

## Supporting information

### **CdS QDs growing on ellipsoidal BiVO<sub>4</sub> for efficient photocatalytic degradation of tetracycline**

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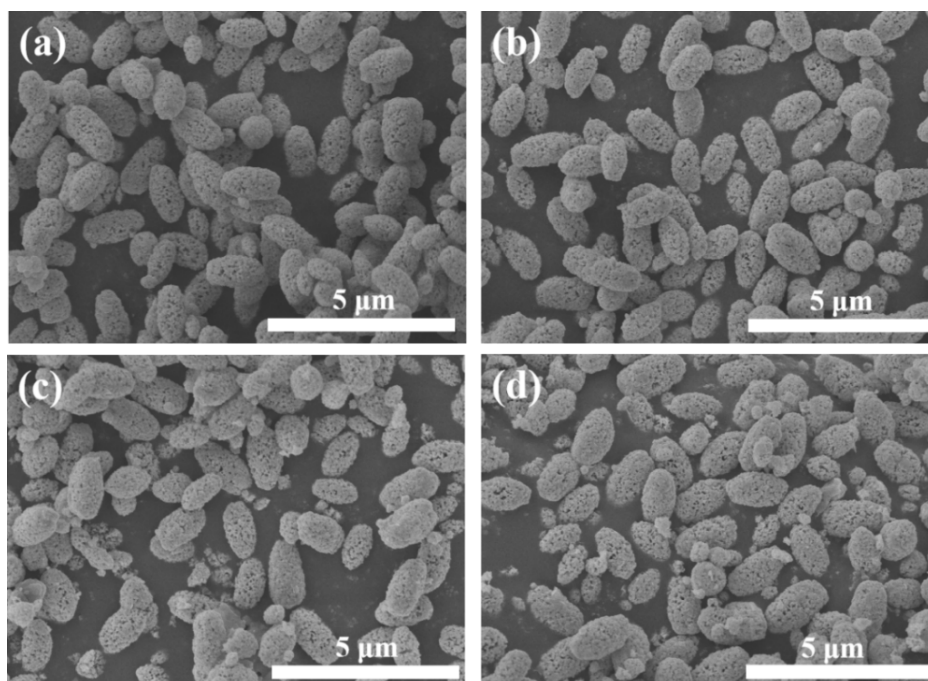
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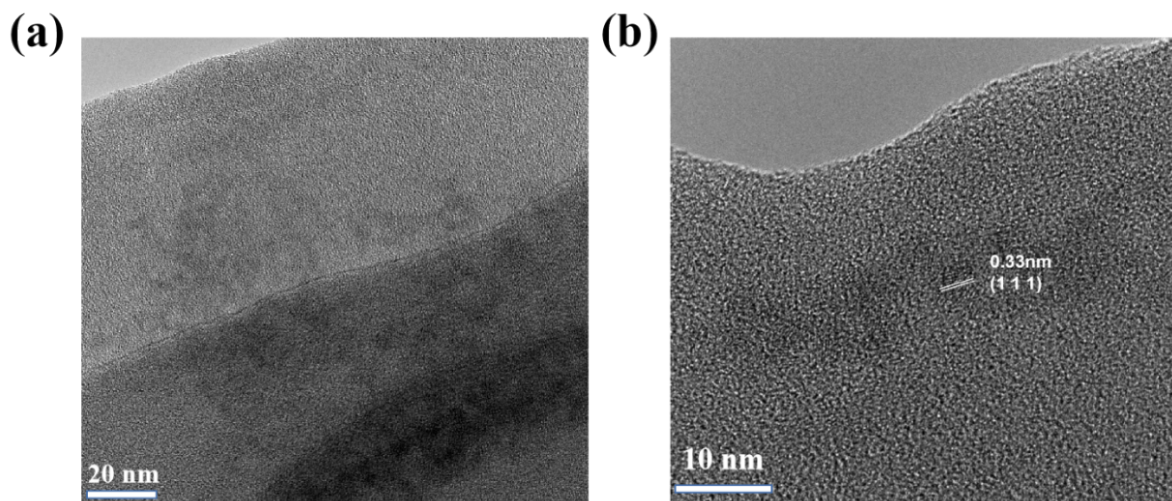
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**Fig. S1.** SEM images of (a) BVO@CdS-0.02, (b) BVO@CdS-0.05, (c) BVO@CdS-0.07 and (d) BVO@CdS-0.1.



**Fig. S2.** HAADF-STEM images of CdS QDs.

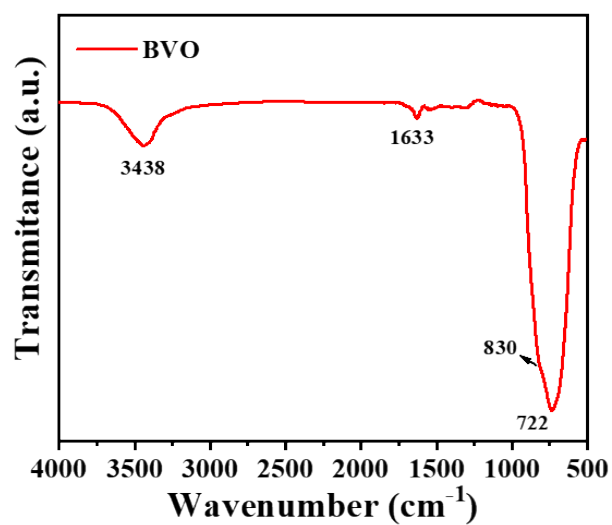


Fig. S3. FTIR spectrum of BVO.

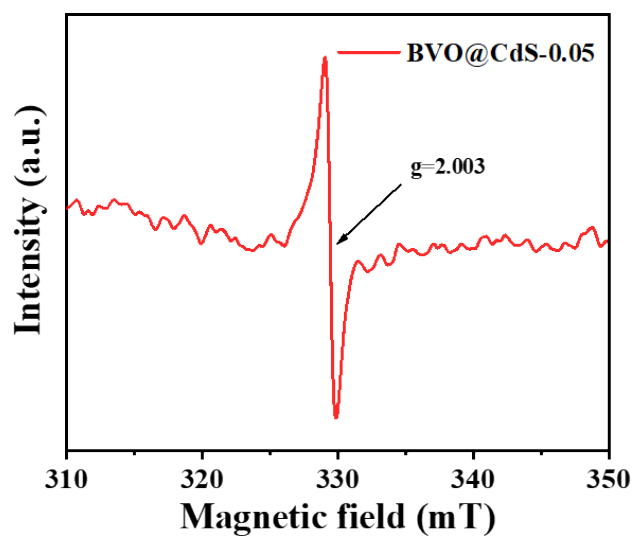
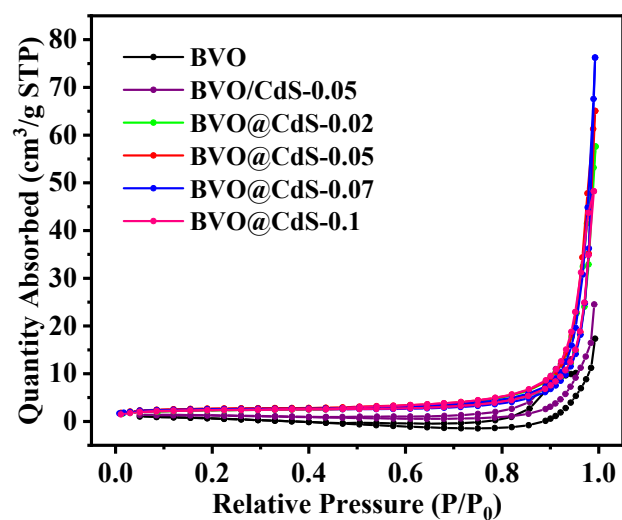
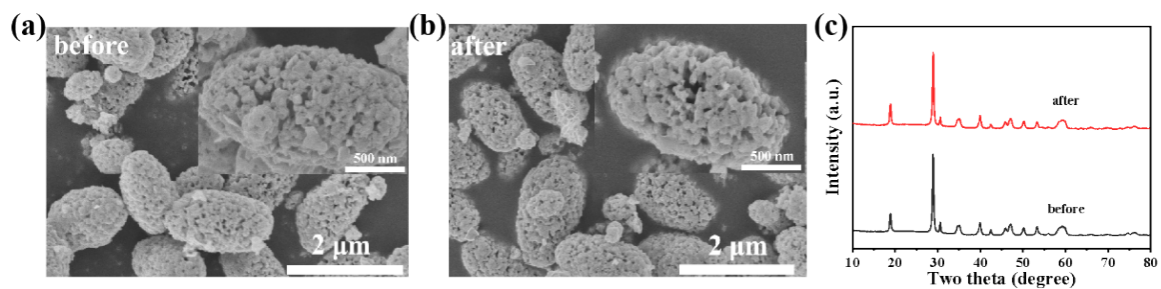


Fig. S4. ESR signal of BVO.



**Fig. S5.** Nitrogen adsorption desorption curves of BVO, BVO/CdS-0.05 and BVO@CdS-X.



**Fig. S6.** SEM (a, b) and (c) XRD test patterns of BVO@CdS-0.05 material before degradation and after four TC photodegradation cycles.

**Table S1.** ICP test of the BVO@CdS-0.05 sample.

Sample	Bi mass ratio (%)	V mass ratio (%)	Cd mass ratio (%)	S mass ratio (%)	Cd/Bi atomic ratio
BVO@CdS-0.05	54.7	14.2	0.78	0.28	1:37.7

**Table S2.** Specific surface area and mean pore size values of BVO, BVO/CdS-0.05 and BVO@CdS-X.

Sample	Specific surface area (m <sup>2</sup> /g)	Mean pore size values (nm)
BVO	0.928	33.2
BVO/CdS-0.05	3.260	16.6
BVO@CdS-0.02	7.472	12.1
BVO@CdS-0.05	7.803	10.7
BVO@CdS-0.07	8.287	10.8
BVO@CdS-0.1	7.373	11.9

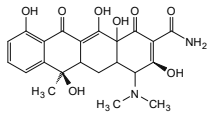
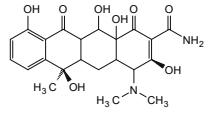
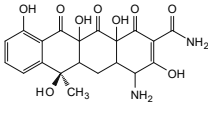
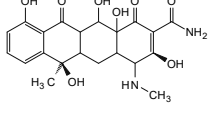
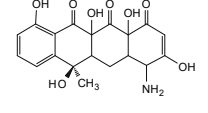
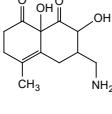
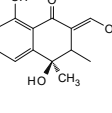

**Tab. S3.** Summary of other reported photocatalysts for the degradation of TC

Photocatalysis	Amount (g)	Concentration (20mg/L) and volume (mL) of tetracycline solution	Time (min)	Removal efficiency	Refs.
<b>BVO@CdS-0.05</b>	<b>0.03</b>	<b>20/100</b>	<b>30</b>	<b>88%</b>	<b>This work</b>
Ag@g-C <sub>3</sub> N <sub>4</sub> @BiVO <sub>4</sub>	0.03	20/100	60	82.75%	[1]
4BN-4	0.02	30/50	120	87.1%	[2]
N-GNDs/Ag/BiVO <sub>4</sub>	0.05	20/100	80	85.4%	[3]
Fe <sub>3</sub> O <sub>4</sub> /BiVO <sub>4</sub> /CdS	0.1	10/100	90	87.37%	[4]
BiVO <sub>4</sub> /rGH	0.05	20/100	120	73.2%	[5]
α-Fe <sub>2</sub> O <sub>3</sub> /BiVO <sub>4</sub>	0.05	20/100	120	75.8%	[6]

**Table S4.** Fluorescence lifetime parameters of the samples.

Sample	$\tau_1$ (ns)	$A_1$ (%)	$\tau_2$ (ns)	$A_2$ (%)	$\tau_{\text{average}}$ (ns)
BiVO <sub>4</sub>	0.18	90.61	3.32	9.93	0.475
BVO@CdS-0.05	0.2	85.14	3.25	14.86	0.635

**Table S5.** The structural information of the possible intermediate products.

Compounds	Formula	m/z	Proposed structure
TC	C <sub>22</sub> H <sub>24</sub> N <sub>2</sub> O <sub>8</sub>	445	
P1	C <sub>22</sub> H <sub>26</sub> N <sub>2</sub> O <sub>9</sub>	461	
P2	C <sub>20</sub> H <sub>20</sub> N <sub>2</sub> O <sub>9</sub>	433	
P3	C <sub>21</sub> H <sub>22</sub> N <sub>2</sub> O <sub>8</sub>	432	
P4	C <sub>19</sub> H <sub>19</sub> NO <sub>8</sub>	388	
P5	C <sub>12</sub> H <sub>17</sub> NO <sub>4</sub>	243	
P6	C <sub>13</sub> H <sub>14</sub> O <sub>4</sub>	235	
P7	C <sub>10</sub> H <sub>10</sub> O <sub>2</sub>	163	

## References

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