

**2D/2D Bi₂WO₆/Protonated g-C₃N₄ Direct Z-scheme Heterojunctions for
Enhancing Photodegradation of 17β-Estradiol: Promotional Role of Electrostatic
Interaction**

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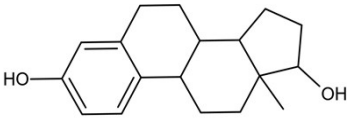
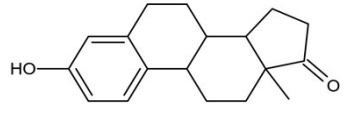
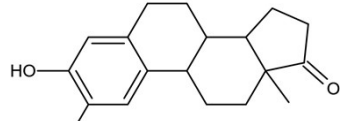
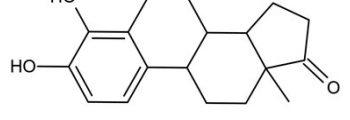
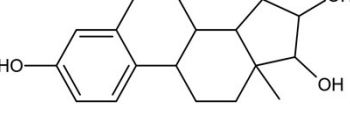
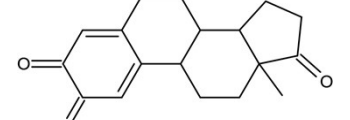
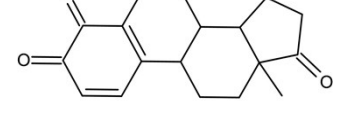
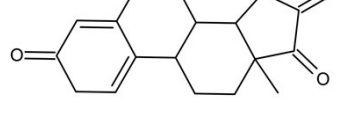
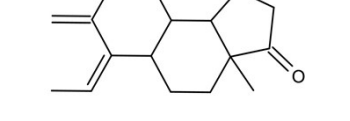
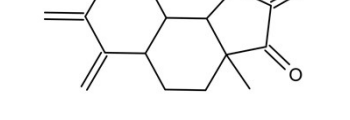
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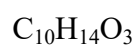
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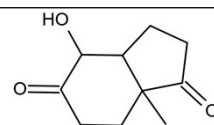
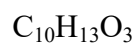
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Table S1. The information of the intermediates.

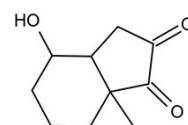
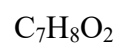
Compounds	Formula	m/z	Proposed structure
17 β -Estradiol	C ₁₈ H ₂₄ O ₂	273.13	
P1	C ₁₈ H ₂₂ O ₂	270.72	
P2	C ₁₈ H ₂₂ O ₃	287.19	
P3	C ₁₈ H ₂₂ O ₃	287.19	
P4	C ₁₈ H ₂₂ O ₃	287.19	
P5	C ₁₈ H ₂₀ O ₃	284.84	
P6	C ₁₈ H ₂₀ O ₃	284.84	
P7	C ₁₈ H ₂₀ O ₃	284.84	
P8	C ₁₇ H ₂₄ O	245.32	
P9	C ₁₆ H ₂₀ O ₂	245.32	

P10

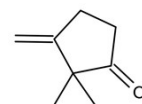
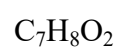
183.15

**P11**

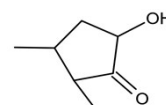
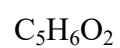
183.15

**P12**

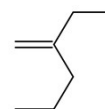
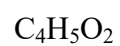
125.94

**P13**

125.94

**P14**

99.20

**P15**

85.21

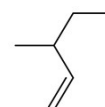


Table S2. Fitted parameters from time-resolved PL spectroscopy of pure Bi_2WO_6 , pure $\text{pg-C}_3\text{N}_4$ and the BPG heterojunction.

Photocatalysts	τ_1/ns	τ_2/ns	A_1	A_2	Y_0	τ/ns	R^2
Bi_2WO_6	2.29	9.10	735.48	247.06	10.81	6.19	0.99607
$\text{pg-C}_3\text{N}_4$	2.18	7.70	708.14	266.50	9.10	5.33	0.99682
B1PG1	3.18	13.76	679.09	302.17	15.96	5.93	0.99584

Table S3. Bandgap energy (E_g), XPS valence band cutoff, Fermi level (E_f), valence band (E_{VB}) and conduction band (E_{CB}) of Bi_2WO_6 and $\text{pg-C}_3\text{N}_4$.

Sample	E_g (eV)	$E_F - E_V$ (eV)	E_F (eV)	E_V (eV)	E_C (eV)
Bi_2WO_6	2.68	1.20	-5.90	-7.10	-4.42
$\text{pg-C}_3\text{N}_4$	2.65	1.05	-4.18	-5.23	-2.59

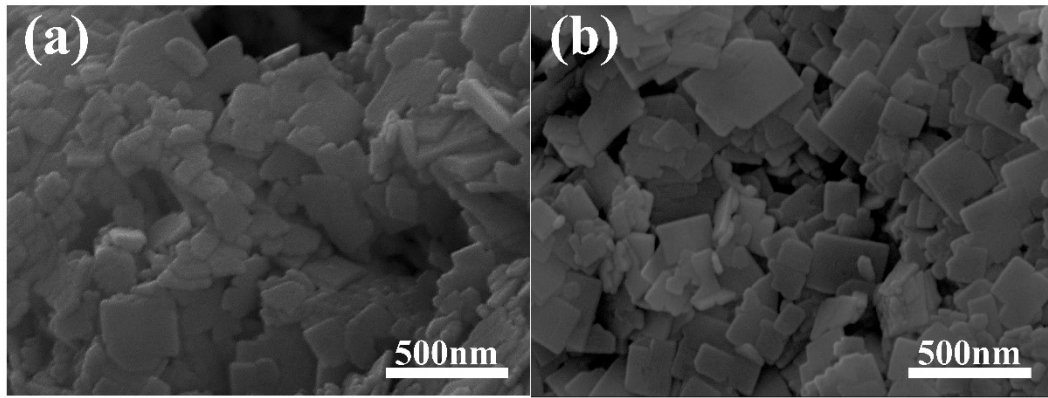


Figure S1. SEM images of (a) B1PG2; (b) B2PG1.

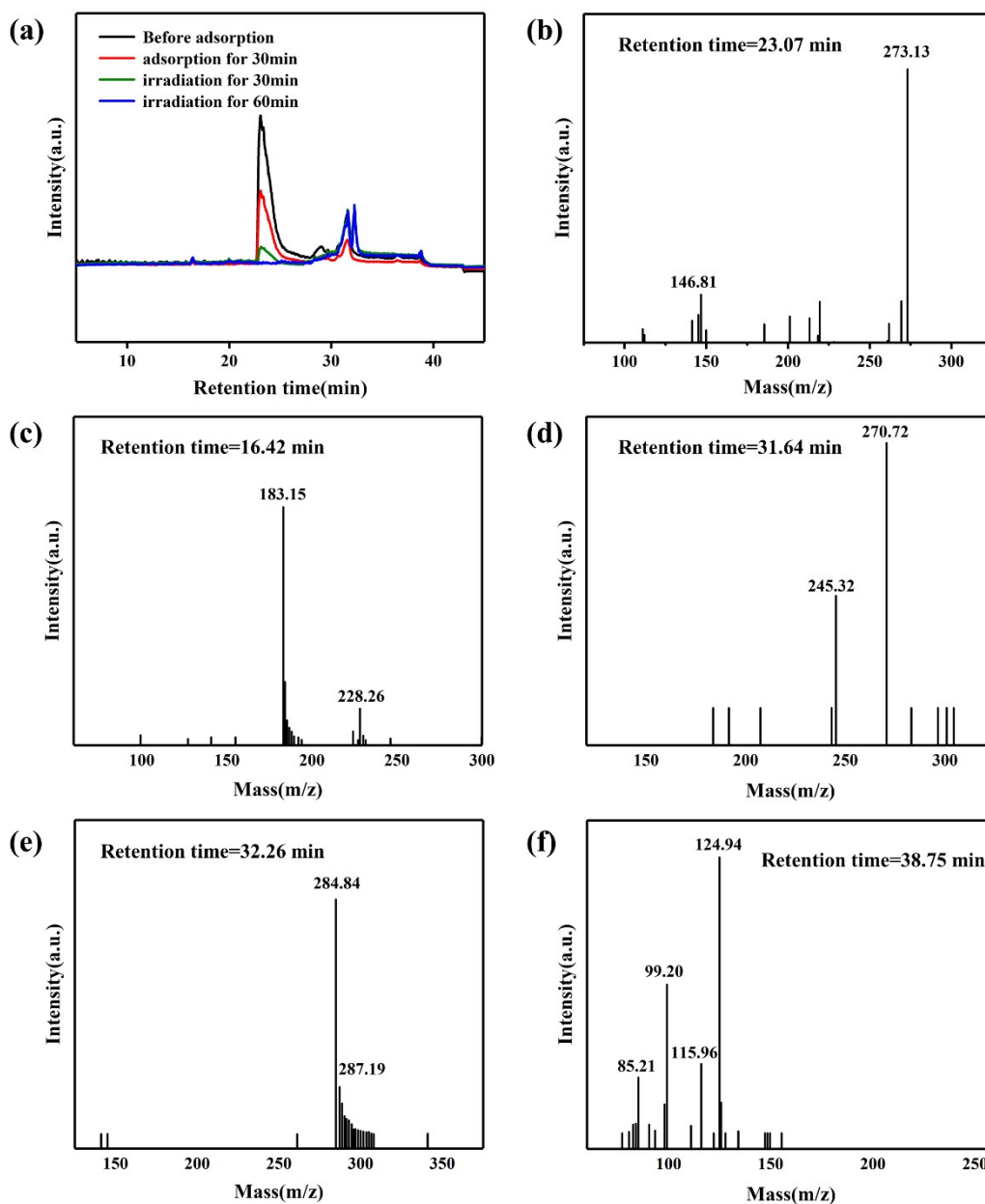


Figure S2. (a) Total ion current (TIC) chromatograms of the reaction solutions before and after irradiation. (b) 17 β -estradiol and (c)~(f) its photodegradation intermediates.

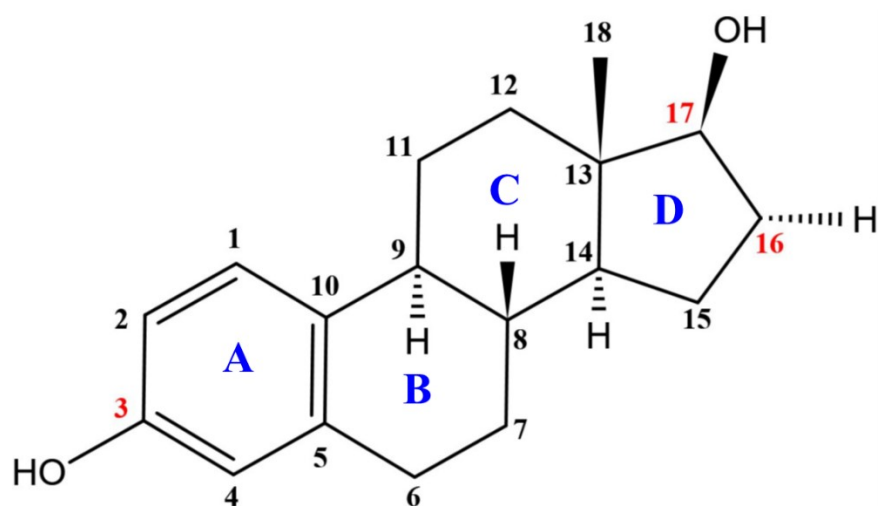


Figure S3. Molecular structure of E2.