Electronic Supplementary Material (ESI) for Green Chemistry.


# Supporting Information

Enhanced photocatalytic performance for oxidation of glucose to value-added organic acids in water using iron thioporphyrazine modified $SnO_2$

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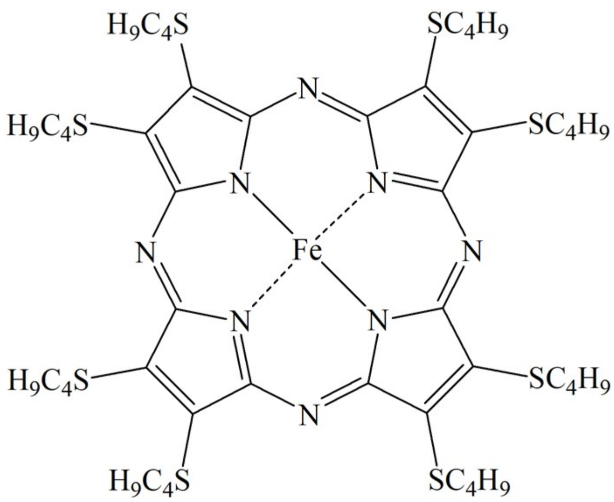



Fig. S1 Molecular structure of FePz(SBu)$_8$.

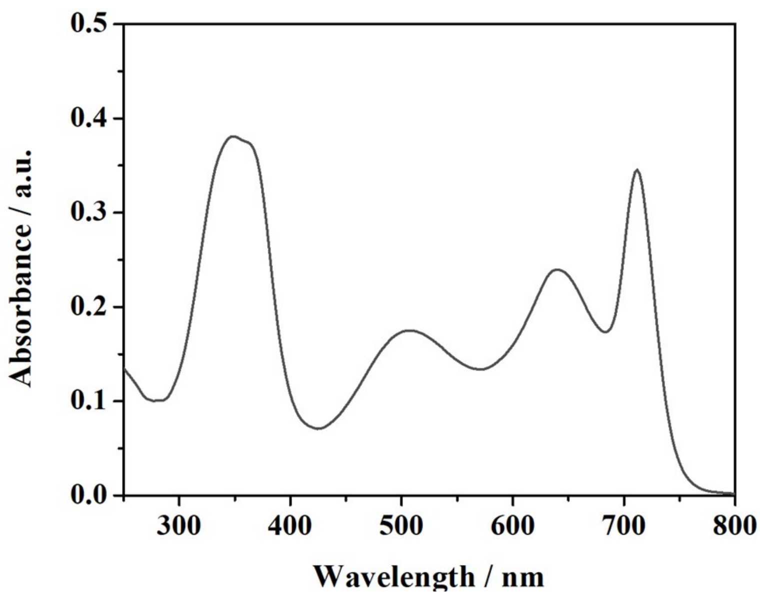



Fig. S2 UV-vis spectrum of metal-free $H_2Pz(SBu)_8$ in dichloromethane.

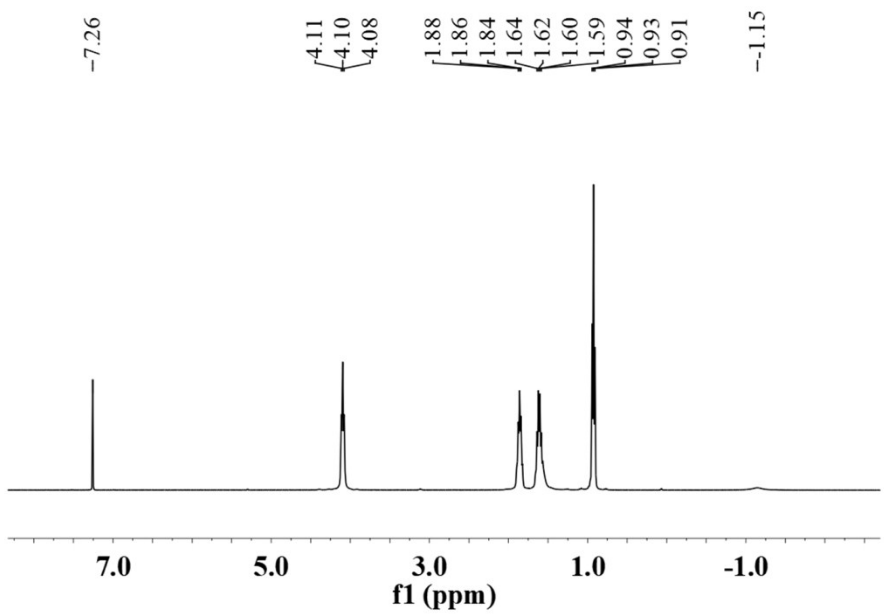



Fig. S3 $^{1}H$ NMR spectrum of metal-free $H_2Pz(SBu)_8$ in $CDCl_3$.

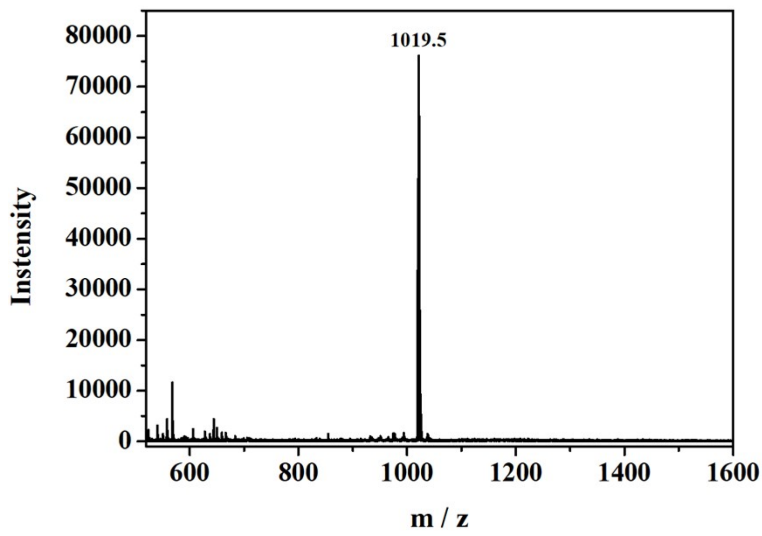



Fig. S4 MALDI-TOF MS of metal-free $H_2Pz(SBu)_8$.

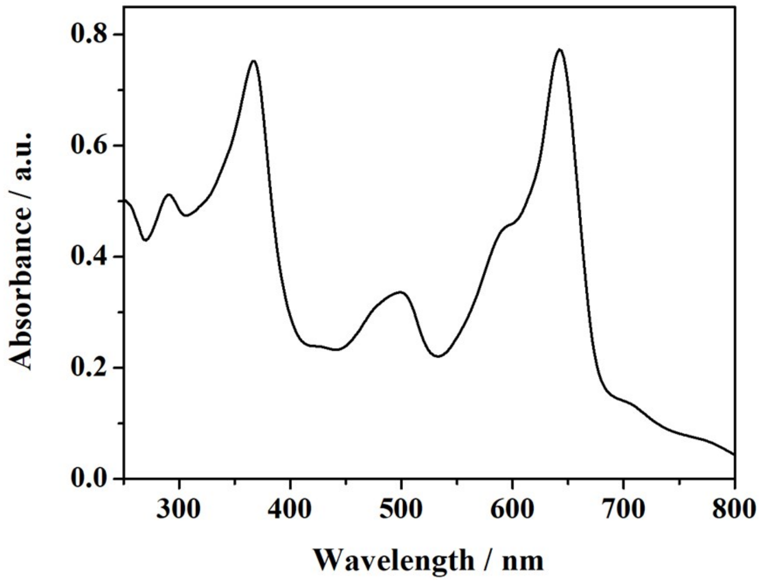



Fig. S5 UV-vis spectrum of $FePz(SBu)_8$ in dichloromethane.

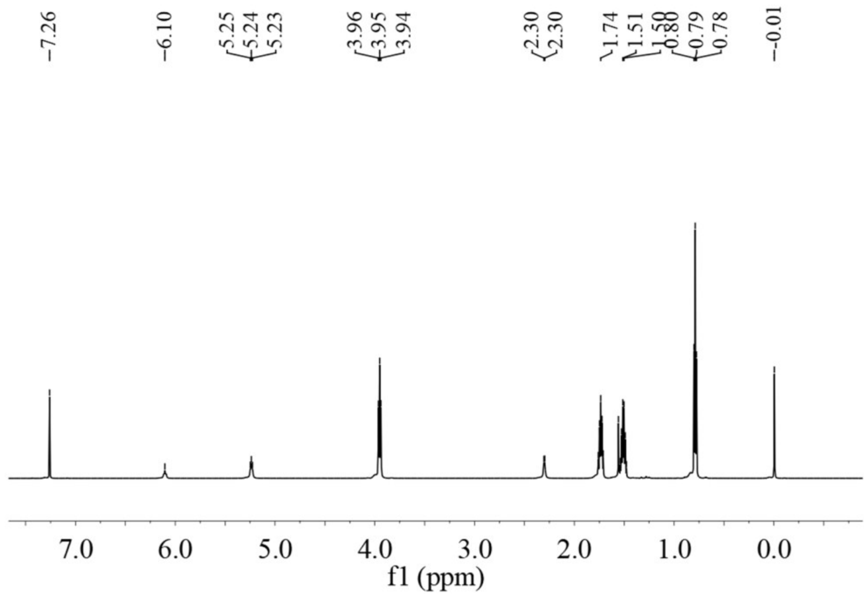



Fig. S6 $^{1}H$ NMR spectrum of $FePz(SBu)_8$ in $CDCl_3$.

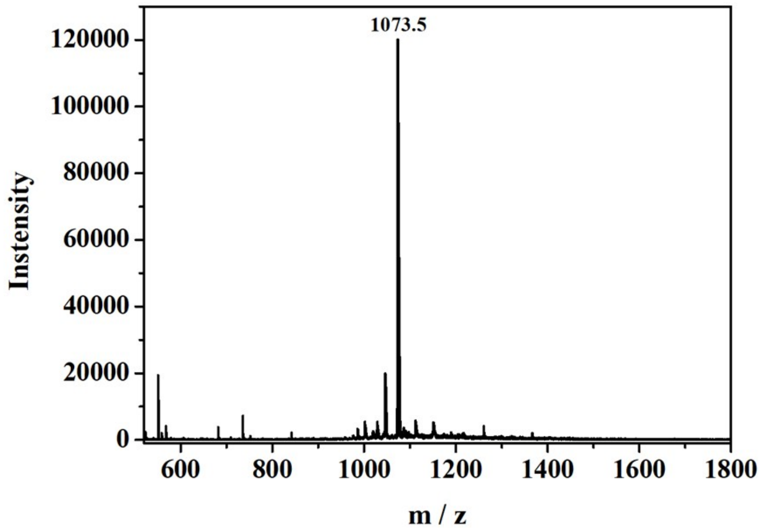
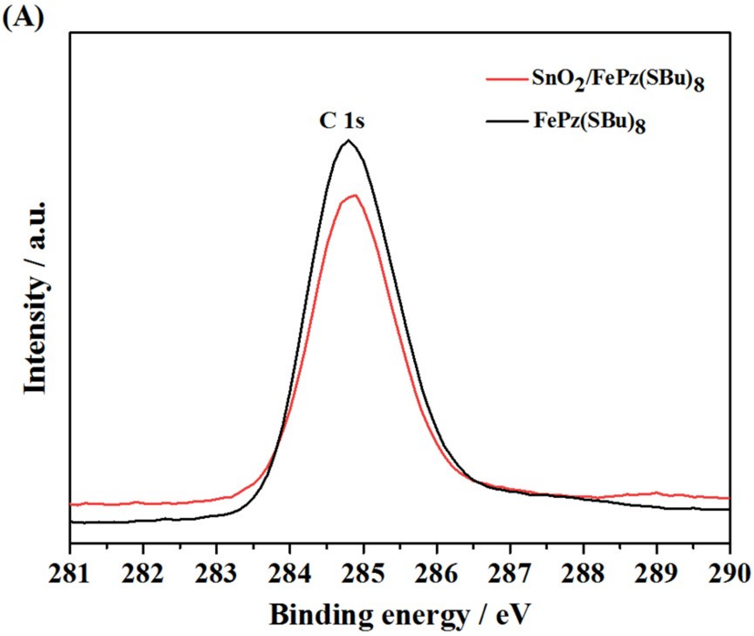
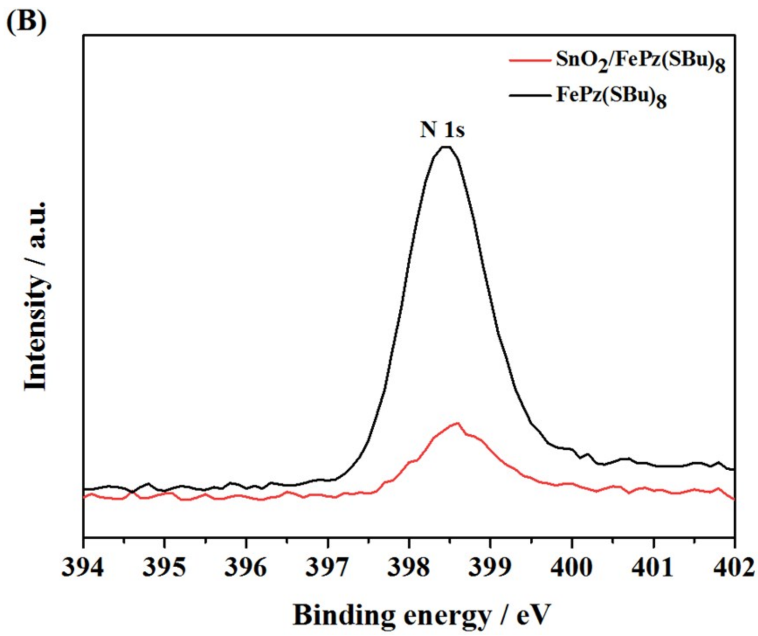



Fig. S7 MALDI-TOF MS of $FePz(SBu)_8$.

(A)





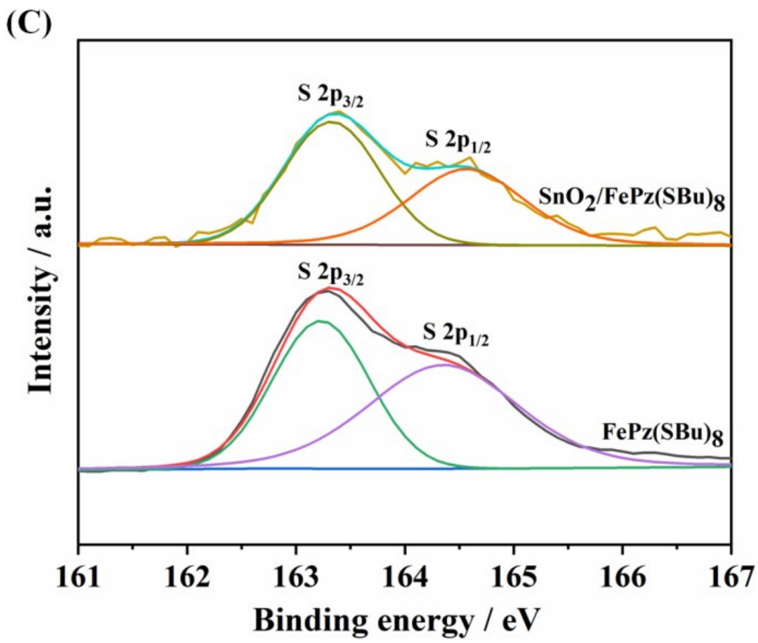
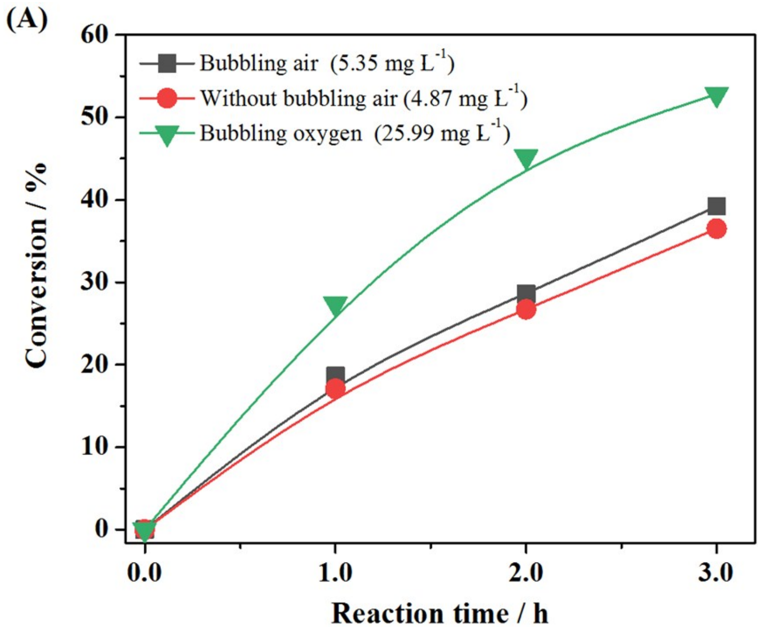




Fig. S8 The high resolution XPS spectra in C 1s (A), N 1s (B) and S 2p (C) region for pure $FePz(SBu)_8$ and $SnO_2/FePz(SBu)_8$ composite.



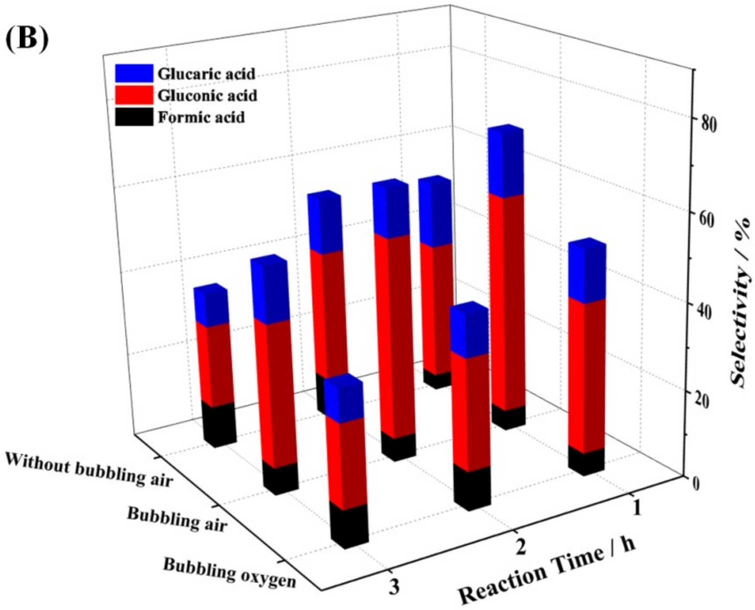




Fig. S9 The effect of dissolved oxygen concentration on the conversion of glucose (A) and the selectivity of organic acid (B). Reaction conditions: catalyst (20 mg), aqueous glucose (1 mmol·L$^{-1}$, 50 mL), light intensity (2 W·cm$^{-2}$).

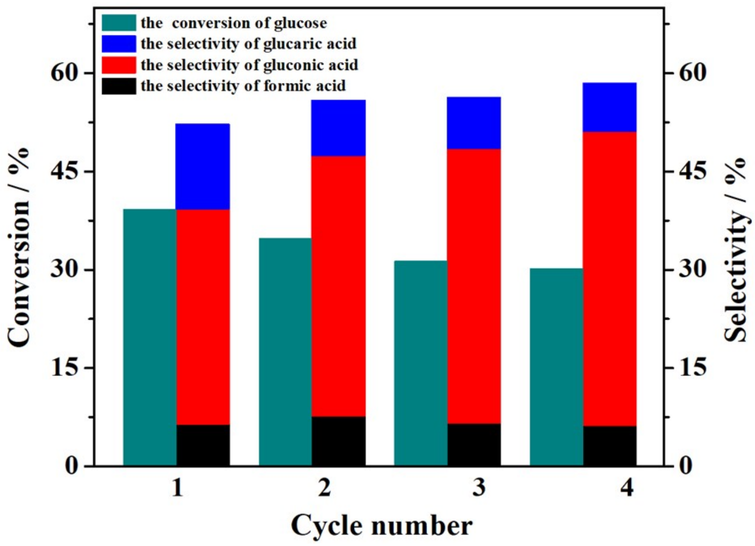



Fig. S10 Reusability of $SnO_2/FePz(SBu)_8$(0.1%) for photocatalytic oxidation of glucose in water under simulated sunlight irradiation. Reaction conditions: $SnO_2/FePz(SBu)_8$(0.1%) (20 mg), aqueous glucose (1 mmol·$L^{-1}$, 50 mL), reaction for 3 h, light intensity (2 W·$cm^{-2}$), air with a flow rate of 0.4 L·$min^{-1}$.

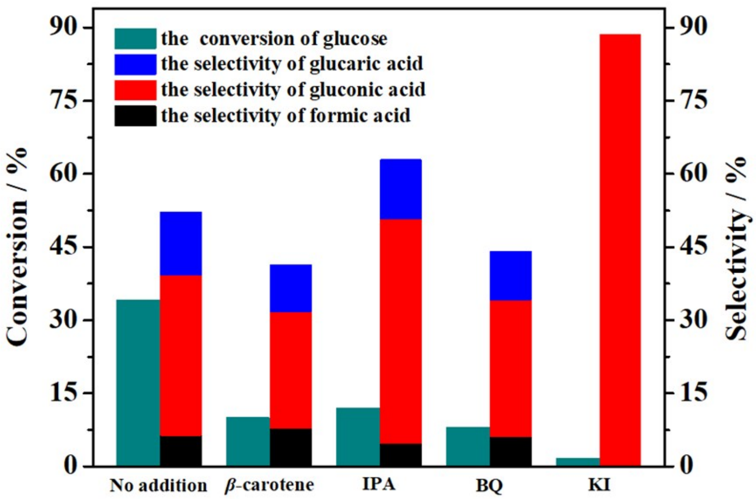



Fig. S11 Effect of scavenger agents on the photocatalytic conversion of glucose in presence of $SnO_2/FePz(SBu)_8$(0.1%) under simulated sunlight irradiation. Reaction conditions: $SnO_2/FePz(SBu)_8$(0.1%) (20 mg), aqueous glucose (1 mmol·$L^{-1}$, 50 mL), light intensity (2 W·$cm^{-2}$), air with a flow rate of 0.4 L·$min^{-1}$, reaction for 3 h. KI (1 mmol·$L^{-1}$), TEMPO (1 mmol·$L^{-1}$), BQ (1 mmol·$L^{-1}$), IPA (1 mmol·$L^{-1}$).

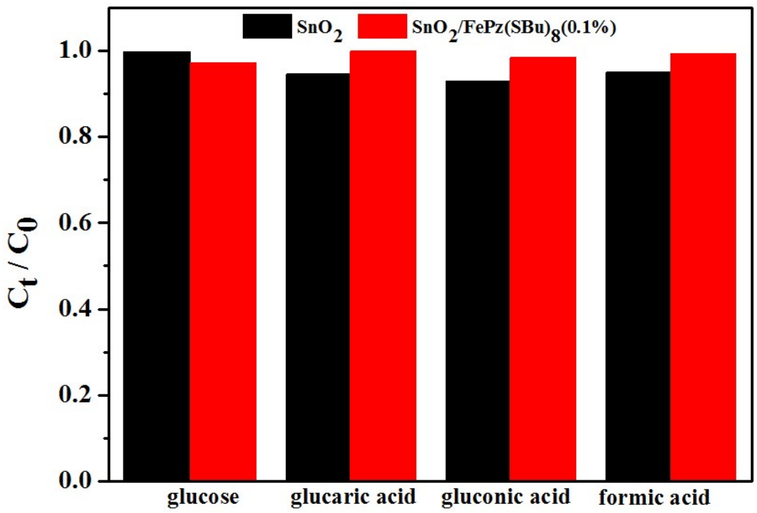



Fig. S12 The adsorption of different substrates on the pure $SnO_2$ and $SnO_2$/FePz(SBu)$_8$(0.1%) in the dark for 6 h. The amount of the catalysts was 20 mg. The initial concentration and the volume of the aqueous substrate were 1 mmol·L$^{-1}$ and 50 mL, respectively.

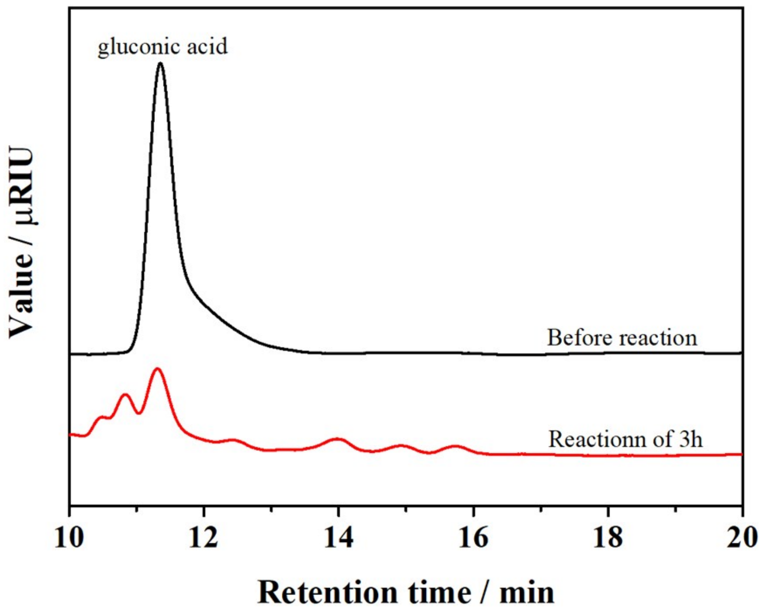



Fig. S13 The photocatalytic oxidation of aqueous gluconic acid in presence of $SnO_2$/FePz(SBu)$_8$(0.1%) under simulated sunlight irradiation. Reaction conditions: $SnO_2$/FePz(SBu)$_8$(0.1%) (20 mg), aqueous gluconic acid (1 mmol·L$^{-1}$, 50 mL), light intensity (2 W·cm$^{-2}$), air with a flow rate of 0.4 L·min$^{-1}$.

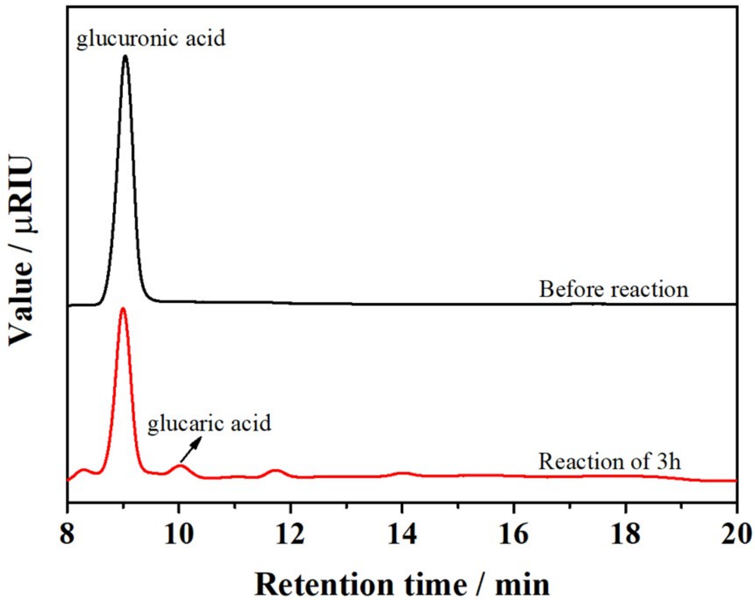



Fig. S14 The photocatalytic oxidation of aqueous glucuronic acid in presence of $SnO_2$/FePz(SBu)$_8$(0.1%) under simulated sunlight irradiation. Reaction conditions: $SnO_2$/FePz(SBu)$_8$(0.1%) (20 mg), aqueous glucuronic acid (1 mmol·L$^{-1}$, 50 mL), light intensity (2 W·cm$^{-2}$), air with a flow rate of 0.4 L·min$^{-1}$.

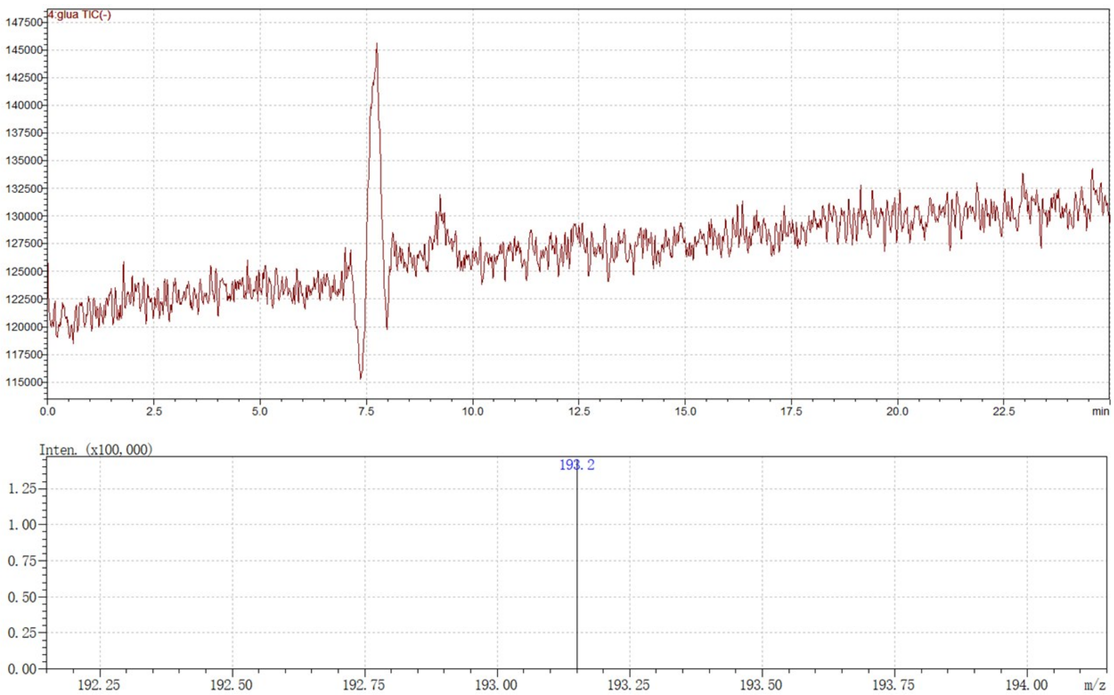



Fig. S15 HPLC-MS spectrum of glucuronic acid generated from the oxidation of aqueous glucose in presence of $SnO_2$/FePz(SBu)$_8$(0.1%).