Supporting Information

Rapid Construction of ZnO@ZIF-8 Heterostructures with

Size-selective Photocatalysis Properties

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Fig.S1 TEM images of the products obtained with Hmim concentrations of (a) 3M and (b) 4M



Fig.S2 XRD patterns of ZnO@ZIF-8 core-shell heterostructures before and after photocatalysis process (Inset: SEM image of ZnO@ZIF-8 core-shell heterostructures after photocatalysis process)



Fig. S3 Relationship between Cr(VI) removal efficiency (irradiation for 4h) and the number of cycles using ZnO@ZIF-8 heterostructures as photocatalysts



Fig.S4 Zeta-potential of the obtained ZnO@ZIF-8 core-shell heterostructures in water at various

pH values



Fig. S5 Degradation curves of RhB in the presence of ZnO@ZIF-8 heterostructures or ZnO

colloidal spheres under UV irradiation

Notes for Figure 8

The concentration of released $Zn^{2+}(C_{Zn}^{2+})$ was used to express the Rr. In addition, content of ZIF-8 in the obtained product (C_{ZIF-8}) could be used to express C_{Zn}^{2+} by suppose of all the released Zn^{2+} ions were coordinated to produce ZIF-8. As a result, C_{ZIF-8} could be used to express Rr. The C_{ZIF-8} was denoted by relative intensity of ZIF-8 peak in XRD patterns [$I_{ZIF-8}/(I_{ZIF-8}+I_{ZnO})$], as shown in Tab.1. The peaks located at 7.42⁰ [(001) plane of ZIF-8] and 36.16⁰ [(101) plane of ZnO] were chosen as the characteristic peaks of ZIF-8 and ZnO. In addition, R_C is proportional to ratio of C_{Hmim}/C_{Zn}^{2+1} , which could be expressed as $C_{Hmim}/[I_{ZIF-8}/(I_{ZIF-8}+I_{ZnO})]^2$, as shown in Eq.(1).

$$B = K \cdot C_{Hmim} / [I_{ZIF-8} / (I_{ZIF-8} + I_{ZnO})]^2 (1)$$

Where B (Rc/Rr) denotes balance between coordination rate and release rate of Zn^{2+} . K (L·mol⁻¹) is a constant. C_{Hmim} (mol·L⁻¹) denotes concentration of Hmim. I_{ZIF-8} and I_{ZnO} were utilized to express relative intensity of ZIF-8 peak [(001) plane of ZIF-8] and ZnO peak [(101) plane of ZnO] in the XRD patterns of the obtained products, respectively.

Reference

1. Yao, J.; Dong, D.; Li, D.; He, L.; Xu, G.; Wang, H., Contra-diffusion Synthesis of ZIF-8 Films on a Polymer Substrate. *Chem. Commun.* **2011**, *47*, 2559-2561.