Supporting Information

Adsorption or photocatalysis?

Engineering BiOi with metalorganic framework CAU-17 and microporous organic polymer MOP-CH2EDA to enhance ciprofloxacin removal from water

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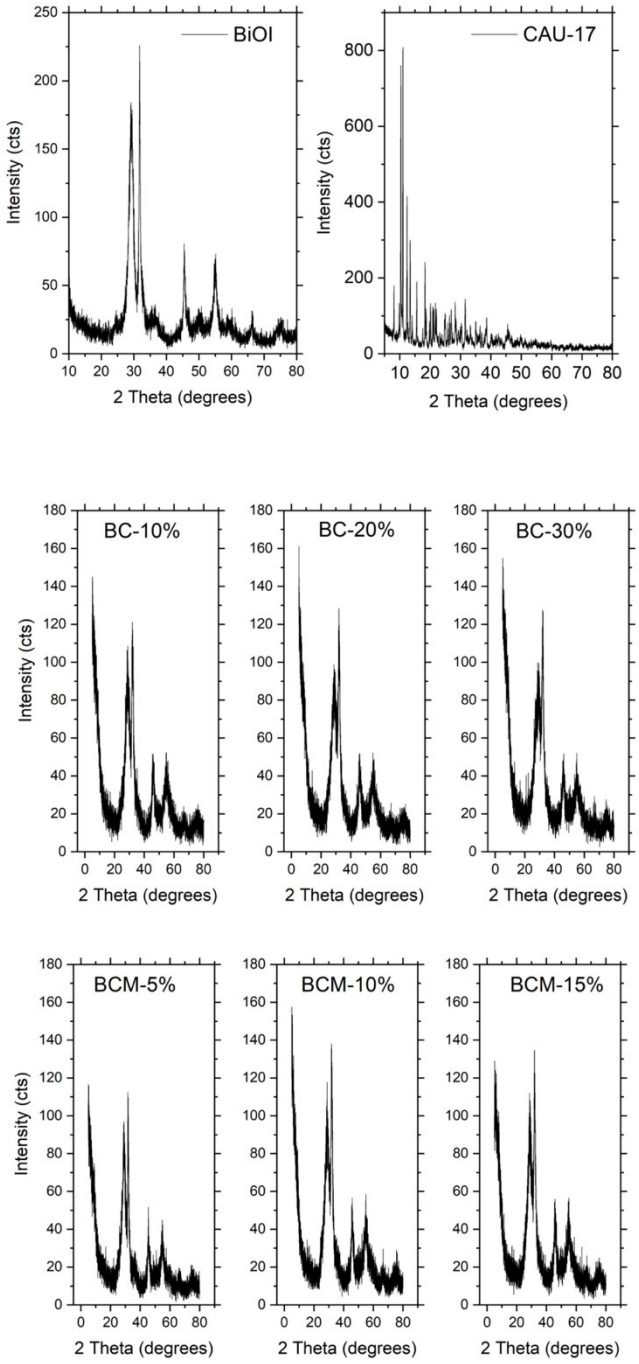


Figure S1. XRD patterns of the materials under investigation.

Prominent diffraction peaks of CAU-17: 2θ = 7.48°, 9.947°, 10.72°, 11.23°, 12.91°, 13.3°, 14.25°, 16.99°, and 24.073°. Main diffraction peaks of the tetragonal BiOI structure: 2θ=29.64°, 31.66°, 45.67°, 55.15°, and 65.1 respectively [37].

Sample	BET surface area (m^2/g)	Pore Volume average (mm^3/g)	Pore Size average (nm)
BiOI	40.2	56	4.1
CAU-17	5.8	3.9	4.8
MOP-CH_2EDA	684.2	640	5.1
BC-10%	55.7	97.6	5.4
BC-20%	54.7	95.1	5.4
BC-30%	35.9	79.8	6.3
BCM- 5%	24.9	46.4	6.1
BCM -10%	63.9	56	5.7
BCM-15%	48.7	83.5	5.5

Table S 1. Surface area and pore analysis of the prepared samples as retrieved from BET measurements.

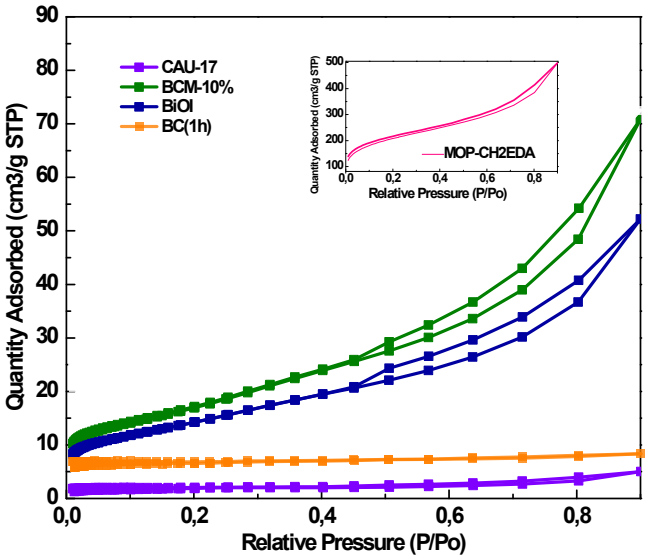


Figure S 2. Nitrogen adsorption-desorption isotherms for as-prepared materials.

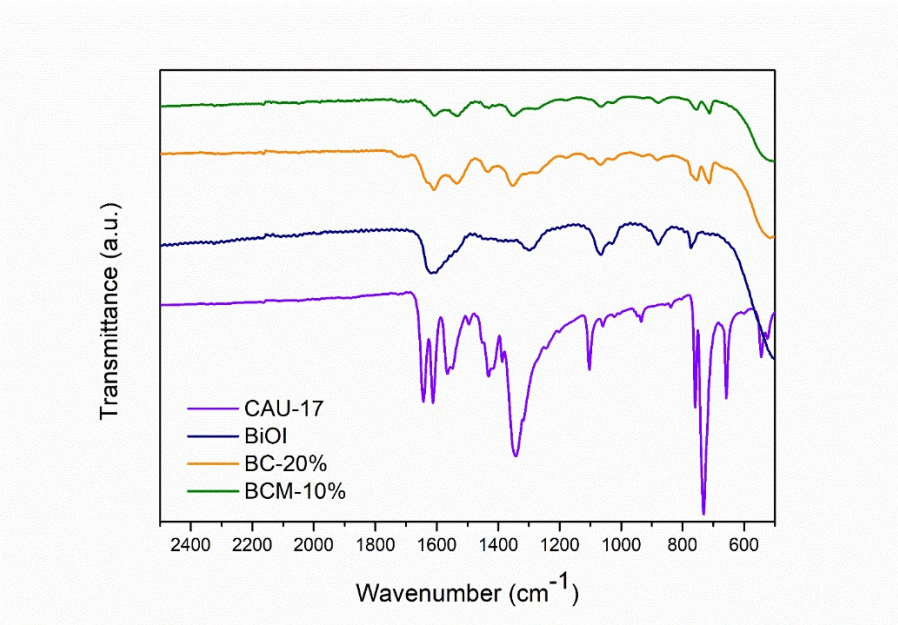


Figure S 3. FTIR spectra of the prepared materials.

Materials	Wavenumber (cm^{-1})	Vibration
BiOI	512	ν_{sym} Bi-O
	722	ν_{asym} Bi-O
	1385	ν Bi-I
	1650	δ O-H
	3450	ν O-H
CAU-17	400-800	O-Bi-O
	1100	ν C-H (benzene ring)
	1400	ν C-C (benzene ring)
	1373 and 1450	δ_{sym} and δ_{asym} COO^-
	1550 and 1650	ν_{sym} and ν_{asym} COO^-

Table S 2. IR correlation table.

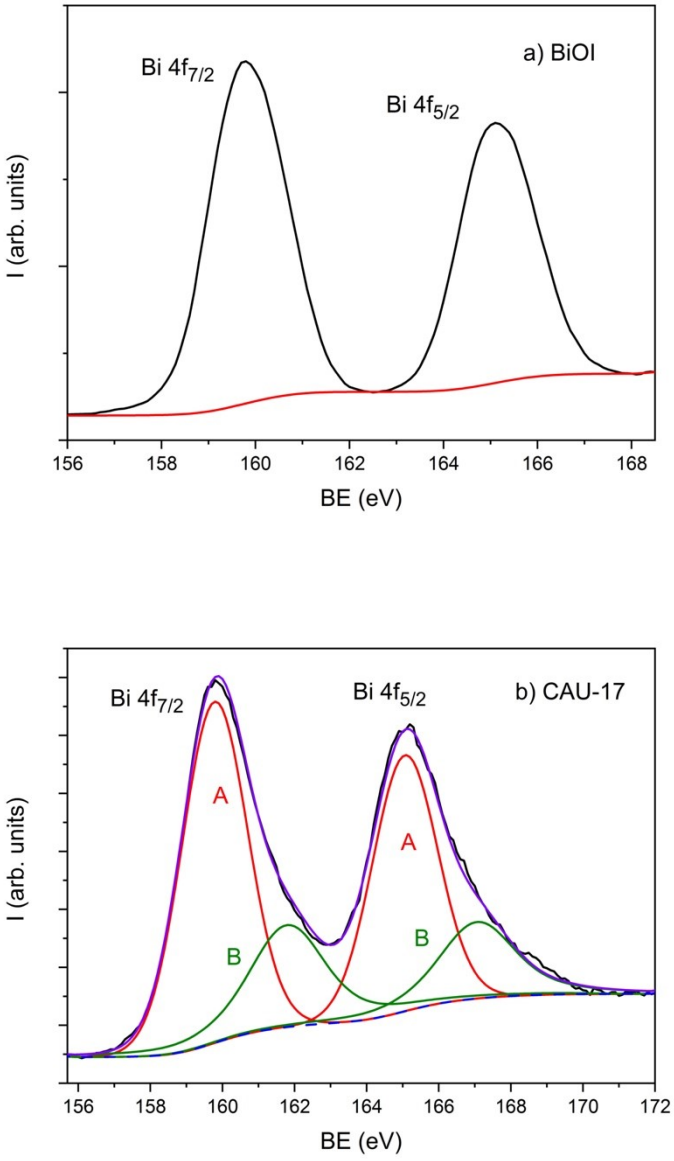
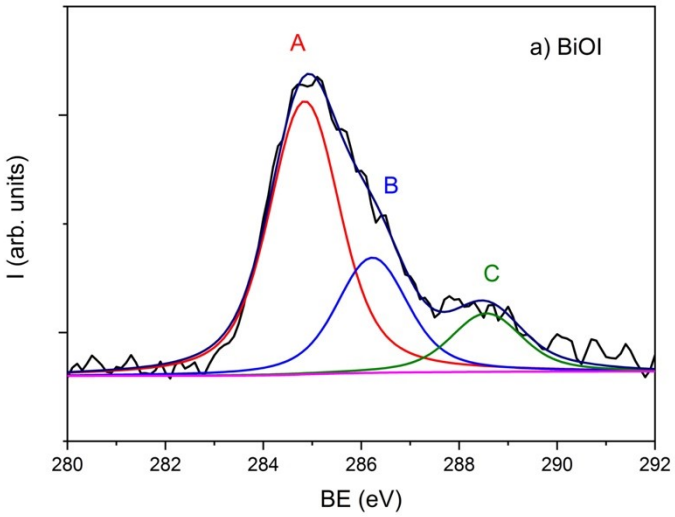
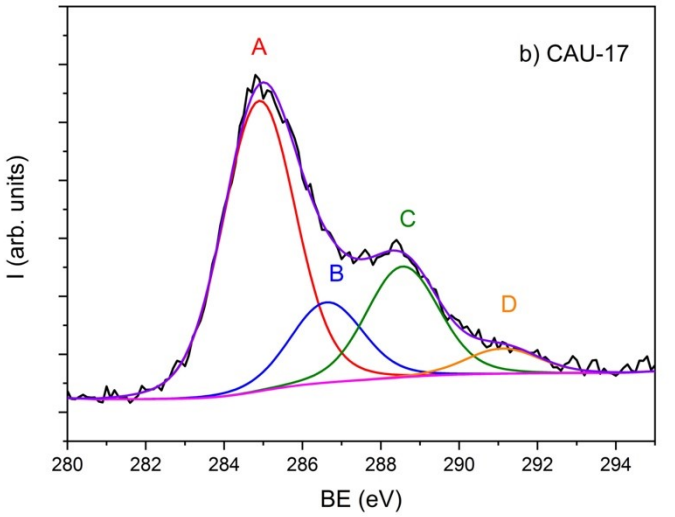


Figure S 4. Bi 4f photoemission spectra of the samples BiOI (a) and CAU-17 (b).


a) BiOI
A
B
C
I (arb. units)
280
282
284
286
288
290
292
BE (eV)


b) CAU-17
A
B
C
D
I (arb. units)
280
282
284
286
288
290
292
294
BE (eV)

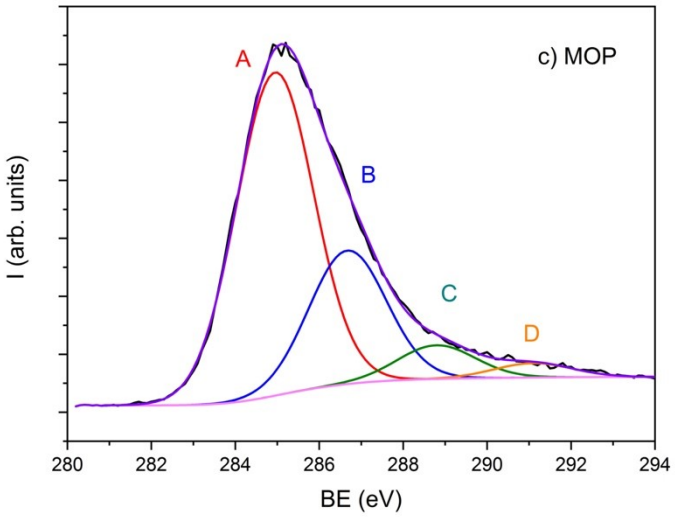


Figure S 5. C 1s photoemission spectra of the samples (a) BiOI, (b) CAU-17 and (c) MOP-CH2EDA.

Peak	BE (eV)	FWHM (eV)	Atomic %	State
Bi $4f_{7/2}$	160.0	1.9	23.4	Bi_2O_3 , BiI_3
C 1s - A	285.0	1.7	22.1	aliphatic
C 1s - B	286.4	1.7	9.4	C-O
C 1s - C	288.7	1.7	4.8	-C=O
I $3d_{5/2}$	619.2	1.7	13.9	iodide
O 1s - A	530.3	1.8	13.3	oxides
O 1s - B	531.9	1.8	10.1	OH^-, C-O
O 1s - C	533.3	1.8	2.7	-C=O

Table S 3. XPS quantification tables with chemical state of the species for the samples BiOI

Peak	BE (eV)	FWHM (eV)	Atomic %	State
Bi $4f_{7/2}$ - A	159.8	2.2	5.6	Bi_2O_3
Bi $4f_{7/2}$ - B	161.8	2.5	2.3	Bi-O-C as in Bi

				acetate, see ref. [x]
C 1s - A	285.0	2.2	36.2	aliphatic
C 1s - B	286.6	2.2	10.0	C-O
C 1s - C	288.6	2.2	13.8	-C=O
C 1s - D	291.1	2.2	3.1	carbonate
N 1s	401.0	3.3	2.2	C-N, C-N-H
O 1s - A	531.0	2.2	22.1	oxides
O 1s - B	532.8	2.2	4.6	-C=O

Table S 4. XPS quantification tables with chemical state of the species for the sample CAU-17.

Peak	BE (eV)	FWHM (eV)	Atomic %	State
C 1s - A	285.0	2.2	55.3	aliphatic
C 1s - B	286.7	2.2	22.8	C-O
C 1s - C	288.8	2.2	5.8	-C=O
C 1s - D	291.1	2.2	2.4	carbonate
Cl $2p_{3/2}$	201.0	3.0	0.6	Cl^-
N 1s - A	399.4	2.9	3.9	C-N, NH_2
O 1s - A	532.4	2.7	6.7	OH^-, -C=O
O 1s - B	534.0	2.7	2.0	-C-O
P $2p_{3/2}$	133.4	3.0	0.4	phosphate

Table S 5. XPS quantification tables with chemical state of the species for the sample MOP-CH2EDA.

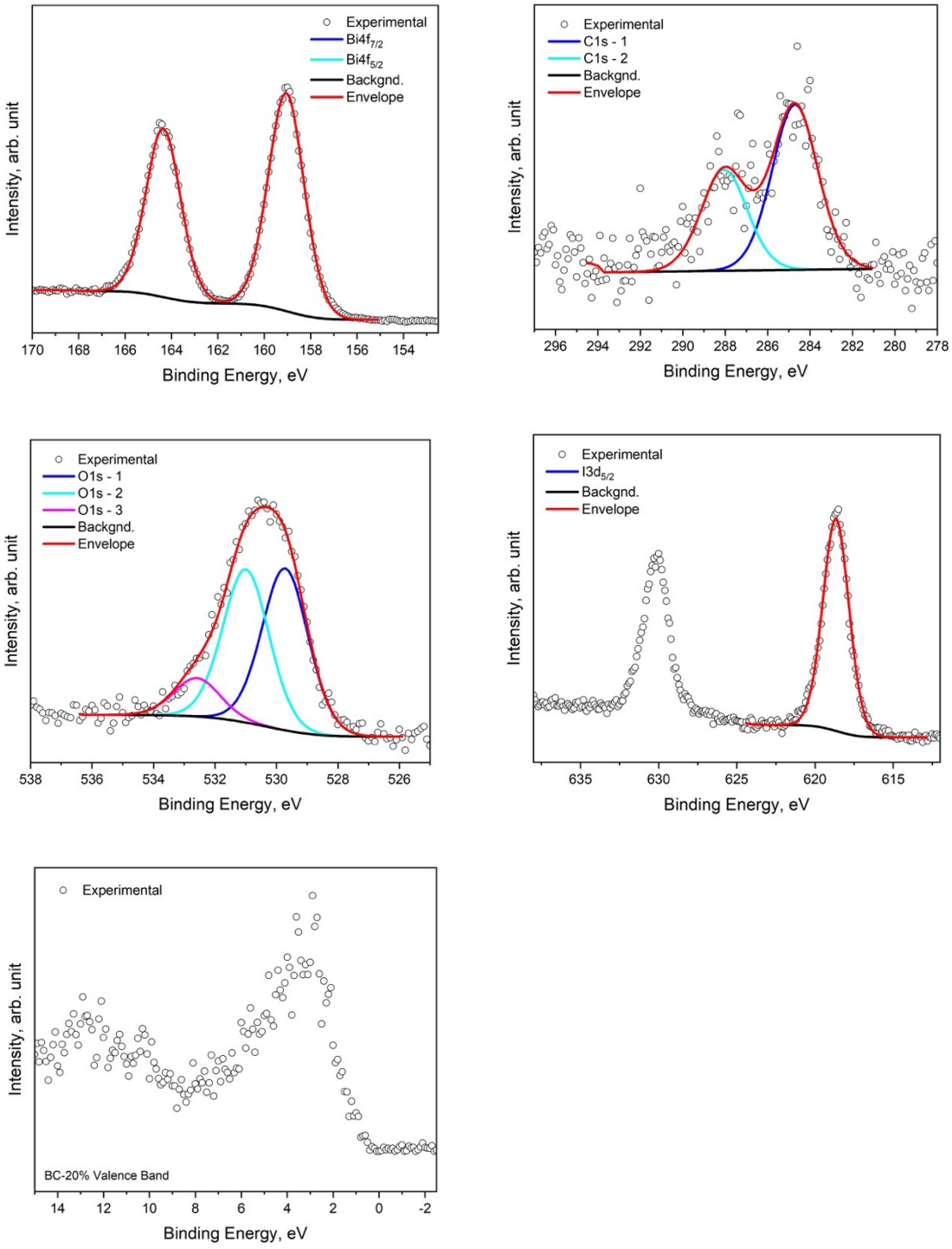


Figure S 6. XPS spectra of the composite BC-20%.

Peak	Peak BE (eV)	FWHM eV	Atomic %	State
Bi4f7	159.4	1.83	22.1	Bi2O3
C1s - 1	285.0	2.55	22.1	Aliphatic

C1s - 2	288.4	2.55	13.5	-C=O
I3d5	619.0	1.96	9.8	iodide
O1s - 1	530.0	1.77	14.9	oxides
O1s - 2	531.3	1.77	14.1	OH^-, C-O
O1s - 3	532.7	1.77	3.5	H_2O

Table S 6. XPA quantification for the composite BC-20%.

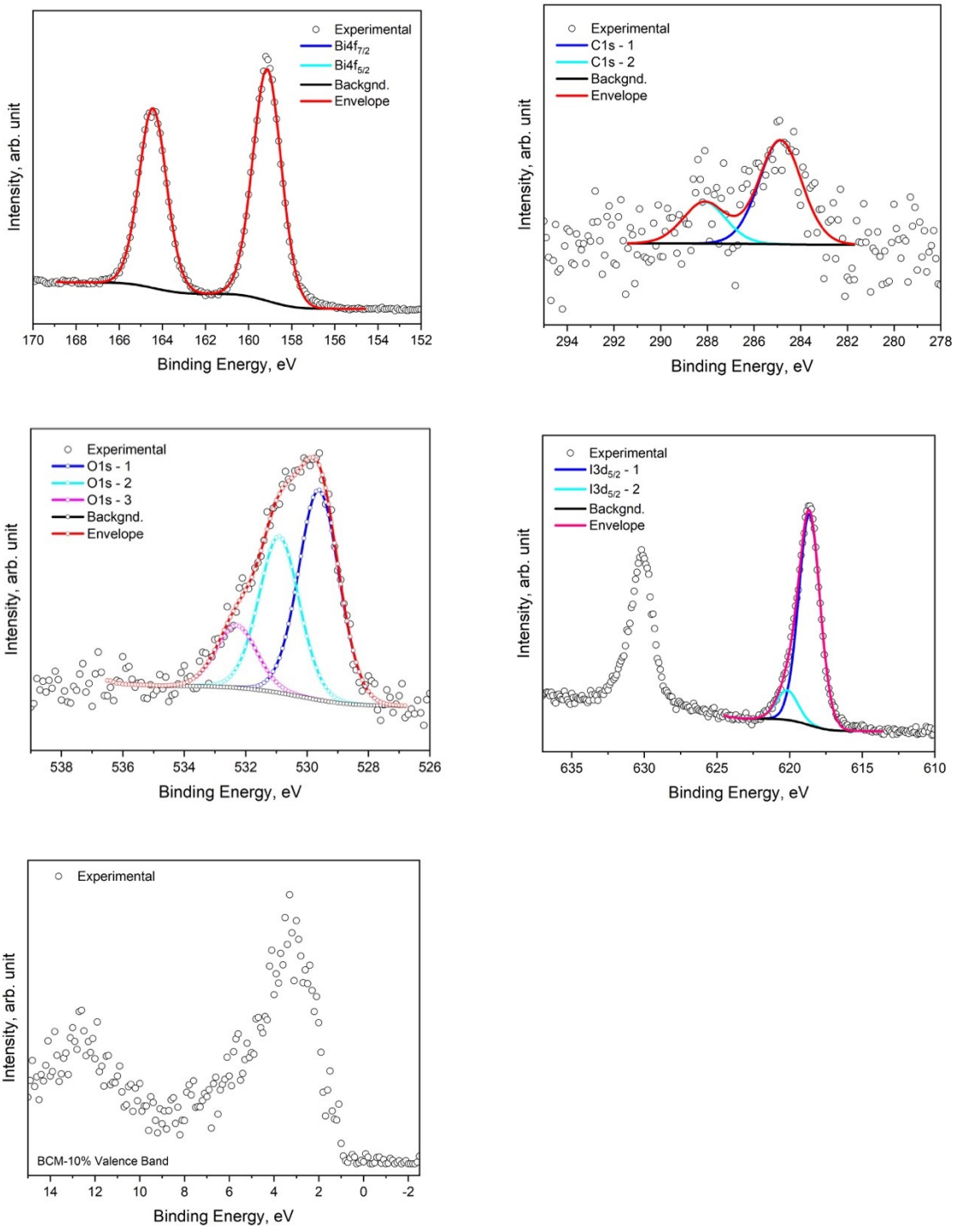


Figure S 7-XPS spectra of the composite BCM-10%.

Peak	Peak BE (eV)	FWHM eV	Atomic %	State
Bi4f7	159.2	1.56	28.6	Bi2O3
C1s - 1	285.0	2.16	14.5	Aliphatic

C1s - 2	288.2	2.16	5.8	-C=O
I3d5 - 1	618.7	1.73	15.3	iodide
I3d5 - 2	620.2	1.73	2.1	
O1s - 1	529.7	1.55	16.5	oxides
O1s - 2	531.0	1.55	12.3	OH^-, C-O
O1s - 3	532.4	1.55	4.9	H_2O

Table S 7. XPS quantification of of the composite BCM-10%.

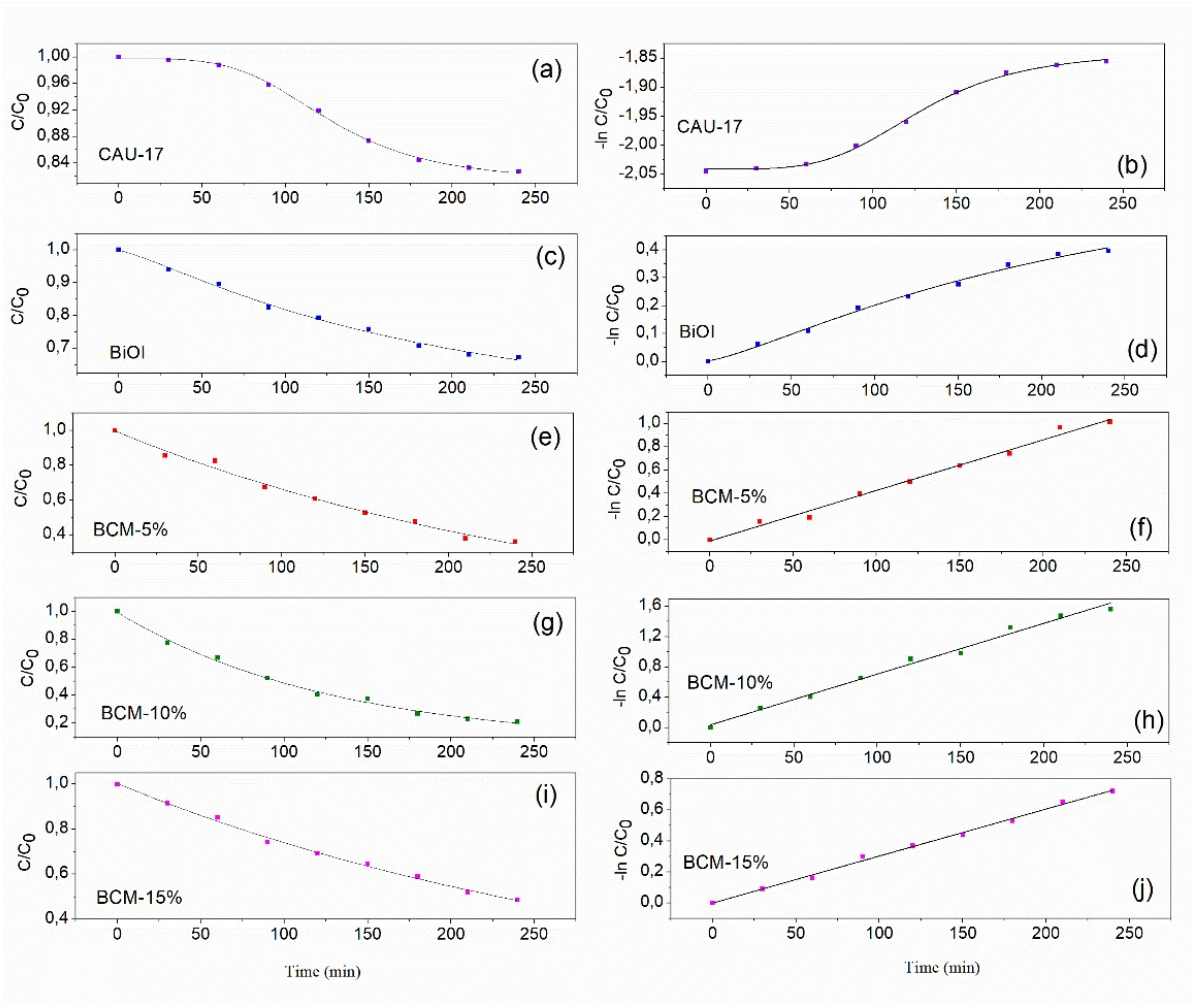


Figure S 8. Reaction course for the degradation of CIP upon light irradiation for pure CAU-17 (a-b), BiOI (b-c) and the ternary composites (e-g). Markers are experimental points, lines are fitting curves.

Table S 8. Fitting parameters of plots, C_t/C_0 and lnC_t/C_0 vs Time for CIP degradation for pure BiOI, CAU-17, and the ternary composites.

Sample	C_t/C_0 vs Time		lnC_t/C_0 vs Time	
	Fitting Equations	Fitting parameters	Fitting Equations	Fitting parameters
CAU-17	sigmoidal	A1 = 0,9972 A2 = 0,8123 x0 = 126,5179 p = 4,0683 R^2 = 0,9977	sigmoidal	A1 = -2.0417 A2 = -1.83813 x0 = 129.3595 p = 4.13575 R^2= 0.99778
BiOI	sigmoidal	A1 = 0.99848 A2 = 0.41821 x0 = 188.35225 p = 1.25727 R^2= 0.9927	sigmoidal	A1 = 0.0023 A2 = 0.79818 x0 = 233.33609 p = 1.2967 R^2= 0.99175
BCM-5%	exponential	Y0 = -0.1770 A1 =1.1727 t1= 298.498 R^2= 0.9871	Linear	a = -0.01122 b = 0.00436 R^2= 0.98829
BCM-10%	exponential	Y0 = 0.0527 A1 =0.9409 t1= 129.0638 R^2= 0.9935	Linear	a = 0.03388 b = 0.00671 R^2= 0.98885
BCM-15%	exponential	Y0 = -0.00065 A1 =1.0024 t1= 329.7704 R^2= 0.9949	Linear	a = -0.00179 b = 0.00304 R^2= 0.9956
Fitting equations: Linear: $y = a + bx$ Exponential: $y = y_0 + A_1 e^{-\frac{x}{t_1}}$ Sigmoidal: $y = \frac{A_1 - A_2}{1 + \left(\frac{x}{x_0}\right)^p} + A_2$				

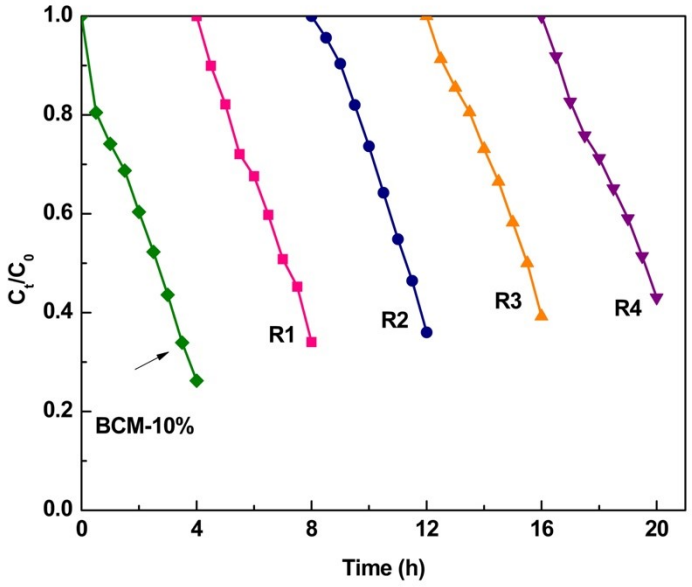


Figure S 9. Recycling efficiency of the photocatalyst BCM-10%.

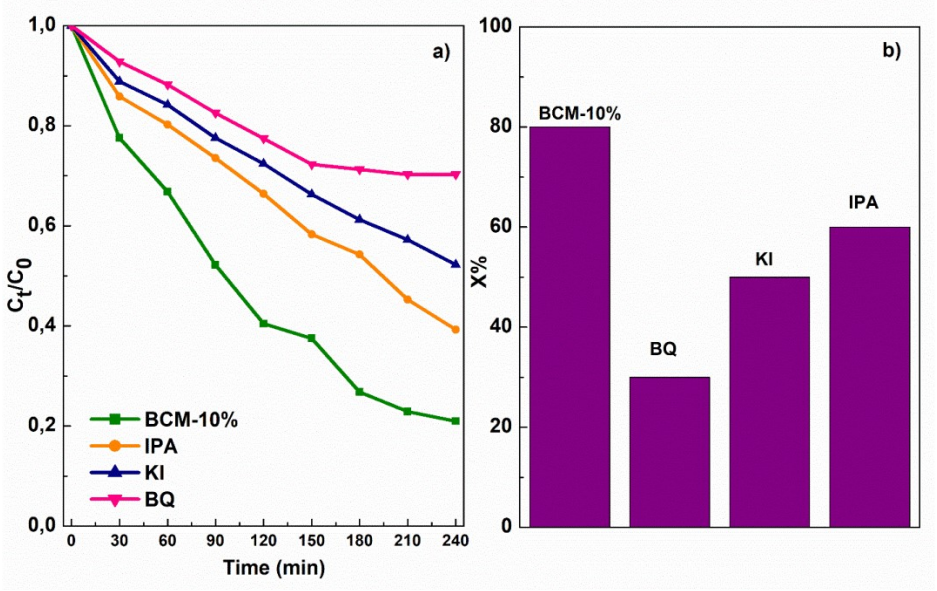


Figure S 10. Results of the catalytic tests carried out with the addition of scavengers. (a) Reaction course plotted as C_t/C_0 vs. time and (b) degradation percentage as a function of the specific scavenger.

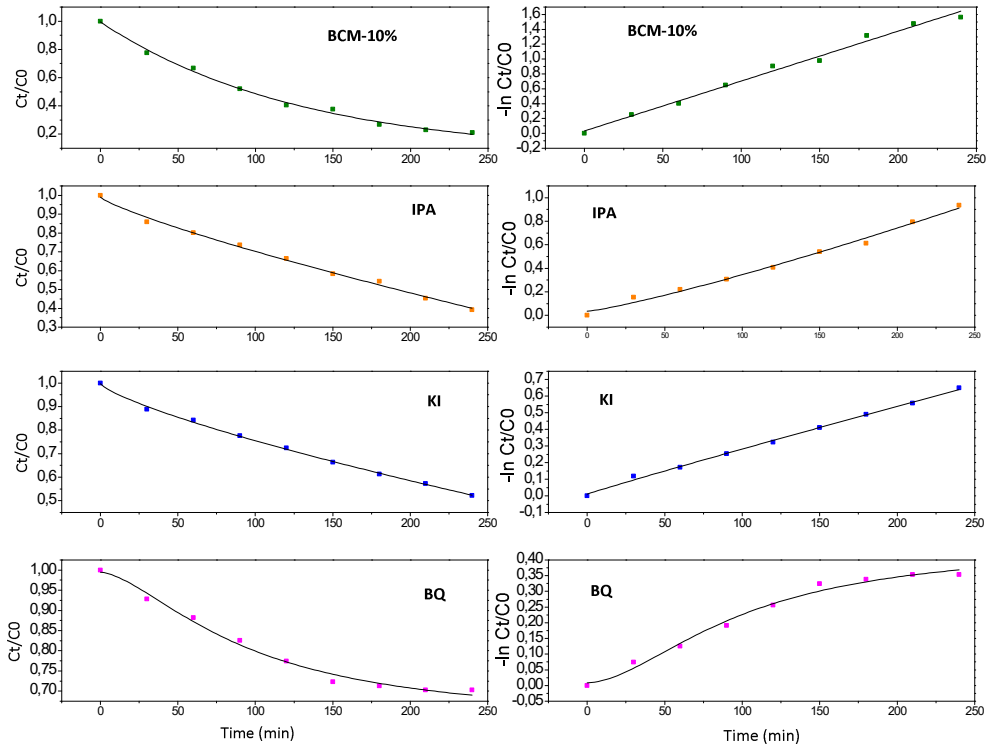


Figure S 11. Reaction course for the degradation of CIP upon light irradiation for BCM-10%, and with the addition of different IPA, KI and BQ scavengers. Markers are experimental points, lines are fitting curves.

Sample	C_t/C_0 *vs.* Time		-lnC_t/C_0 *vs.* Time	
	Fitting Equations	Fitting parameters	Fitting Equations	Fitting parameters
BCM-10%	exponential	Y0 = 0.0527 A1 =0.9409 t1= 129.0638 R2 = 0.9935	Linear	a = 0.03388 b = 0.00671 R2 = 0.98885
BCM-10%, scavenger IPA	sigmoidal	A1 = 0.9906 A2 = -3911.81 x0 = 1.1212 p = 0.8183 R2 = 0.9929	sigmoidal	A1 = 0.0341 A2 = 25340,32 x0 = 1.4062 p = 1.1837 R2 = 0.9864
BCM-10%, scavenger KI	sigmoidal	A1 = 0.9970 A2 = -413.77 x0 = 1.6435 p = 0.7669 R2 = 0.9974	sigmoidal	A1 = 0.0101 A2 = 49580.97 x0 = 2.9581 p = 0.9616 R2 = 0.9960
BCM-10%, scavenger BQ	sigmoidal	A1 = 0.9949 A2 = 0.6198 x0 = 94.5863 p = 1.5835 R2 = 0.9833	sigmoidal	A1 = 0.0086 A2 = 0.4469 x0 = 100.9006 p = 1.7575 R2 = 0.9819

Table S 9. Fitting parameters of plots, C_t/C_0 and lnC_t/C_0 vs Time for CIP degradation with the addition of scavengers For BCM-10% ternary composites

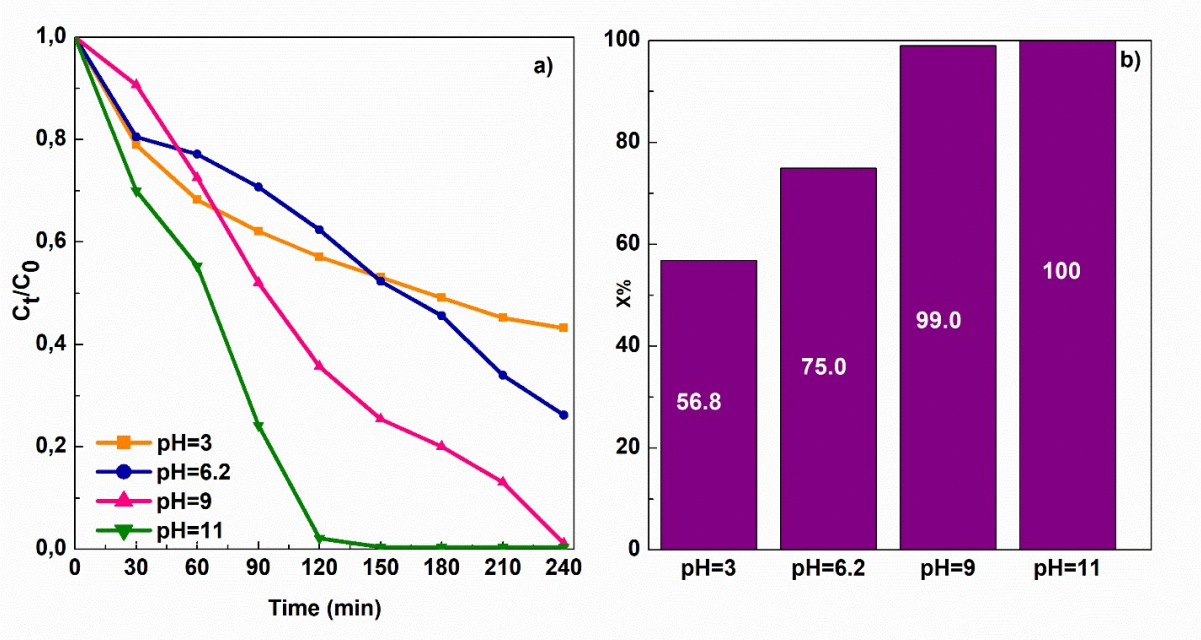


Figure S 12. Effect of pH on CIP photodegradation promoted by BCM-10%:(a) reaction course plotted as C_t/C_0 vs. time and (b) removal efficiency at different pHs after 240 min reaction.

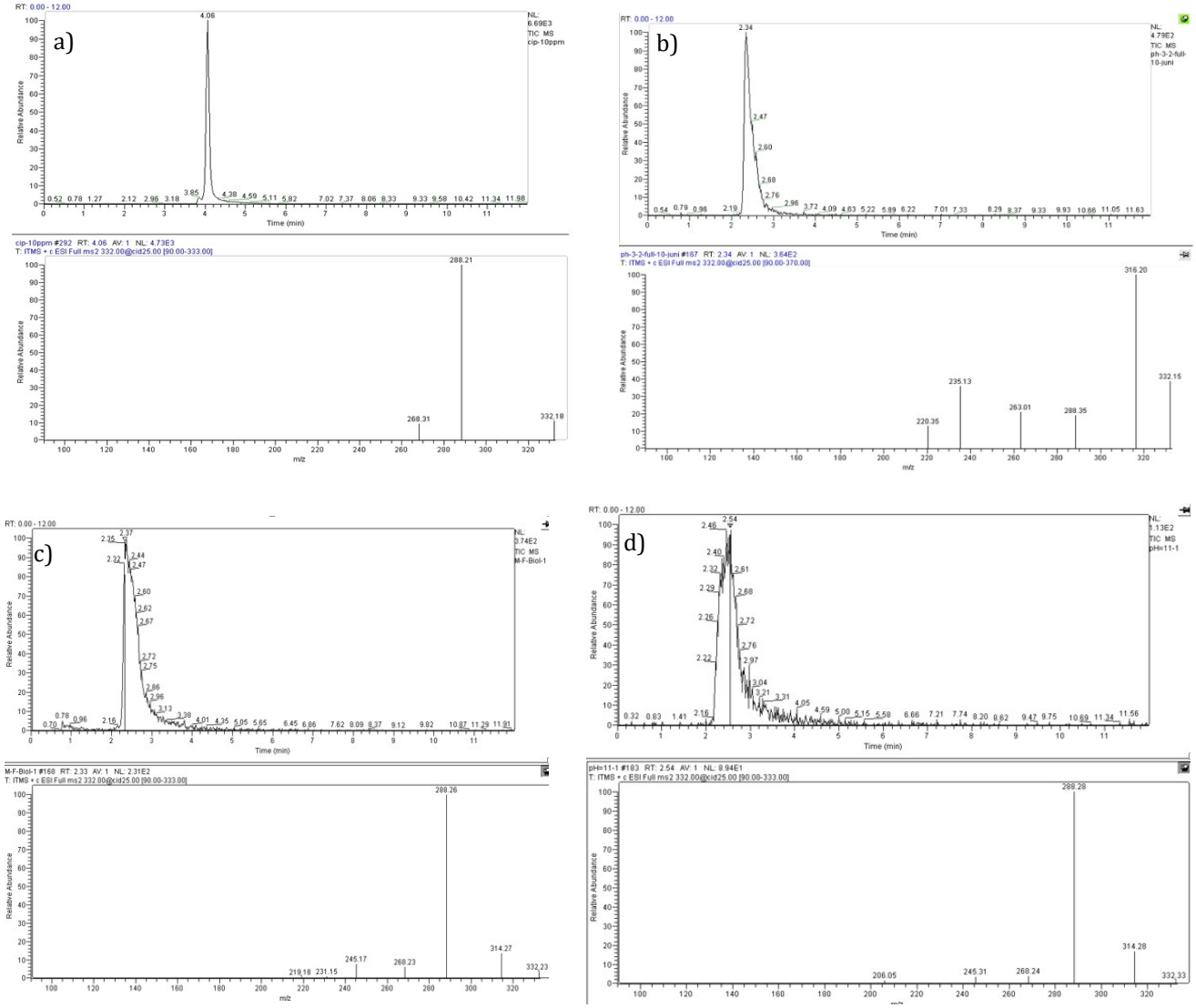


Figure S 13. Chromatograms and MS patterns pertaining to a) CIP and catalytic CIP degradation promoted by the ternary composite BCM-10% under simulated solar light at different pHs: b) pH= 3, c) pH = 6.2, d) pH=9,11.