

Figure S1. (a) N<sub>2</sub> adsorption-desorption isotherms of G200;(b) Barret-Joyner-Halenda (BJH) pore-size distribution of BG,NT,BGN and GN200.

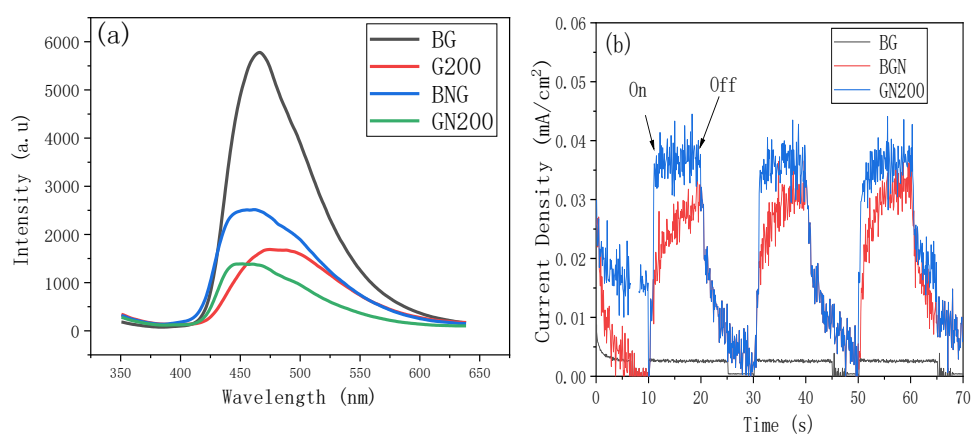


Figure S2. (a) PL spectra of the photocatalyst; (b) transient photocurrent responses of the photocatalyst.

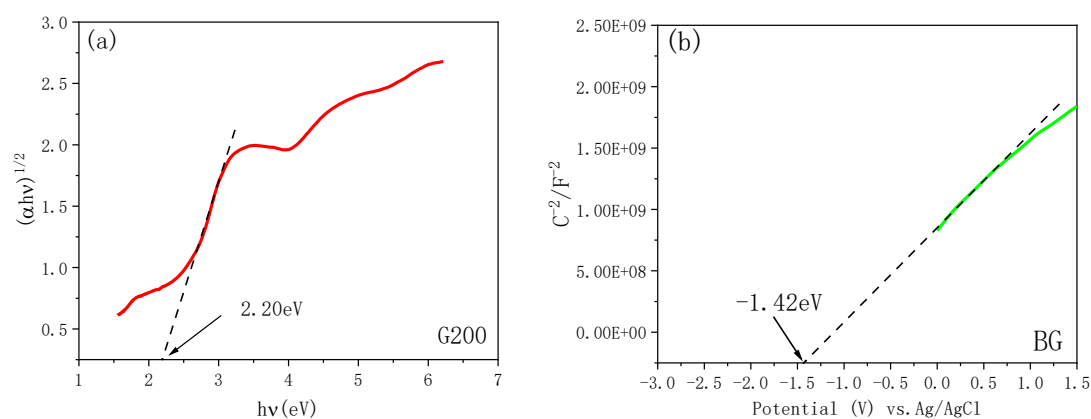


Figure S3. (a) Calculated band gap of G200; (b) Mott-Schottky plots of BG.

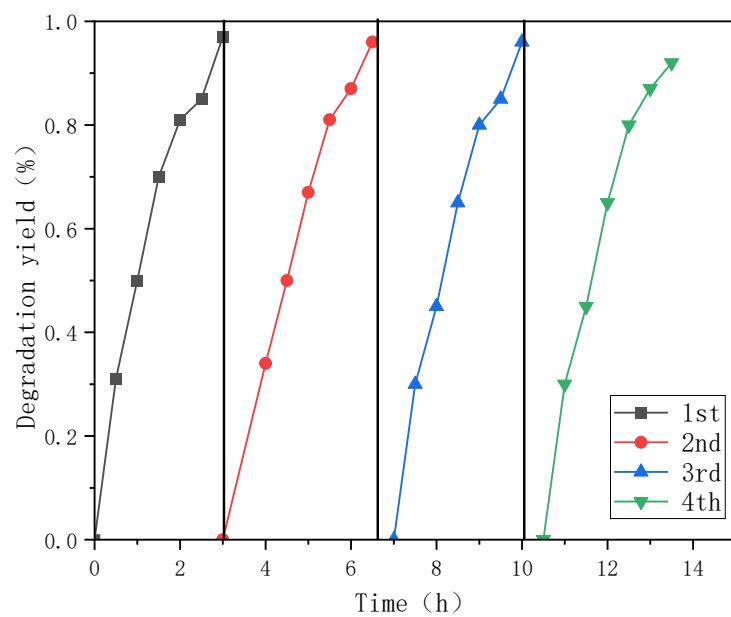


Figure S4. Degradation performance of GN200 toward MB over four cycles.

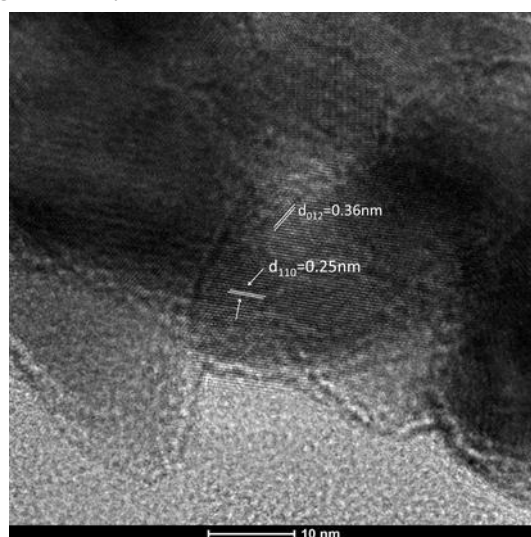


Figure S5. HRTEM image of GN200.

Table S1. Photoelectric conversion efficiency(PCE) of BG, BGN and GN200.

Photocatalyst	$j_p(\text{mA}/\text{cm}^2)$	$\lambda(\text{nm})$	$P_{in}(\text{mW}/\text{cm}^2)$	PCE(%)
BG	0.002	420	100	0.06%
BGN	0.032	420	100	0.94%
GN200	0.044	420	100	1.30%

The Photoelectric conversion efficiency were subjected to conversion using Formula as follows [47].

$$\text{PCE} = \frac{j_p \times 1240}{\lambda \times P_{in}}$$

where  $j_p$  is the actual measured photocurrent density under monochromatic light irradiation, the unit is  $\text{mA}/\text{cm}^2$ ;  $\lambda$  is the incident light wavelength, in nm, and  $P_{in}$  is the light irradiation intensity irradiated to the surface of the photoelectrode, in  $\text{mW}/\text{cm}^2$ .

[47] Wen Zhang. Studies on the Photo-electrocatalytic water splitting performance of  $\text{BiVO}_4\text{-Cu}_2\text{O}$  Photoelectrochemical cell. Xi'an Northwest University. 2021.  
<https://doi.org/10.27405/d.cnki.gxbdu.2021.000132>.