

Anisotropic photogenerated charge separations between different facets of dodecahedral α - Fe_2O_3 photocatalyst

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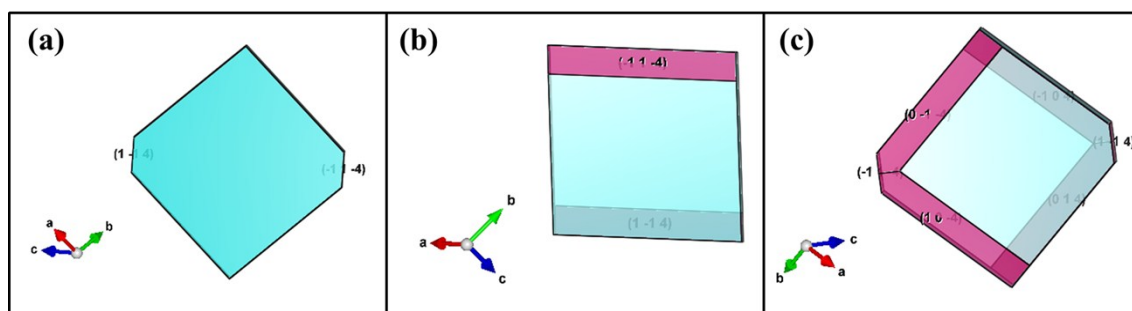


Fig. S1 When two edges are selectively truncated, the TEM images should be composed of two kinds of morphology: (a) pseudo cubic α - Fe_2O_3 (PCFe) with two edges being selectively truncated; (b) PCFe with integrate angles. (c) When six edges that intersect with c axis are cut off, the shadow of (c) accords with TEM images in the paper.

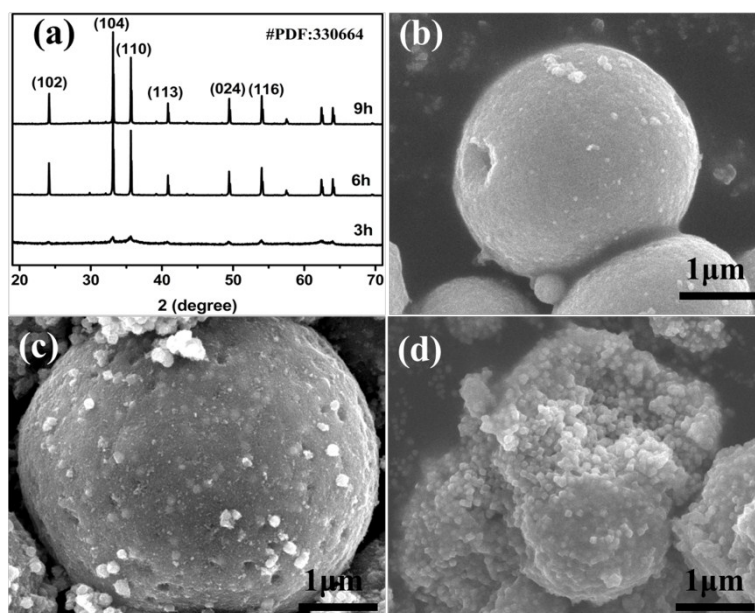


Fig. S2 Powder XRD patterns (a) and SEM images (b-d) of the products at reaction time: (b) 3 h; (c) 6 h; (d) 9 h. $\text{Fe}(\text{NO}_3)_3$ is 2.4g, ammonium acetate is 2 M, ethanol and water are 60ml and 3ml, respectively.

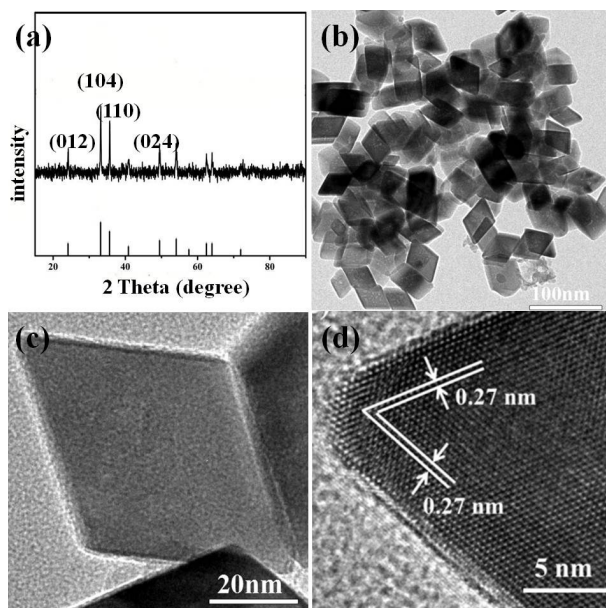


Fig. S3 (a) XRD and (b) Low-magnification TEM image of the synthesized RhFe particles; (c) Typical high-magnification TEM image of individual nanocrystals and the inset is the corresponding SAED; (d) image taken from the tips of the nanocrystals.

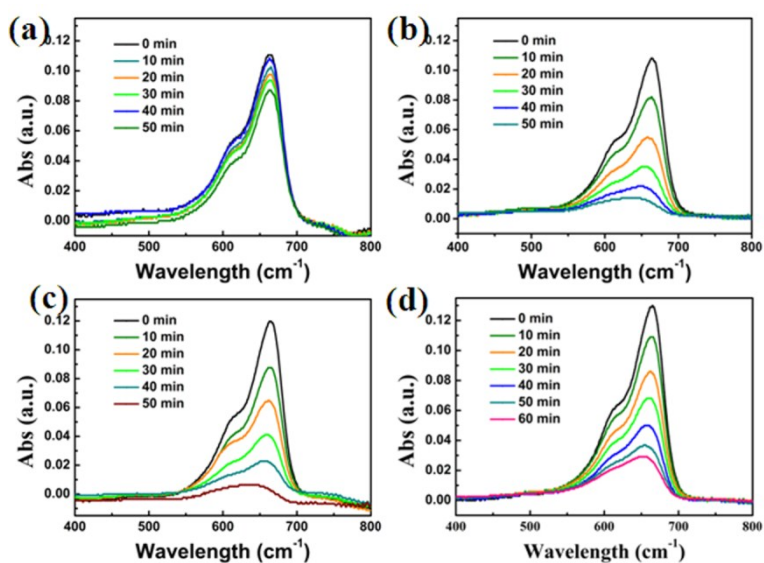


Fig. S4 Photodegradation of MB by using (a) DoFe-1 without H_2O_2 ; (b) RhFe; (c) DoFe-1 and (d) DoFe-3. When ammonium acetate was 2 M/4 M, the obtained samples are named as DoFe-1 / DoFe-3.

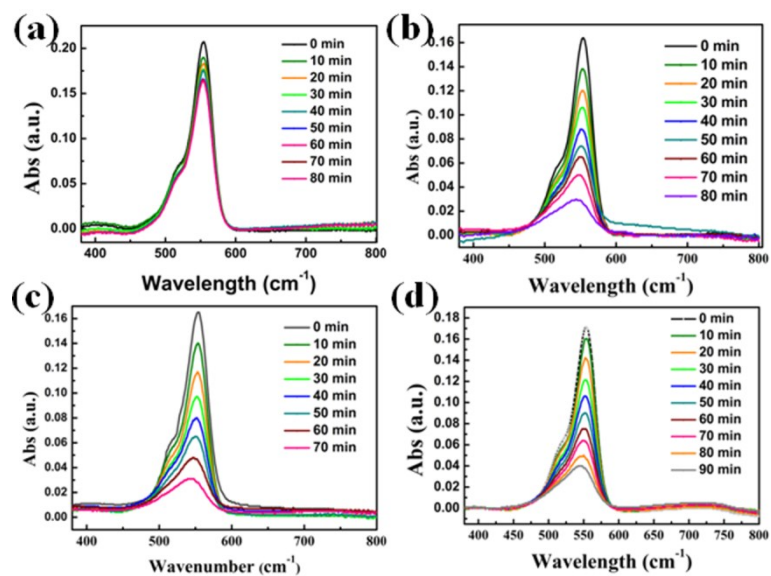


Fig. S5 Photodegradation of RhB by using (a) DoFe-1 without H_2O_2 ; (b) RhFe; (c) DoFe-1 and (d) DoFe-3. When ammonium acetate was 2 M/4 M, the obtained samples are named as DoFe-1 / DoFe-3.

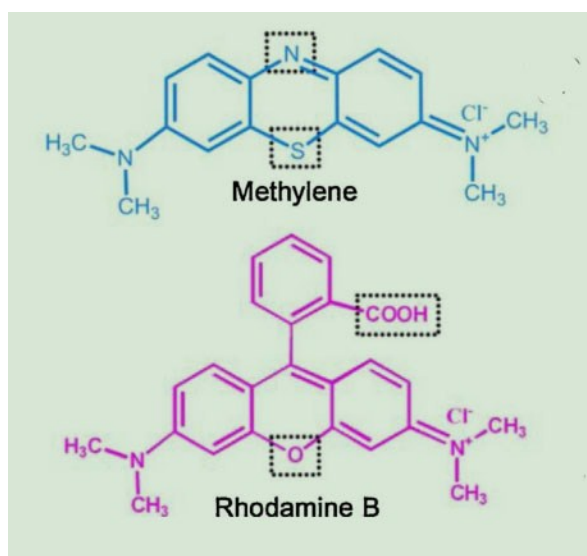


Fig. S6 The molecular structure of MB and RhB dyes.

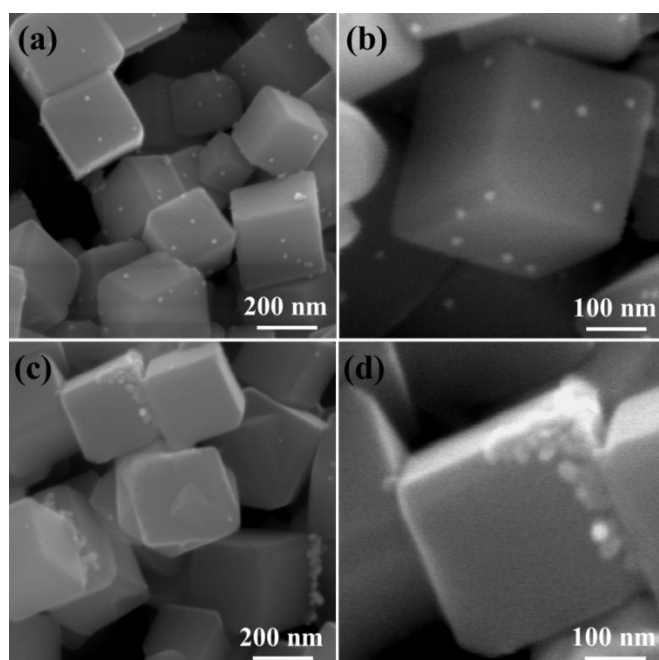


Fig. S7 The SEM images of DoFe nanocrystals with the deposition of Au (a, b) in dark and (c, d) induced by full spectrum light source.

Table S1 Samples obtained under different experimental conditions (AA: ammonium acetate).

Sample No.	Ethanol/ml	Water/ml	AA/ M	Size/ nm
DoFe-1	60	4.2	1	75± 5
DoFe-2	60	3	1	100± 5
DoFe-3	60	3	2	160± 10

Table S2. A simple summary of photodegradation on pure α -Fe₂O₃ of different morphology. Usually, the analysis focuses on surface structure while it is clear that morphology with best performance always expose at least two kinds of crystal facets.

Morphology with best performance	Crystal facets	Dye	Reference
Truncated nanocube	(012) and (104)	RhB	[18]
Icositetrahedron	(110), (104) and (113)	RhB	[27]
Hexagonal nanoplate	(110), (012) and (104)	MB	[29]
Octodecahedron	(113) and (104)	MB	[30]
Truncated dodecahedron	(012) and (001)	RhB	[32]
Polyhedron	(101) and (001)	MB	[40]