

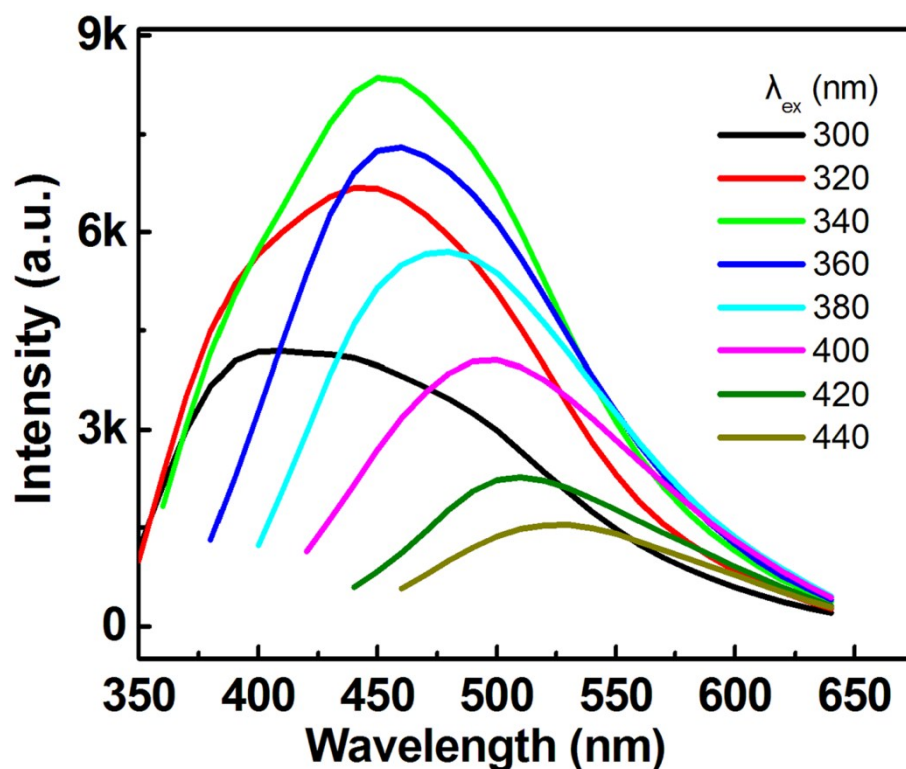
## Electronic Supplementary Information

### Synthesis of catalytically active peroxidase-like Fe-doped carbon dots and application for ratiometric fluorescence detection of hydrogen peroxide and glucose

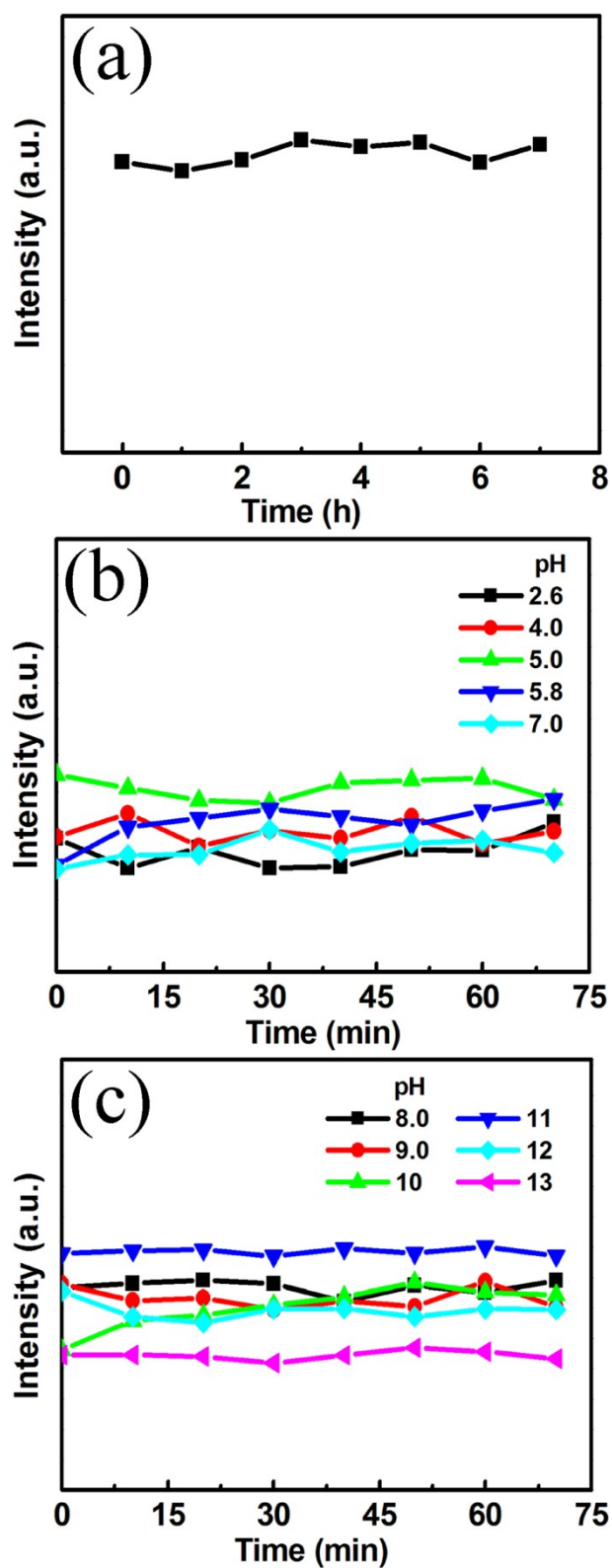
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**Fig. S1** Fluorescence spectra of the Fe-CDs at different excitation wavelengths.



**Fig. S2** (a) Stability against photobleaching of Fe-CDs under xenon lamp. (b) and (c) Stability against photobleaching of Fe-CDs in various solutions with different pH at room temperature.

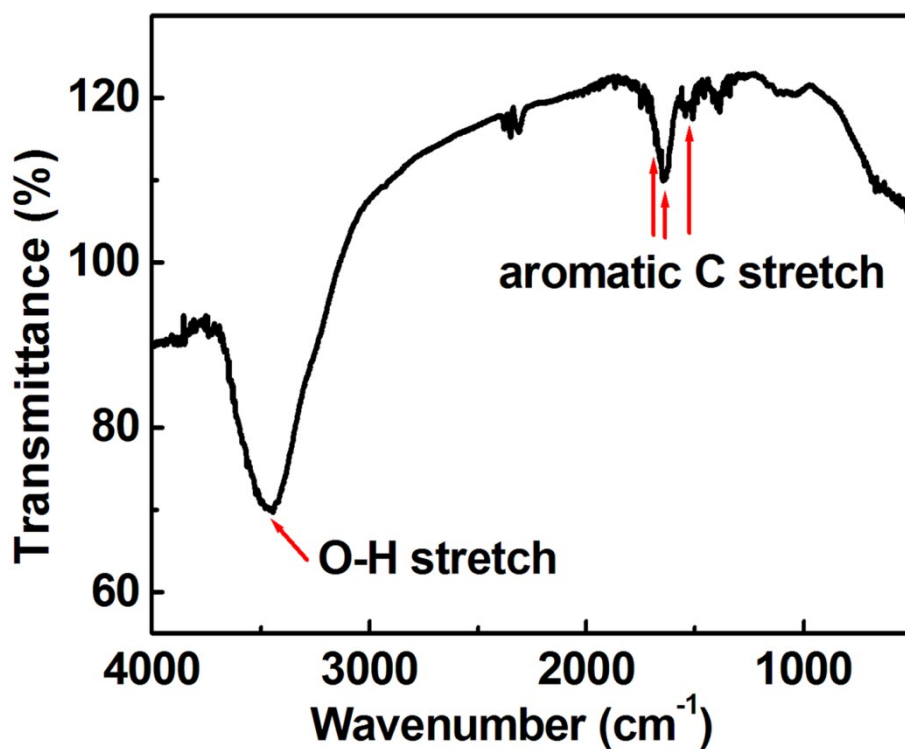


Fig. S3 FT-IR spectrum of the Fe-CDs.

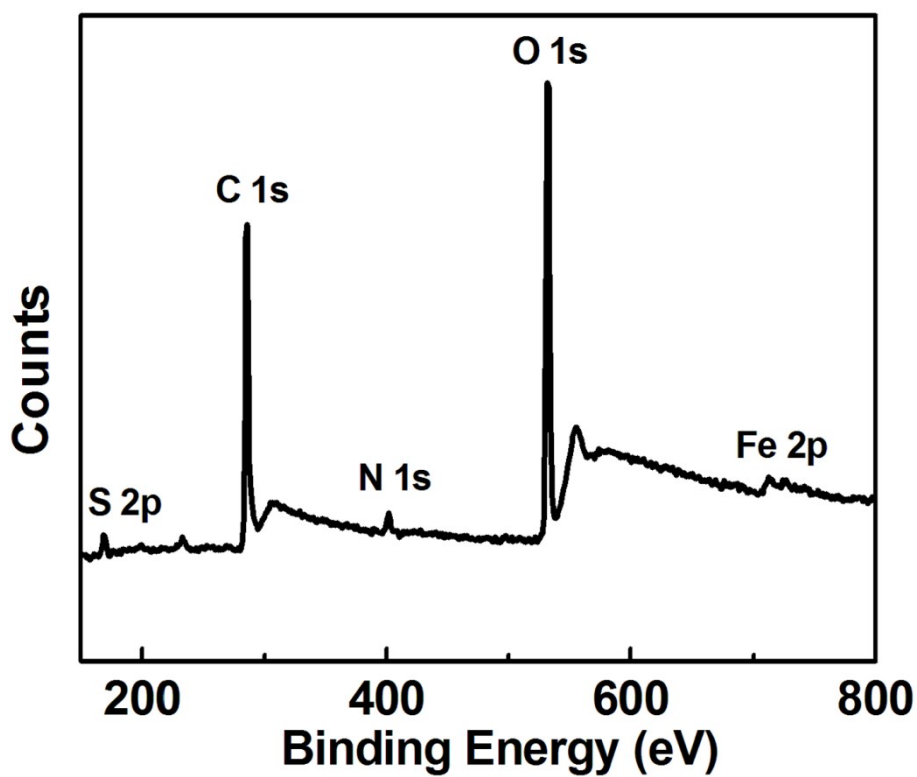
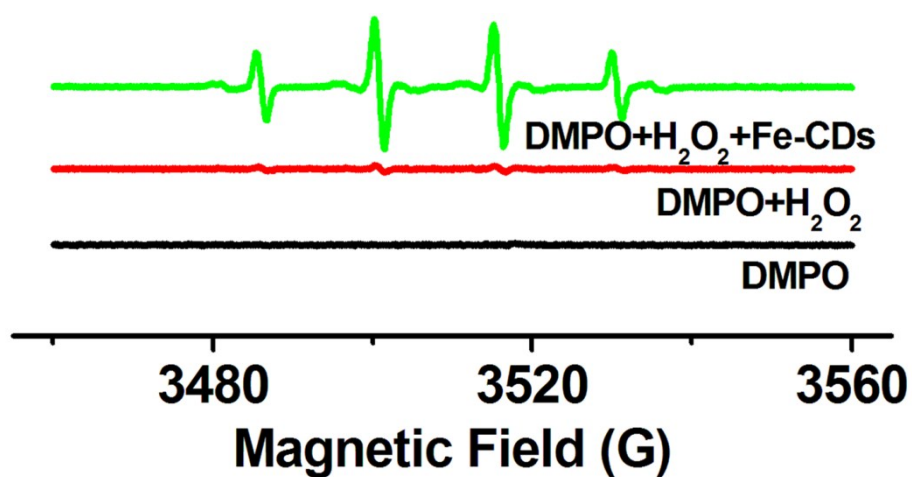
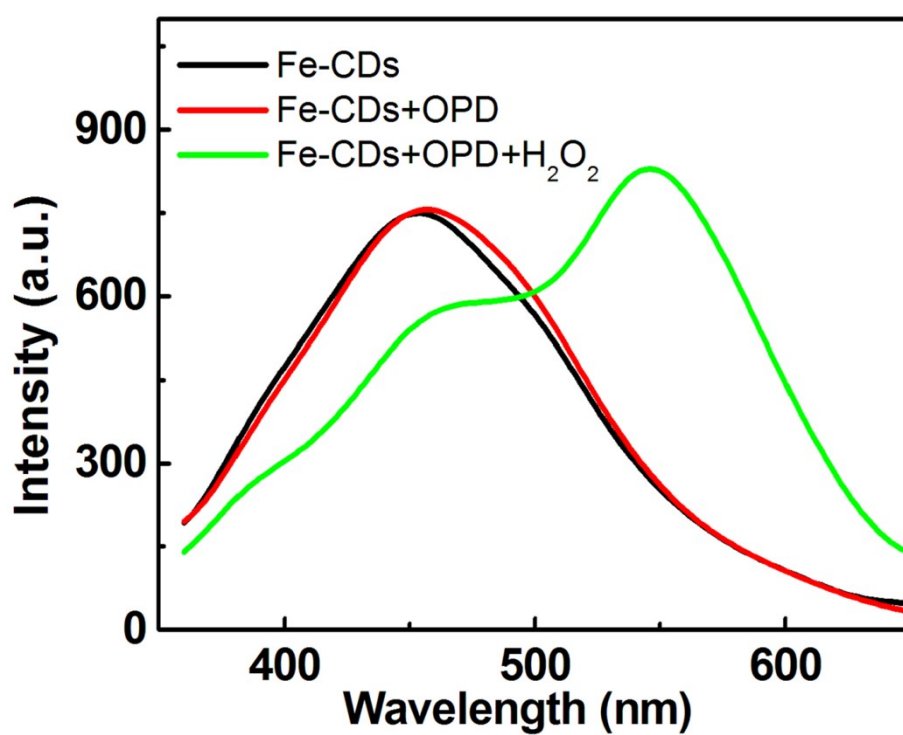


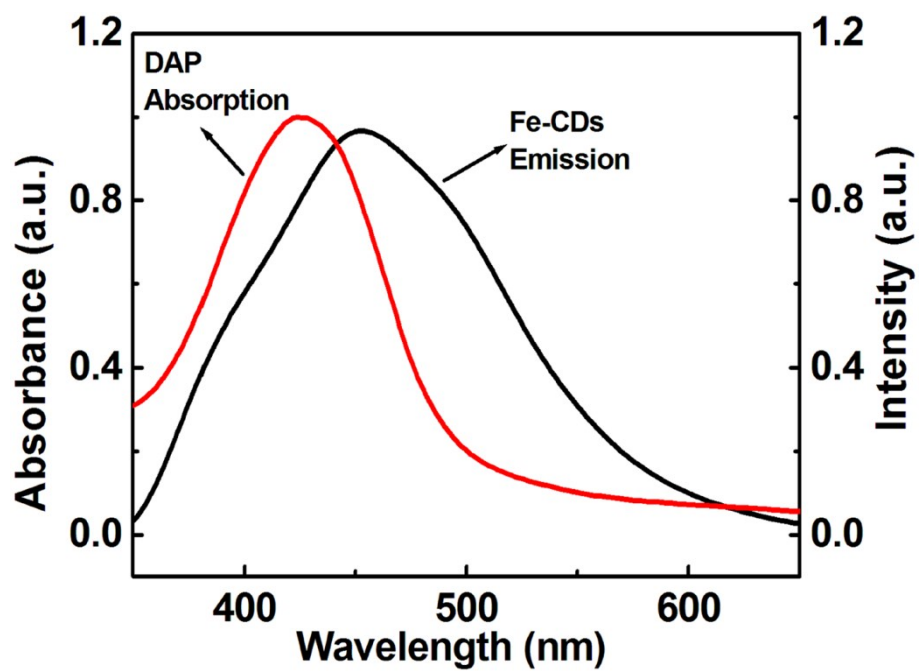
Fig. S4 Wide scan XPS full spectrum of Fe-CDs.



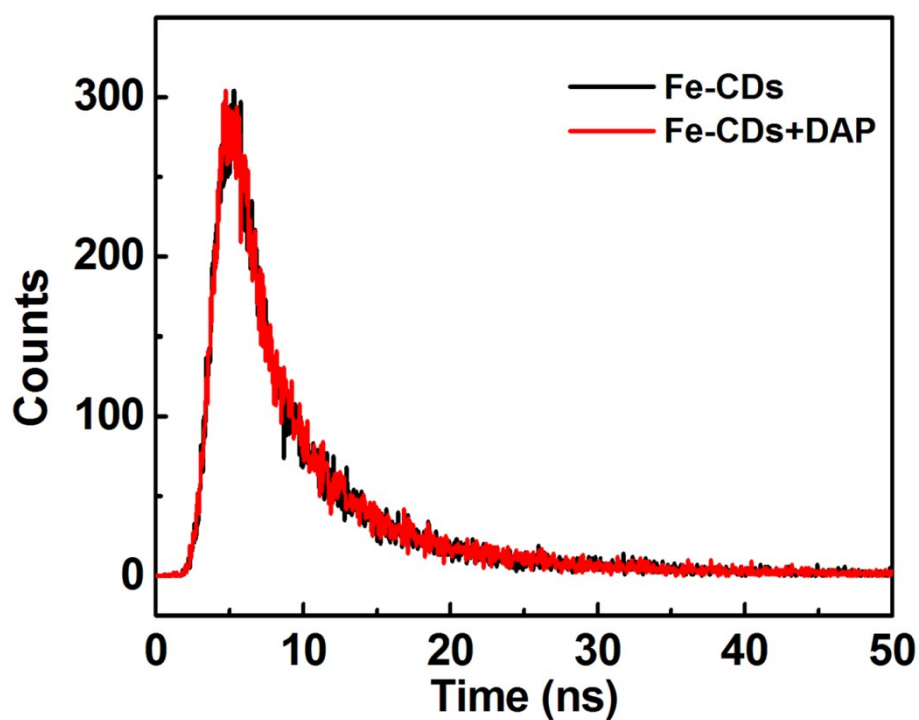
**Fig. S5** ESR spectra of DMPO, DMPO+H<sub>2</sub>O<sub>2</sub> and DMPO+H<sub>2</sub>O<sub>2</sub>+Fe-CDs system.



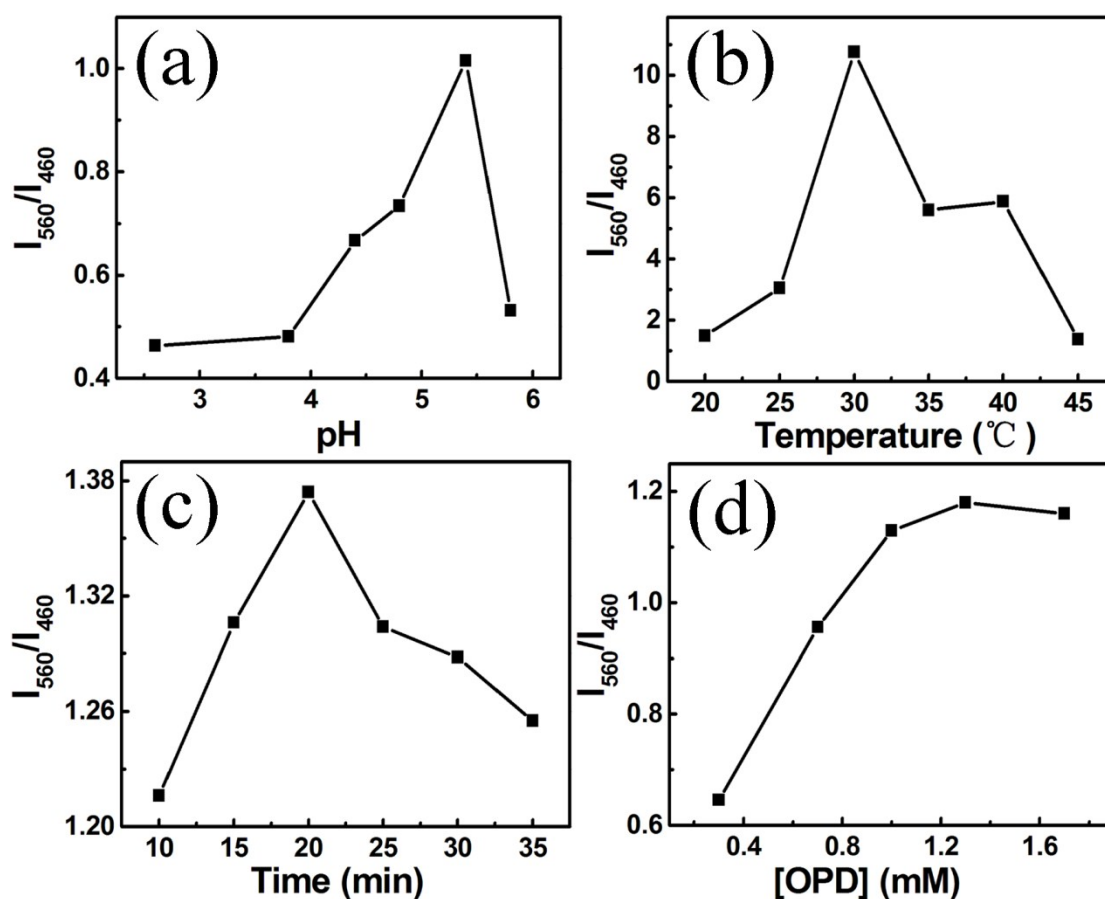
**Fig. S6** Fluorescence spectra of Fe-CDs, Fe-CDs+OPD and Fe-CDs+OPD+H<sub>2</sub>O<sub>2</sub> system.



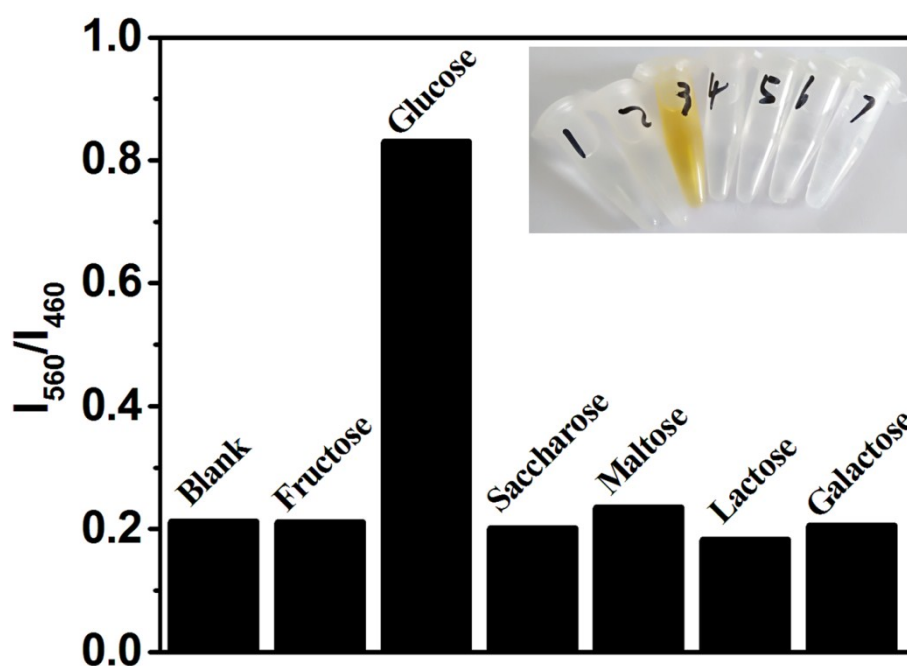
**Fig. S7** UV-vis absorption spectrum (red line) of DAP and fluorescence spectrum (black line) of Fe-CDs.



**Fig. S8** The fluorescence lifetimes of Fe-CDs (black line) and Fe-CDs+DAP (red line).



**Fig. S9** The effects of various reactive conditions on the determination of  $H_2O_2$ : (a) the pH of reactive solution, (b) the temperature of reactive solution, (c) the reactive time and (d) the concentration of OPD.



**Fig. S10** Selectivity of glucose detection, the concentrations of glucose and interferences were 0.017 mM. Inset: the corresponding photographs.

**Table S1** Comparison of the sensing performance of different catalysts for glucose detection.

Catalyst	Linear range ( $\mu\text{M}$ )	Detection limit ( $\mu\text{M}$ )	Refs.
ME-CDs	200-2500	60	1
Co <sub>3</sub> O <sub>4</sub> NPs	10-10000	5	2
Graphene oxide	1-20	1	3
Pt NCs	0-200	0.28	4
Fe-CDs	0-300	2.5	This work

## References

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- 2 J. S. Mu, Y. Wang, M. Zhao and L. Zhang, *Chem. Commun.*, 2012, **48**, 2540–2542.
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- 4 L. H. Jin, M. Zheng, Y. Q. Zhang, S. J. Cai, Z. H. Zhang, C. Li, L. Shang and Y. H. Shen, *ACS Appl. Mater. Interfaces*, 2017, **9**, 10027–10033.