Enhanced photocatalytic activity of B_{12}-based catalyst co-photosensitized by TiO_2 and Ru(II) towards dechlorination

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Experimental

Preparation of B_{12}-TiO_2

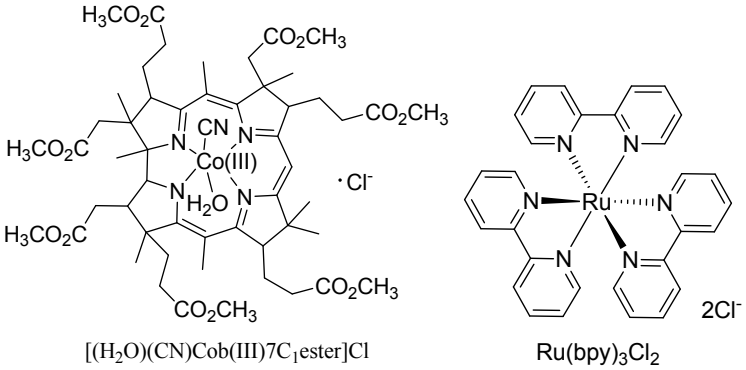
[(CN)(H_2O)Cob(III)7COOH]Cl (2.5 mg, 2.4×10^{-3} mmol) was added to 5 mL methanol dispersion of mesoporous anatase TiO_2 microspheres (30 mg) and the mixture was stirred at room temperature for 4 h. Then the hybrid B_{12}-TiO_2 was obtained after centrifugation and washed with methanol for three times.

The Co content of B_{12}-TiO_2 was 6.9×10^{-5} mol·g^{-1}, which was determined through detecting the absorbance change of the characteristic peak of [(CN)(H_2O)Cob(III)7COOH]Cl at 523 nm in the supernatant by UV-vis spectra.

Preparation of Ru(II)-TiO_2

Ru(dcb)$(bpy)_2(PF_6)_2$ (5 mg， 5.8 mmol) was added to 5 mL methanol dispersion of mesoporous anatase TiO_2 microspheres (30 mg) and the mixture was stirred at room temperature for 4 h, Then the hybrid Ru(II)-TiO_2 was obtained after centrifugation and washed with methanol for three times.

The Ru content of Ru(II)-TiO_2 was 1.75×10^{-4} mol·g^{-1}, which was determined through detecting the absorbance change of the characteristic peak of Ru(dcb)$(bpy)_2(PF_6)_2$ at 480 nm in the supernatant by UV-vis spectra.



[(H_2O)(CN)Cob(III)7C_1ester]Cl Ru$(bpy)_3Cl_2$

Fig. S1 Structures of [(CN)(H_2O)Cob(III)7C_1ester]Cl and Ru(bpy)$_3$$Cl_2$.

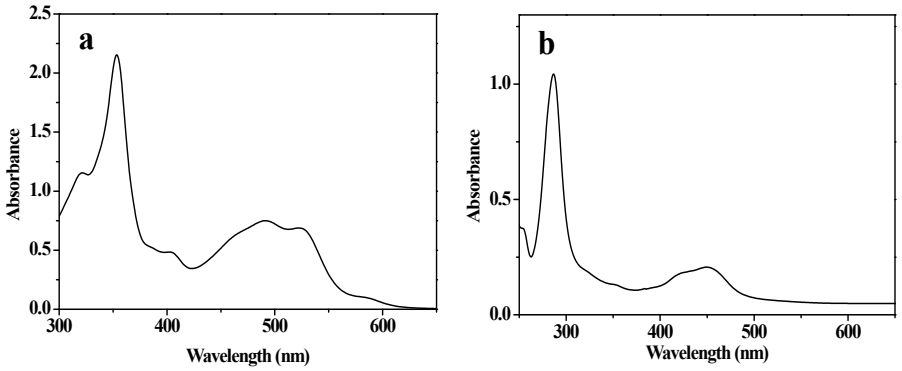


Fig. S2 UV-vis spectra of Cob(III)7C_1ester (a) and Ru(bpy)$_3$$Cl_2$ (b) in methanol.

Fig. S3 Photographs of B_{12}-TiO_2 (a) and Ru(II)-TiO_2 (b).

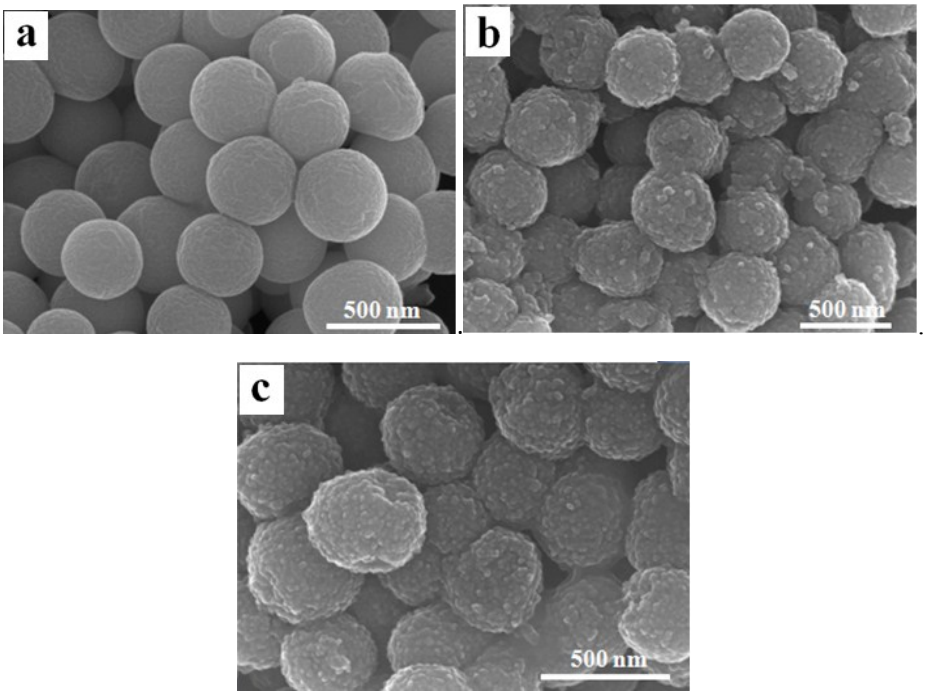


Fig. S4 SEM images of titanium glycolate (a), B_{12}-TiO_2 (b) and Ru(II)-TiO_2 (c).

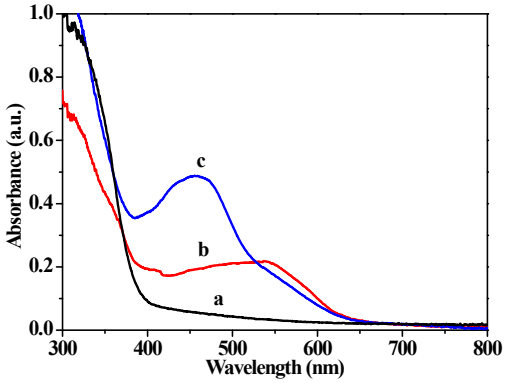


Fig. S5 Diffuse reflectance UV-vis spectra of TiO_2 (a), B_{12}-TiO_2 (b) and Ru(II)-TiO_2 (c).