Supporting information

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1. Preparation of $ZnBi_2O_4$

In a typical procedure, a precisely measured amount of zinc nitrates (2.5 mmol) was dissolved in distilled water, followed by the addition of bismuth nitrate (4.99 mmol) pentahydrate in a stoichiometric ratio to achieve the desired Zn:Bi (1:2) ratio. This solution was then subjected to hydrothermal treatment in a Teflon-lined stainless-steel autoclave at 180 °C for 12 h. Subsequently, the resulting precipitate was thoroughly washed with distilled water and ethanol and then dried at 60 °C. The prepared white powder was then calcined at 500 °C for 4 h to ensure phase purity and crystallinity.

2. Preparation of BiOBr

A specified amount of bismuth nitrate pentahydrate (1.5 mmol) was dissolved in a mixture of ethylene glycol and distilled water, followed by the dropwise addition of 1.5 mmol potassium bromide solution under continuous stirring. The resulting suspension was then transferred to a Teflon-lined autoclave and subjected to hydrothermal treatment at 160 °C for 12 h to yield the crystalline BiOBr phase. After cooling, the precipitate was thoroughly washed with distilled water and ethanol several times, followed by drying at 60 °C to obtain pure BiOBr powder.

Table 1: % atomique of the elements Oxygen, Zinc, Brum, and Bismuth in all composite (0<x<1), and the fraction Zn/Bi, and Br/Bi.

	x value						
Elements	0	0,1	0,3	0,5	0,7	0,9	1
Zn	33,48	27,5	25,48	18,95	13,05	6,05	0
Br	0	3,57	10,4	20,04	28,94	39,94	48,83
Bi	66,52	68,93	64,12	61,01	58,01	54,01	51,17
Zn/Bi(exp)	0,503307	0,398955	0,39738	0,310605	0,224961	0,112016	0
Zn/Bi(the)	0,5	0,473684	0,411765	0,333333	0,230769	0,090909	0
Br/Bi(exp)	0	0,051792	0,162196	0,328471	0,49888	0,739493	0,95427
Br/Bi(the)	0	0,052632	0,176471	0,333333	0,538462	0,818182	1

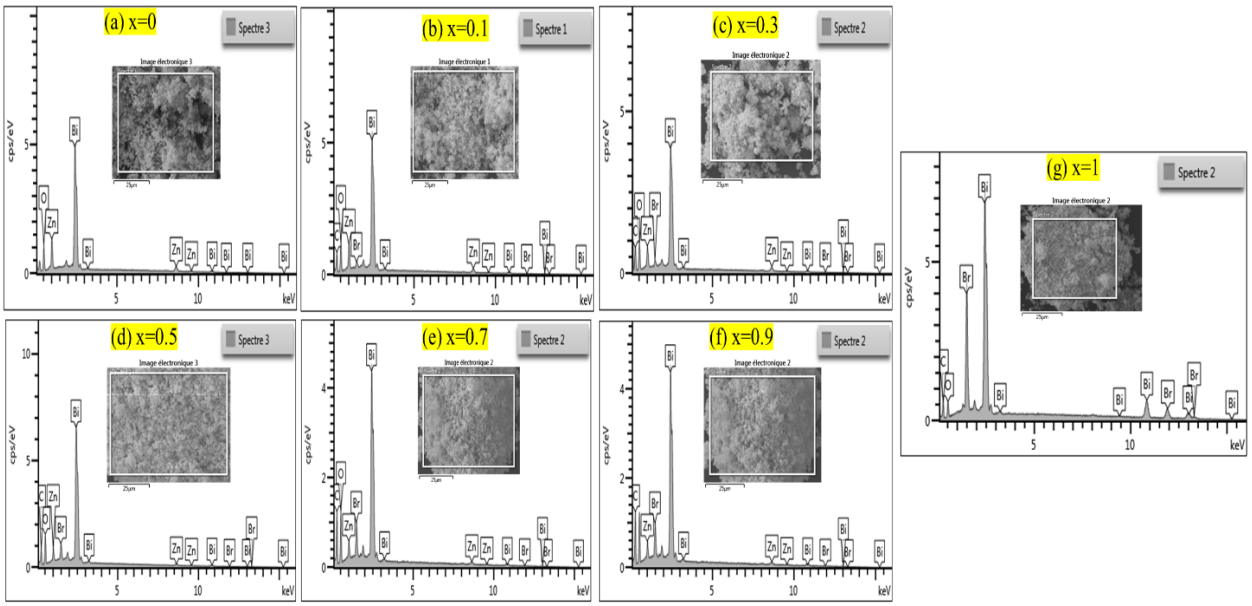

Figure 1: EDX defractogramme of x=0 (a), x=0.1 (b), x=0.3 (c), x=0.5 (d), x=0.7 (e), x=0.9 (f), x=1(g).

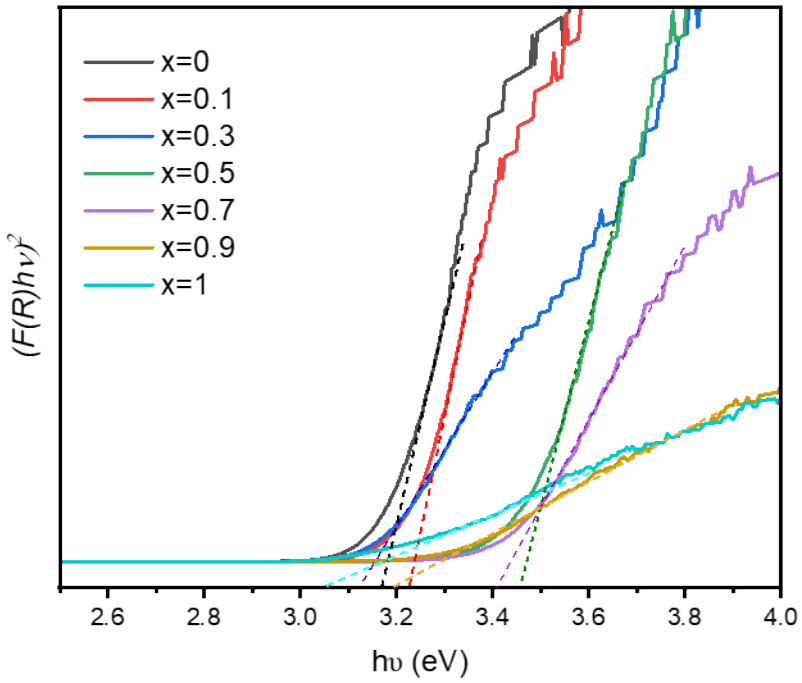

Figure 2: calculation of the Eg (direct) from plots of $(F(R)hv)^2$ vs hv of the prepared composites.

Table 2: Indirect and Direct Band-Gap Energies (Eg) of $ZnBi_2O_4$/BiOBr Composites"

Sample	Eg_indirect (eV)	Eg_direct (eV)
x=0 ($ZnBi_2O_4$)	2.84	3.16
x=0.1	2.96	3.22
x=0.3	3.10	3.12
x=0.5	3.12	3.45
x=0.7	2.91	3.40
x=0.9	2.97	3.20
x=1 (BiOBr)	2.95	3.09

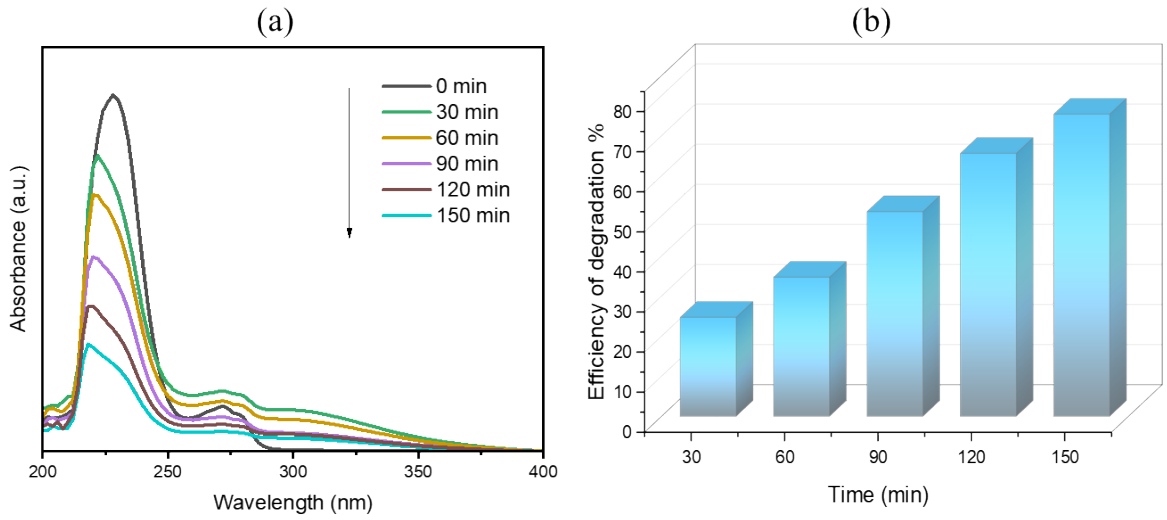

Figure 3 : (a) Evolution UV-Vis absorption spectra during the photocatalytic degradation of Amoxicillin (AMX) over the x=0.7 composite, and (b) the corresponding degradation efficiency (%) as a function of irradiation time under visible light.