

**A series of BiO_xI_y/GO photocatalysts: synthesis, characterization, activity, and
mechanism[†]**

Shang-Yi Chou^a, Wen-Hsin Chung^b, Li-Wen Chen^a, Yong-Ming Dai^a, Wan-Yu Lin

^b, Jia-Hao Lin^a, Chiing-Chang Chen^{a*}

^a Department of Science Education and Application, National Taichung University of
Education, Taichung 403, Taiwan

^b Department of Plant Pathology, National Chung Hsing University, Taichung 402,
Taiwan

* Author to whom correspondence should be addressed

E-mail: ccchen@mail.ntcu.edu.tw

Fax: +886-4-2218-3560

Tel: +886-4-2218-3406

1 **Table S1.** Energy gap of BiO_xI_y/GO photocatalysts.

Energy gap (E_g , eV)					
GO Weight (%)	pH				
	1	4	7	10	13
0	1.69	1.81	1.94	2.19	1.17
0.005	1.60	1.60	1.98	2.11	1.77
0.01	1.49	1.51	1.75	2.01	1.37
0.05	1.53	1.25	1.52	1.82	1.92
0.10	-	0.74	1.11	1.60	0.86
0.15	-	0.21	0.60	0.58	0.65

2

3

4

5

6

7

8 **Table S2.** Physical and chemical properties of as-prepared samples.

9

10

pH	BiO _x I _y /GO (g)	S _{BET} (m ² /g)	Pore volume (cm ³ /g)	Pore diameter (nm)
	GO	10.78	0.012	4.54
1	BiOI/GO (0.05)	8.34	0.093	38.49
1	BiOI	3.51	0.024	22.37
4	Bi ₄ O ₅ I ₂ /GO (0.05)	47.83	0.347	23.93
4	Bi ₄ O ₅ I ₂	8.08	0.096	36.10
7	Bi ₇ O ₉ I ₃ /GO (0.05)	37.13	0.397	36.14
7	Bi ₇ O ₉ I ₃	6.65	0.057	27.39
10	Bi ₇ O ₉ I ₃ /GO (0.05)	31.03	0.247	26.29
10	Bi ₇ O ₉ I ₃	5.74	0.065	37.74
13	Bi ₅ O ₇ I/GO (0.05)	6.32	0.050	27.16
13	Bi ₅ O ₇ I	0.44	0.006	44.68

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19

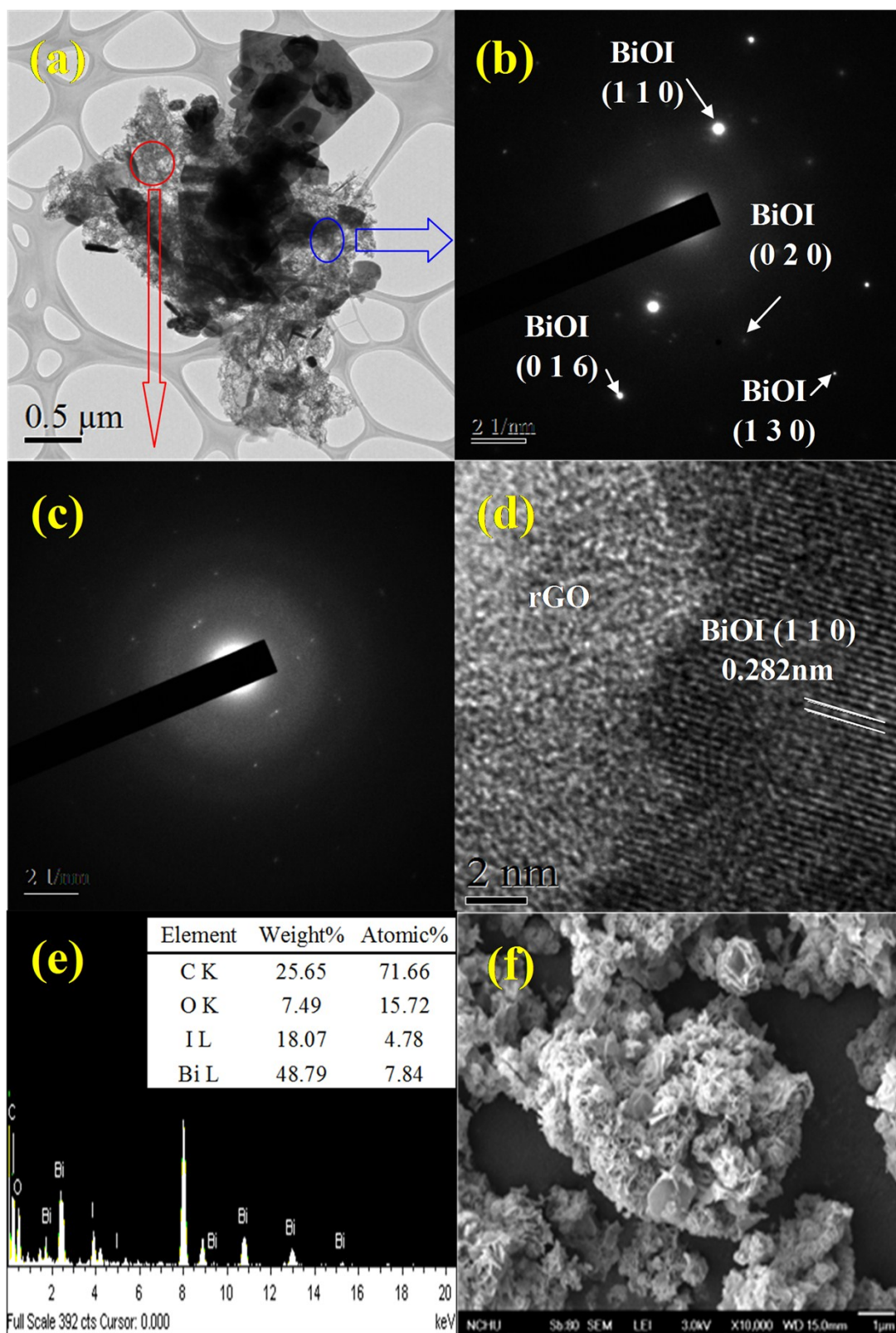
1 **Table S3.** The degraded intermediates of CV by photocatalytic process

HPLC peaks	Intermediates	ESI-MS spectrum ions (m/z)	Absorption maximum (nm)
A	<i>N,N,N',N',N'',N''</i> -hexaethylpararosaniline	372.18	588.2
B	<i>N,N</i> -dimethyl- <i>N',N'</i> -dimethyl- <i>N''</i> -methyl pararosaniline	358.14	581.1
C	<i>N,N</i> -dimethyl- <i>N'</i> -methyl- <i>N''</i> -methylpararosaniline	344.10	573.4
D	<i>N,N</i> -dimethyl- <i>N',N'</i> -dimethyl pararosaniline	344.09	579.5
E	<i>N</i> -methyl- <i>N'</i> -methyl- <i>N''</i> -methyl pararosaniline	330.10	566.1
F	<i>N,N</i> -dimethyl- <i>N'</i> -methylpararosaniline	330.36	570.7
G	<i>N</i> -methyl- <i>N'</i> -methylpararosaniline	316.15	561.8
H	<i>N,N</i> -dimethylpararosaniline	316.17	566.2
I	<i>N</i> -methylpararosaniline	302.06	554.1
J	Pararosaniline	288.07	543.4
a	4-(<i>N,N</i> -dimethylamino)-4'-(<i>N',N'</i> -dimethylamino)benzophenone	269.05	376.4
b	4-(<i>N,N</i> -dimethylamino)-4'-(<i>N'</i> -methylamino)benzophenone	255.06	366.6
c	4-(<i>N</i> -methylamino)-4'-(<i>N'</i> -methylamino)benzophenone	240.92	364.4
d	4-(<i>N,N</i> -dimethylamino)-4'-aminobenzophenone	240.98	358.8
e	4-(<i>N</i> -methylamino)-4'-aminobenzophenone	226.84	357.3
f	4,4'-Bis-aminobenzophenone	213.06	337.5
α	4-(<i>N,N</i> -dimethylamino)phenol	138.16	309.7
β	4-(<i>N</i> -methylamino)phenol	124.03	283.6
γ	4-aminophenol	110.14	278.1

2

3

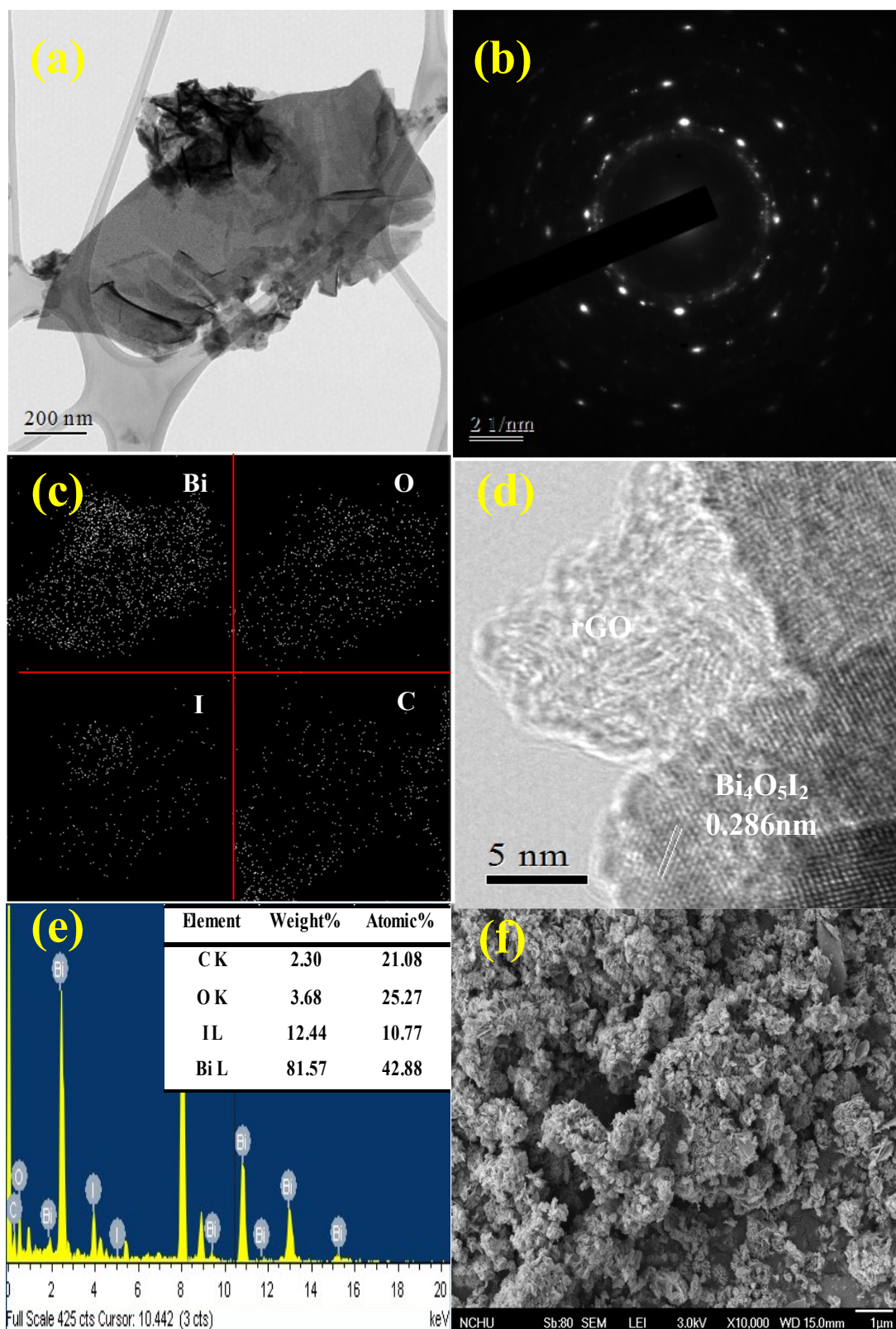
4



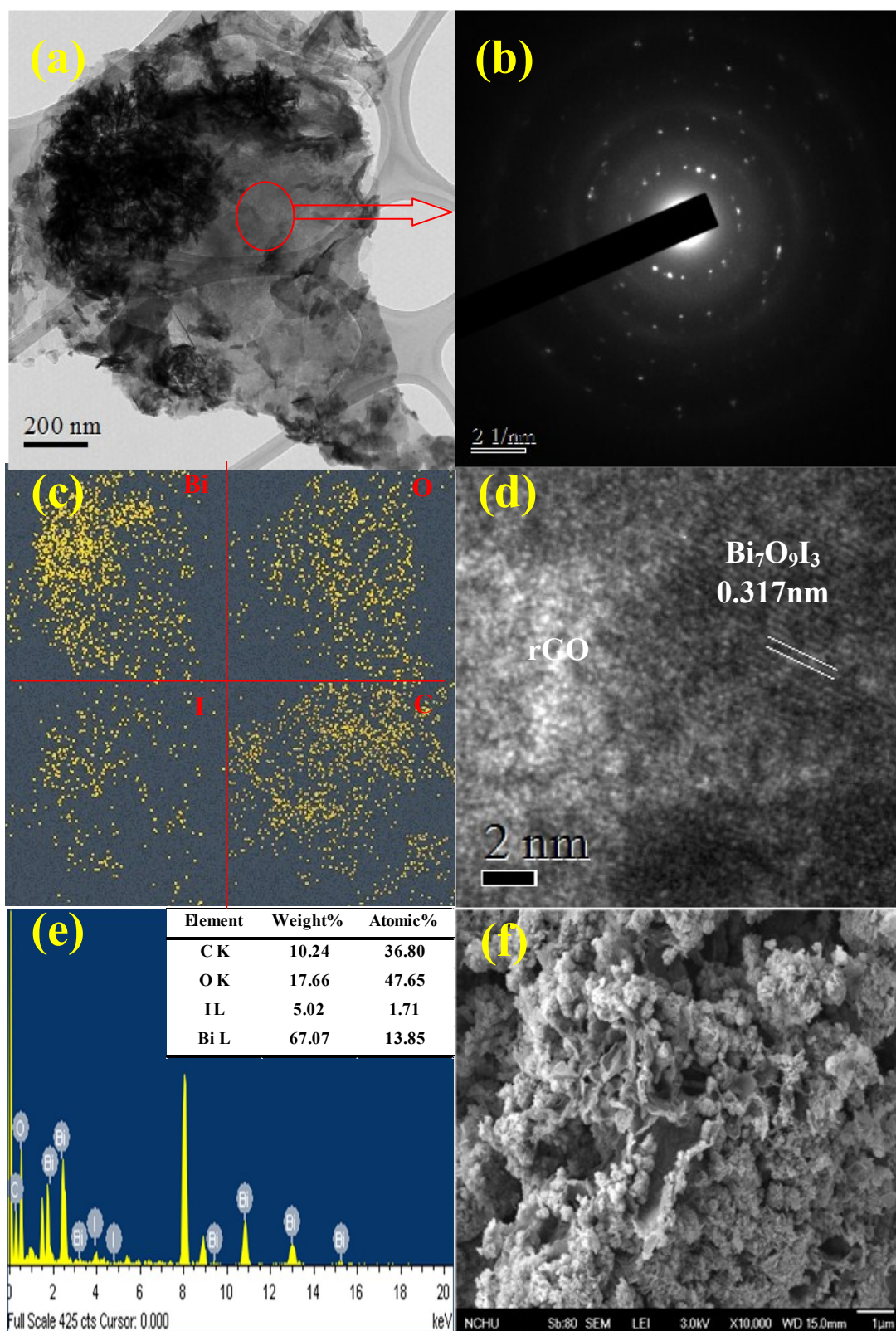
1

2 **Figure S1.** FE-TEM and FE-SEM of as-prepared BiOI/GO (pH = 1, 0.05

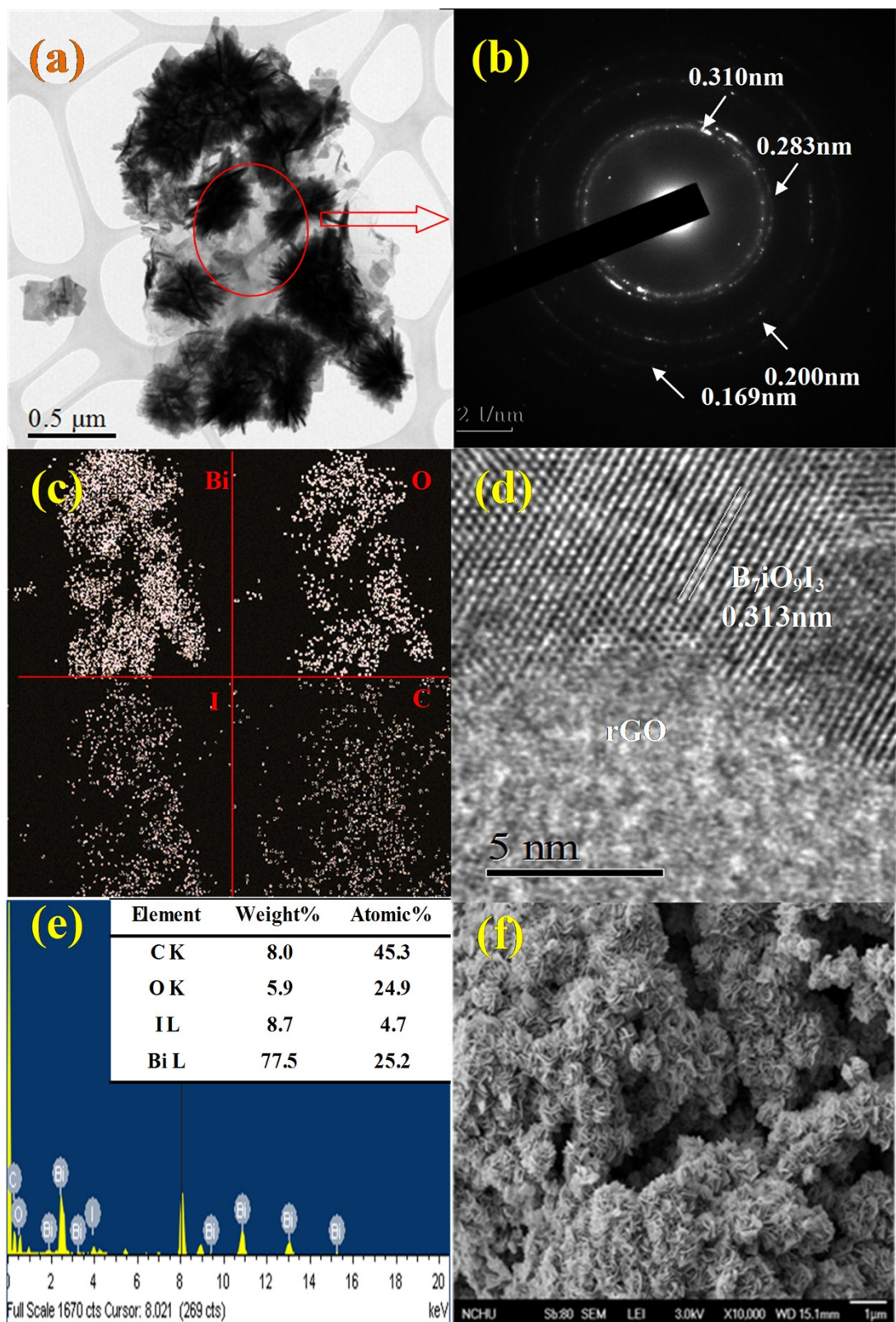
3 g GO).



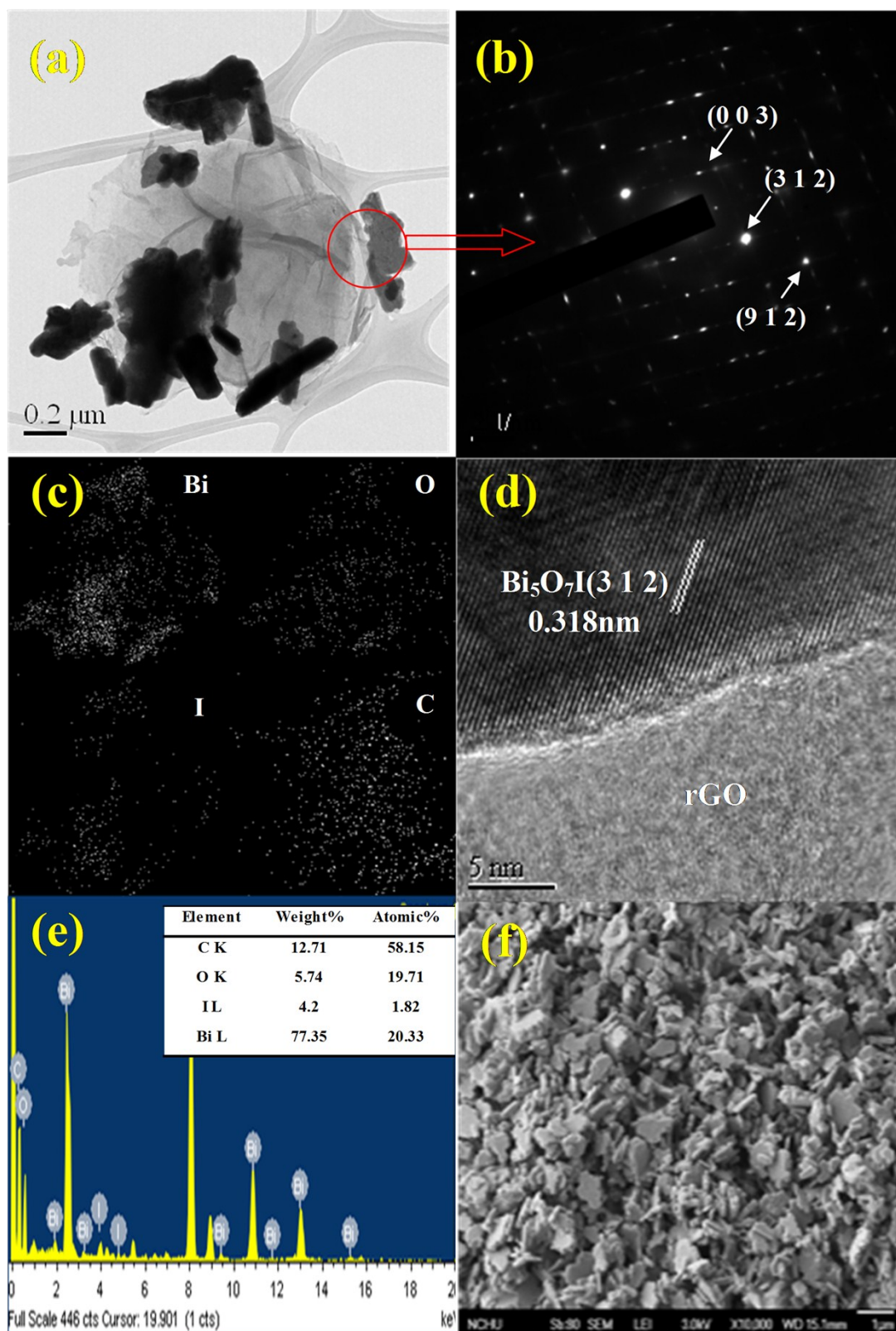
1
2 **Figure S2.** FE-TEM and FE-SEM of as-prepared Bi₄O₅I₂/GO (pH = 4,
3 0.05 g GO).



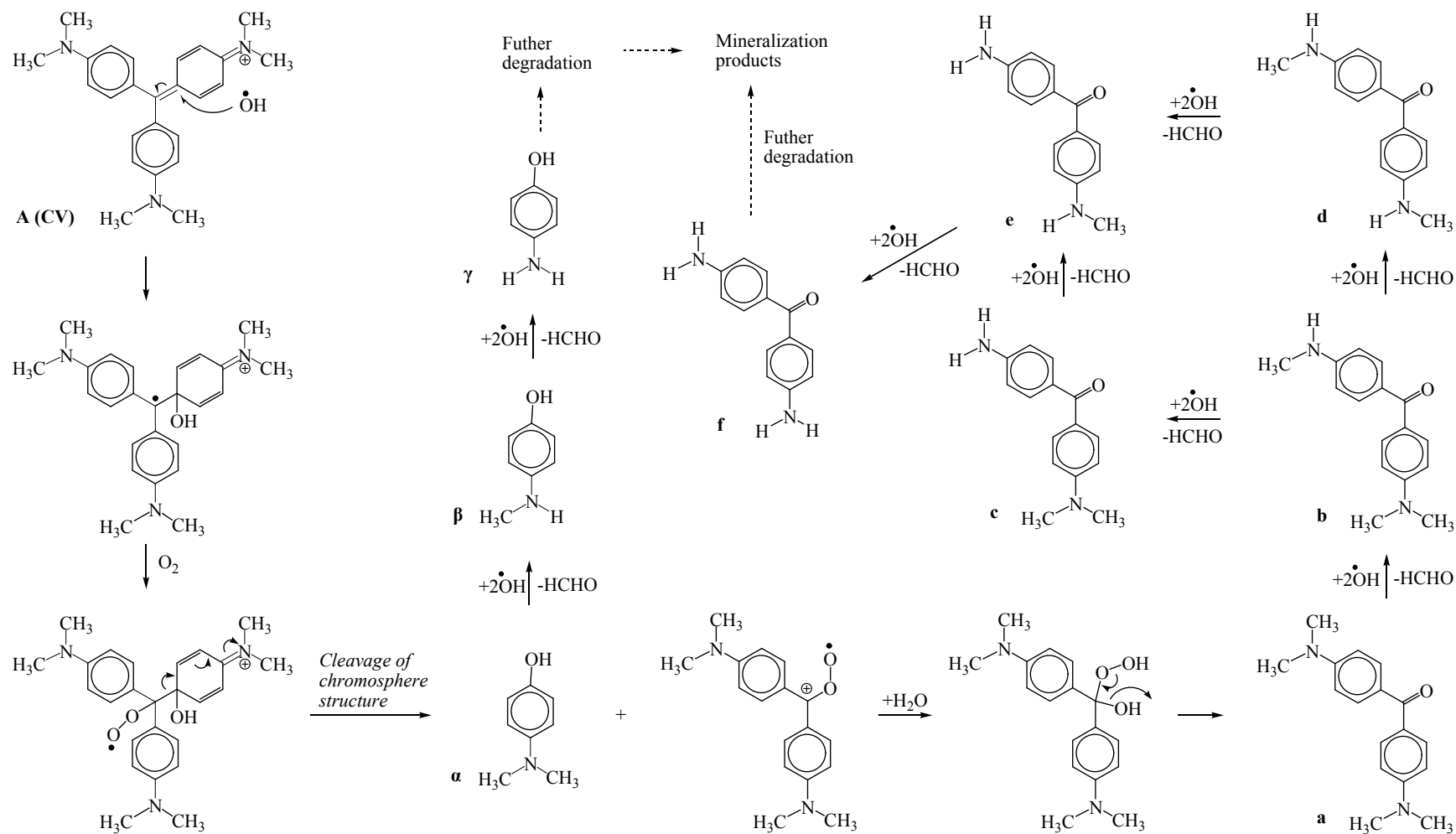
1
2 **Figure S3.** FE-TEM and FE-SEM of as-prepared $\text{Bi}_7\text{O}_9\text{I}_3/\text{GO}$ (pH = 7,
3 0.05 g GO).



1
2 **Figure S4.** FE-TEM and FE-SEM of as-prepared Bi₇O₉I₃/GO (pH = 10,
3 0.05 g GO).



1
2 **Figure S5.** FE-TEM and FE-SEM of as-prepared Bi₅O₇I/GO (pH = 13,
3 0.05 g GO).



1
2
3 Figure S7. Proposed mechanism of cleavage of chromosphere structure of CV under photocatalytic process.

