

Supplementary material

Efficient Dye Contaminant Elimination and Simultaneously Electricity Production via a Bi-Doped TiO₂ Photocatalytic Fuel Cell

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Photocatalytic degradation of RhB by TiO₂, BT-1, BT-2 BT-3 BT-4 and BT-5 powers were performed under visible light irradiation, as shown in Figure S1. It is observed that BT-3 exhibited the highest photocatalytic performance. The BT-3 has the best efficiency in both powder and photoanode.

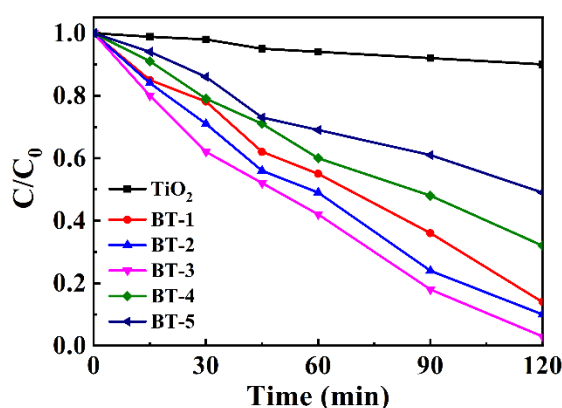


Figure S1. Photocatalytic degradation of RhB by TiO₂ and BT powers under visible light irradiation.

The SEM image and XRD pattern of BT-3 after the photocatalytic reaction were also investigated to further evaluate the stability of the catalyst. As shown in Figure S2 and Figure S3, there was no significant change in the its microtopography and crystal form before and after the photocatalytic experiment, which suggested that the BT catalysts exhibited good stability.

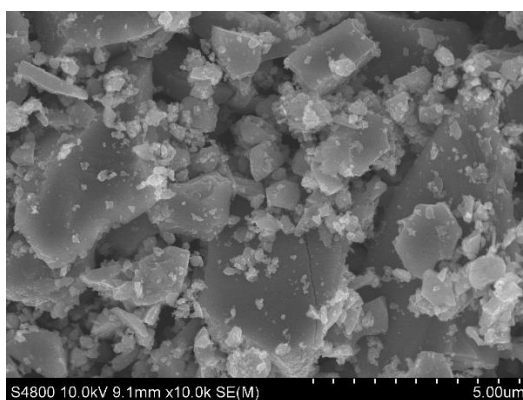


Figure S2. SEM image of BT-3 after the photocatalytic reaction.

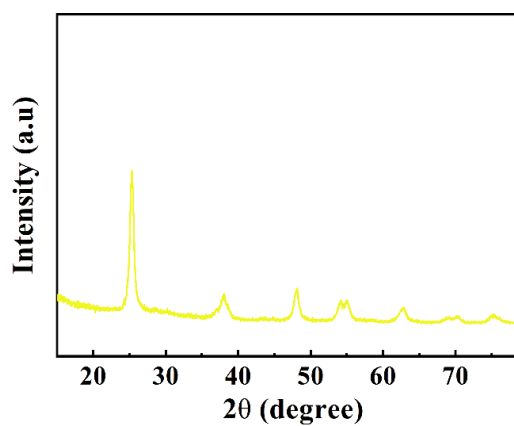


Figure S3. XRD pattern of BT-3 after the photocatalytic reaction.

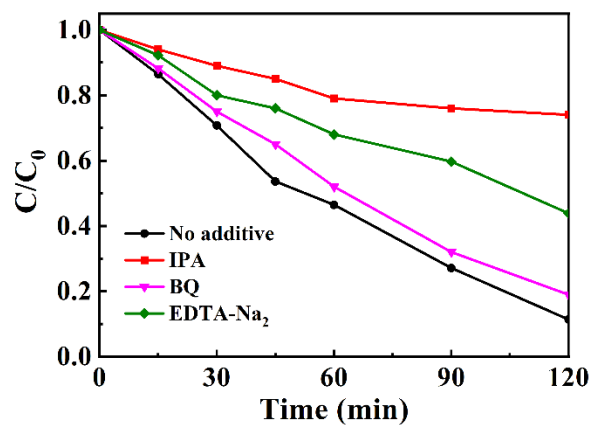


Figure S4. PFC degradation of RhB with existence of scavengers.

The electron transfer was recorded directly by ZF-100 electrochemical workstations. The charges transfer were regarded as Q_{total} when 10 mg L⁻¹ of RhB aqueous solutions was obtained and Q_{blank} without any fuel. The net charge was obtained by Q_{total} minus Q_{blank} .

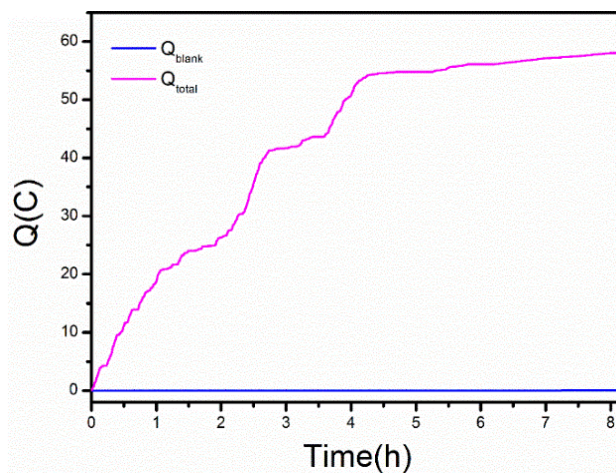


Figure S5. The Q_{total} and Q_{blank} of PFC process.

The PFC degradation of RhB was fitted by the first-order kinetic equation as shown in the Table S1.

Table S1. The kinetic equation of TiO₂ and 1–5% Bi-TiO₂ PFC

Photoanode	Kinetic Equation	R ²
Pure TiO ₂	$-\ln(C/C_0) = 0.0015t - 0.0145$	0.9953
BT-1	$-\ln(C/C_0) = 0.0037t + 0.106$	0.9894
BT-2	$-\ln(C/C_0) = 0.0042t - 0.0022$	0.9988
BT-3	$-\ln(C/C_0) = 0.0052t + 0.2609$	0.9292
BT-4	$-\ln(C/C_0) = 0.0026t - 0.0003$	0.9713
BT-5	$-\ln(C/C_0) = 0.0018t + 0.0097$	0.9891