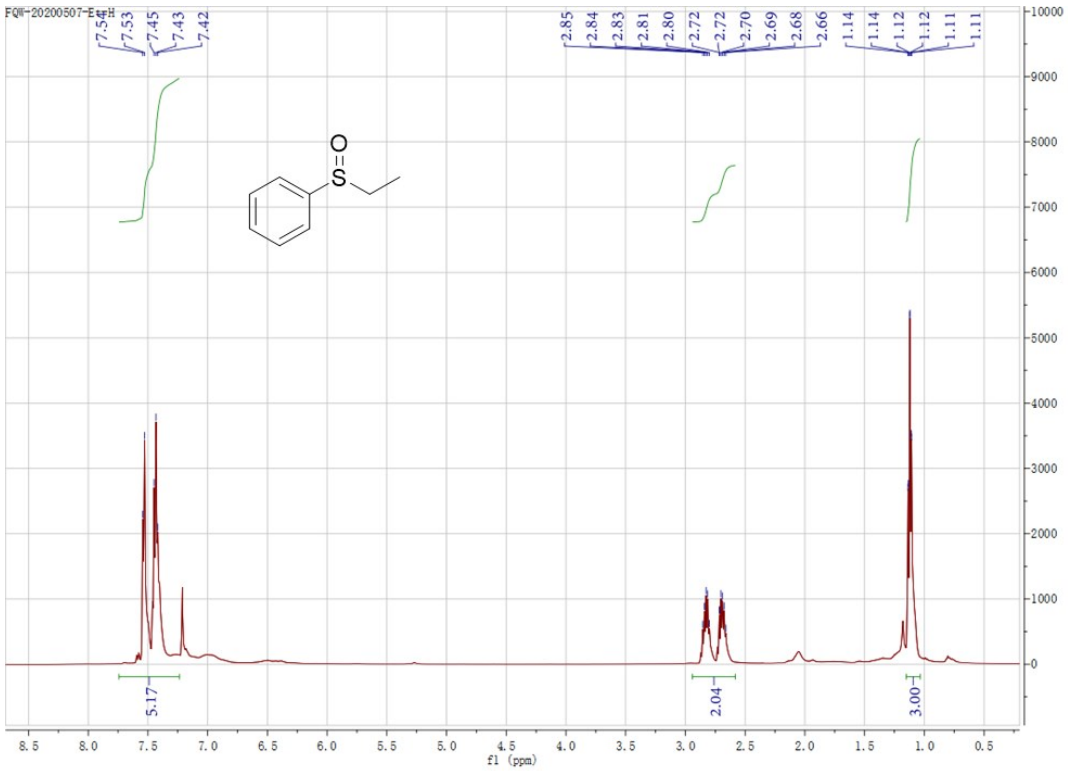
7.19
4.00
2.06
4.13
f1 (ppm)


FQW-20200507-E-H
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7.53
7.45
7.43
7.42
2.85
2.84
2.83
2.81
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2.72
2.70
2.69
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1.11
5.17
2.04
3.00
f1 (ppm)

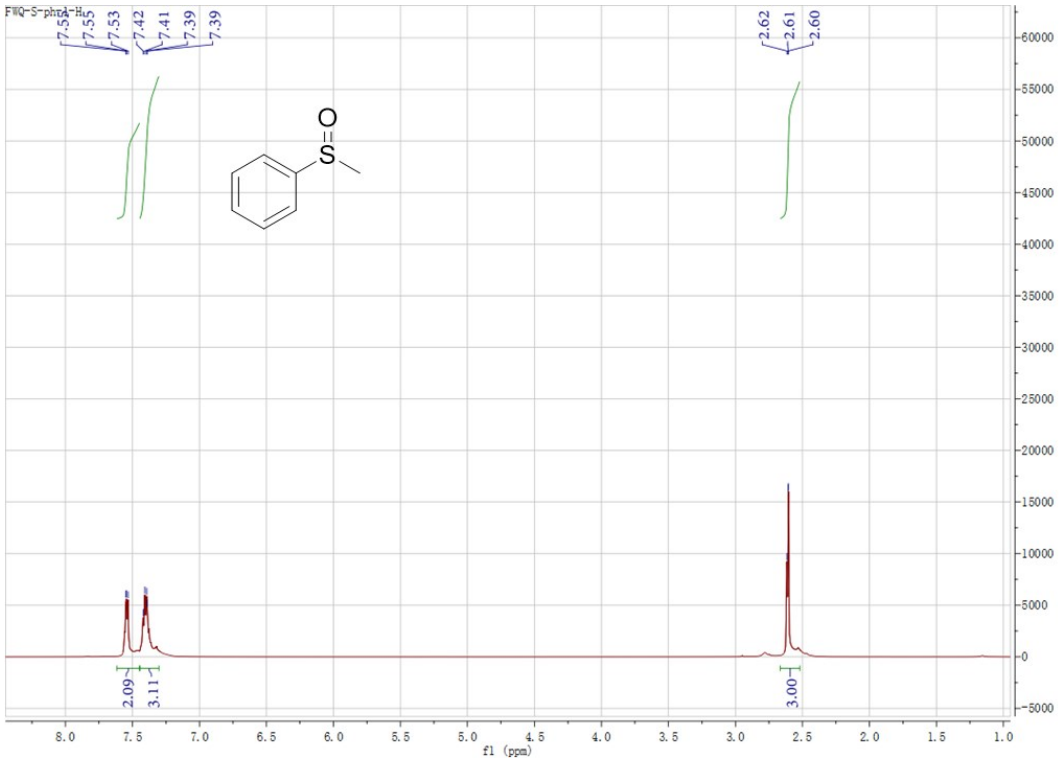

Fig.S3 [1]HNMR spectra of photocatalytic products of sulfides

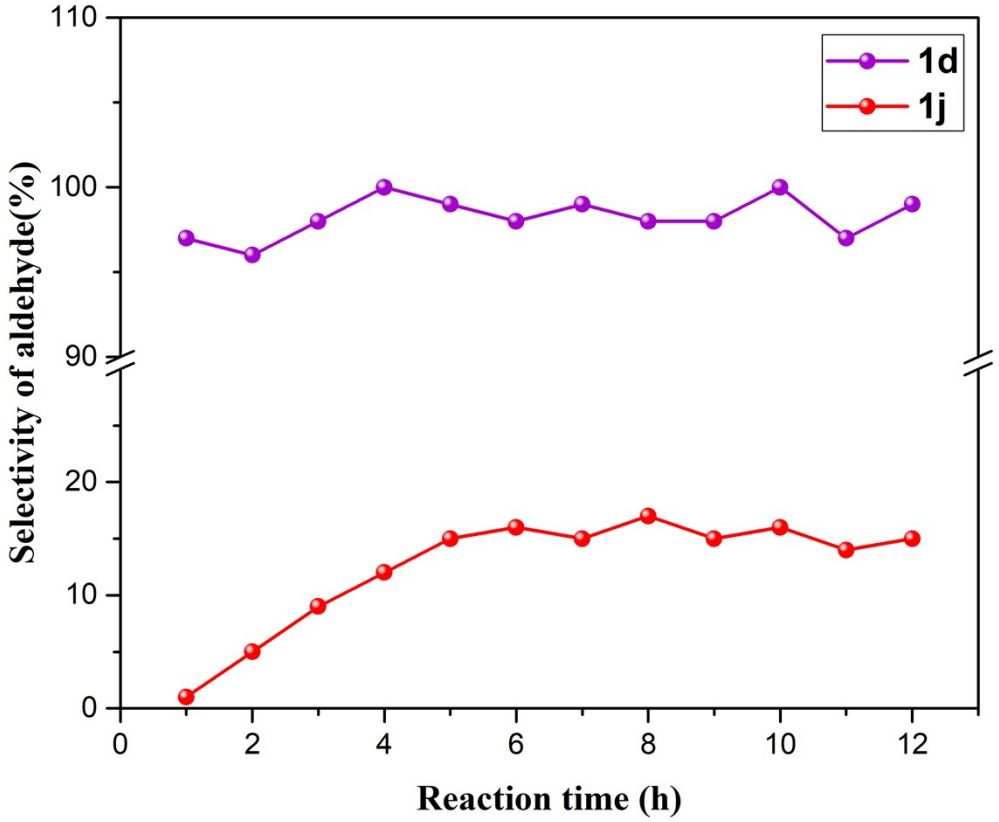

Fig.S4 Detection of the products of the transformation of **1d** and **1j** at different reaction times by GC

As shown in **Fig.S4**, for the transformation of **1d**, the selectivity of aldehyde was in the range of 96~99% and was not affected by the reaction time, but for the reaction of **1j,** the selectivity of aldehyde in the first two hours was negligible (<5%), that is, the imine was almost the only product, while with the prolonging of reaction time, the selectivity was increased to 15%, which was kept at about 16% after 6 hours. These results indicated that the formation of aldehyde afforded by amines with electron-denoting group was irreversible, while the formation of imine afforded by amines with electron-withdrawing group was reversible and the reaction equilibrium would be achieved after several reaction hours, which gave rise to a certain amount of aldehyde as accompanied product with imine.