

Supporting information for

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

Yuting Cai,^{‡ab} Jun Song,^{‡ab} Xiaoyan Liu,^{*a} Xia Yin,^{ab} Xiaoran Li,^{ab} Jianyong Yu^{ab} and Bin Ding^{*ab}

^aState Key Laboratory for Modification of Chemical Fibers and Polymer Materials, College of Textiles, Donghua University, Shanghai 201620, China

^bInnovation Center for Textile Science and Technology, Donghua University, Shanghai 200051, China

[‡] These authors contributed equally to this work.

Calculation of fractal dimension

The fractal dimension (D) was calculated from the corresponding N₂ adsorption isotherms based on the modified FHH equation:^{1,2}

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

Where V is the N₂ 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 $\ln(V/V_{mono})$ versus $\ln(\ln(P_0/P))$ 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: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 TiO₂ 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 $E_{CB} = E_{VB} - E_g$.

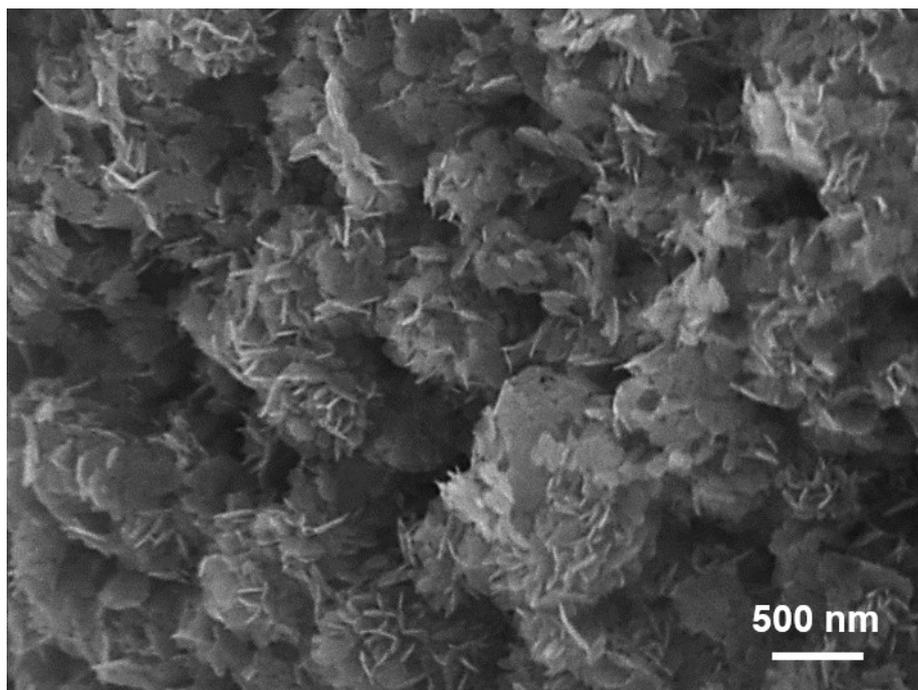


Fig. S1 SEM image of the synthesized pure BiOBr powder.

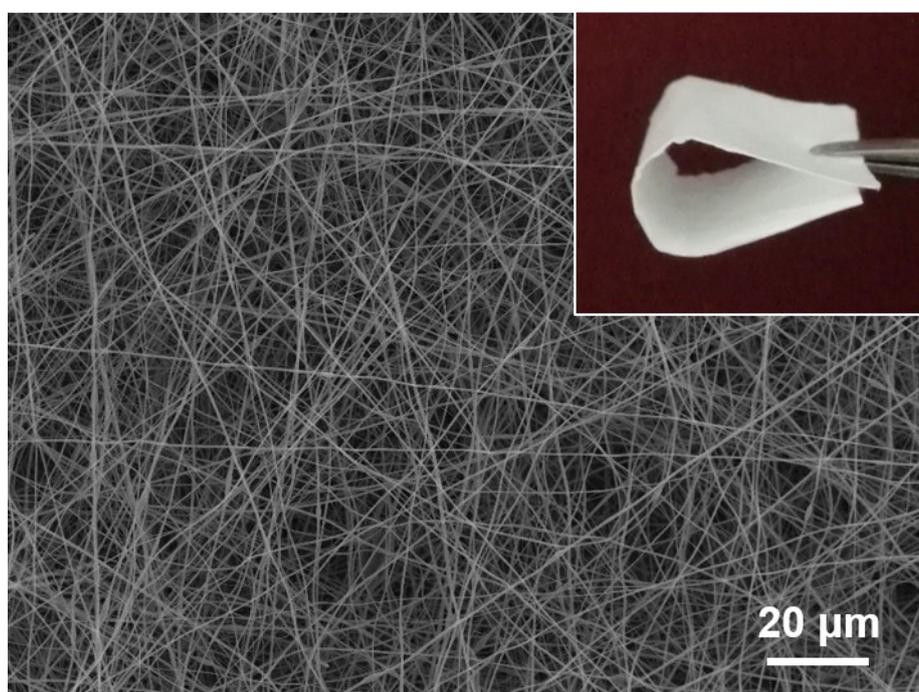


Fig. S2 SEM image of TiO₂ NFM with Y³⁺ doping. The inset shows the softness of the membrane.

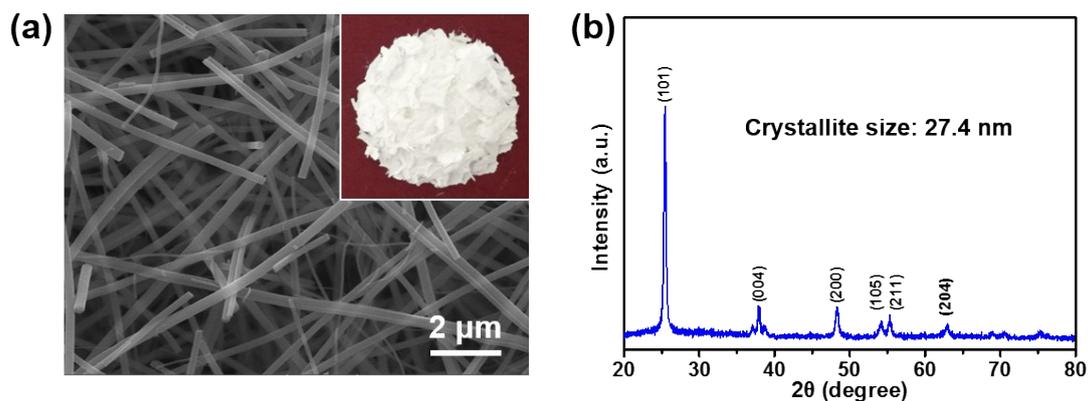


Fig. S3 (a) SEM image of pure TiO₂ NFM without Y³⁺ doping and (b) the corresponding XRD pattern. The inset in (a) shows the fragility of the membrane.

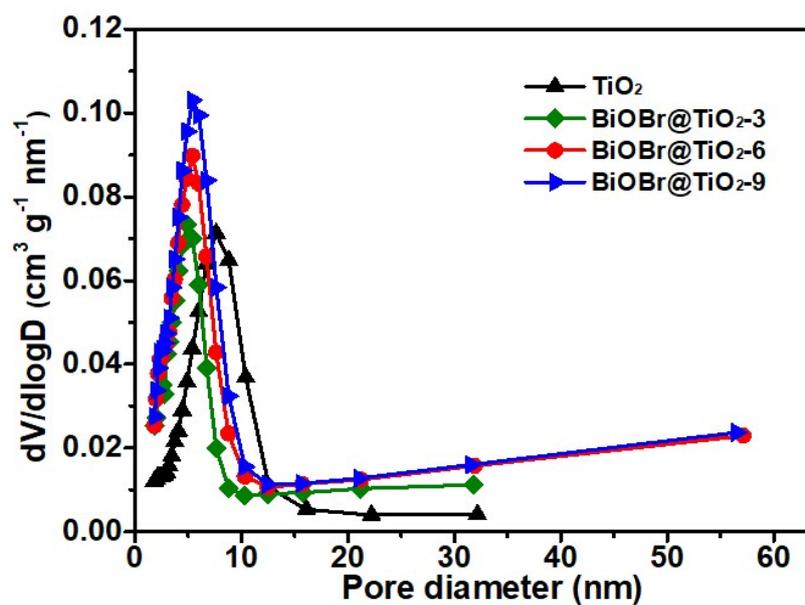


Fig. S4 Pore size distribution curves of the relevant nanofibrous membranes using the BJH method.

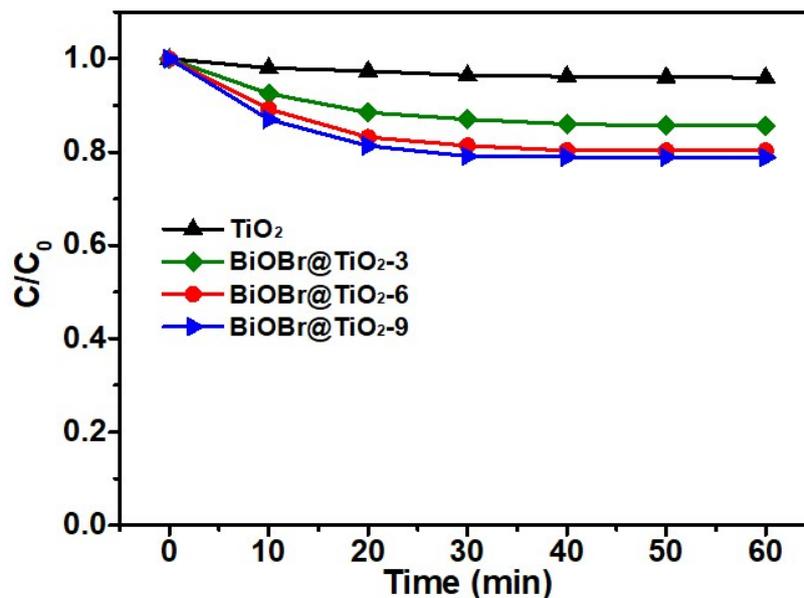


Fig. S5 Adsorption performance of various nanofibers towards RhB in the dark.

References

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