Supporting information for

Soft BiOBr@TiO₂ nanofibrous membranes with hierarchical heterostructures as efficient and recyclable visible-light photocatalysts†

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Calculation of fractal dimension

The fractal dimension (D) was calculated from the corresponding N$_2$ adsorption isotherms based on the modified FHH equation:\textsuperscript{1,2}

$$\ln\left(\frac{V}{V_{mono}}\right) = A\left[\ln\left(\frac{P_0}{P}\right)\right] + \text{constant}$$

Where $V$ is the N$_2$ adsorption capacity at equilibrium pressure; $V_{mono}$ is the monolayer adsorption capacity; $P_0$ and $P$ are the saturation and equilibrium pressure, respectively; plots of $\ln\left(\frac{V}{V_{mono}}\right)$ versus $\ln\left(\frac{P_0}{P}\right)$ showing a linear trend were reconstructed, and the slope $A$ could be used to calculate $D$ by utilizing the expression: $D = A + 3$, which was according to the dominant forces of liquid-gas surface tension at high coverage.

Calculation of band edge positions

The band edge positions of the semiconductor were calculated by the atom’s Mulliken electronegativity equation:\textsuperscript{3-5}

$$E_{VB} = X - E^e + 0.5E_g$$

Where $E_{VB}$ is the valence band edge potential; $X$ is the absolute electronegativity of the semiconductor (5.6 eV for TiO$_2$ and 6.17 eV for BiOBr); $E^e$ is the energy of free electrons on the hydrogen scale (about 4.5 eV); $E_g$ is the corresponding energy band gap; The conduction band potential can be deduced by $E_{CB} = E_{VB} - E_g$. 
**Fig. S1** SEM image of the synthesized pure BiOBr powder.

**Fig. S2** SEM image of TiO$_2$ NFM with Y$^{3+}$ doping. The inset shows the softness of the membrane.
**Fig. S3** (a) SEM image of pure TiO$_2$ NFM without Y$^{3+}$ doping and (b) the corresponding XRD pattern. The inset in (a) shows the fragility of the membrane.

**Fig. S4** Pore size distribution curves of the relevant nanofibrous membranes using the BJH method.
Fig. S5 Adsorption performance of various nanofibers towards RhB in the dark.

References


