Supporting information for

Highly selective photocatalytic oxidation of biomass-derived chemicals to carboxyl compounds over Au/TiO_2

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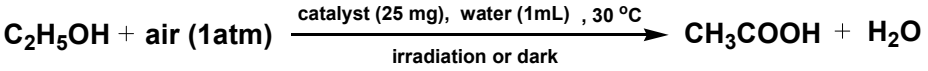
1. Scheme S1



Scheme S1. Light-induced selective oxidation of ethanol to acetic acid in water at ambient temperature by air.

2. Figure S1

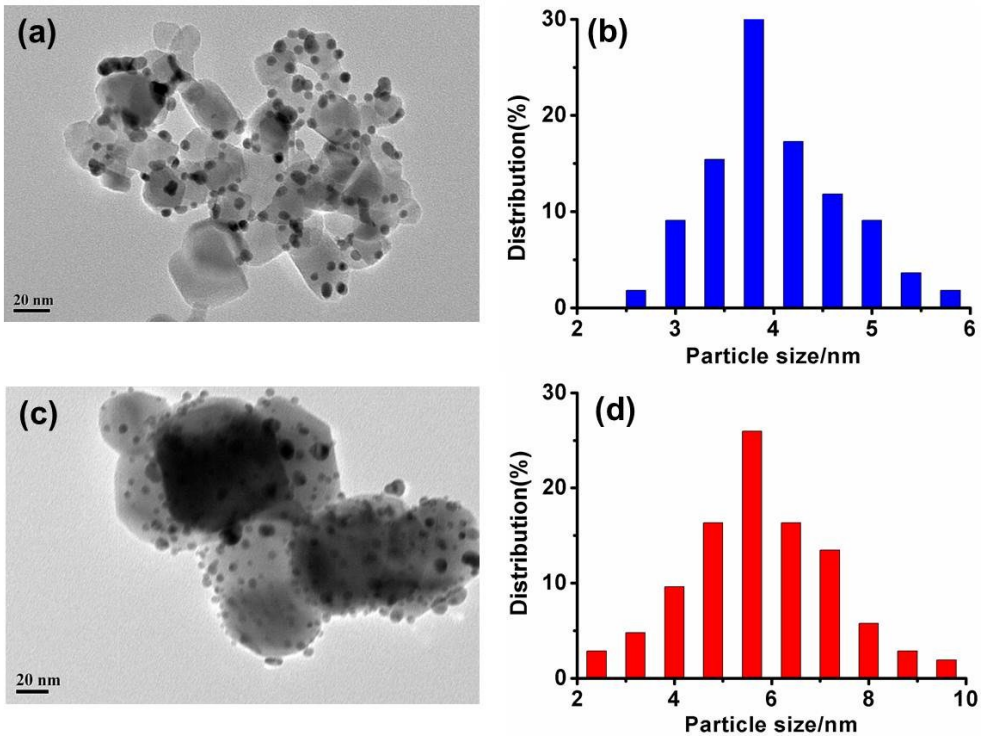


Fig. S1. TEM images and the size distribution of AuNPs/TiO_2 (a and b) and AuNPs/ZrO_2 (c and d) with 3 wt% AuNPs loading.

3. Figure S2

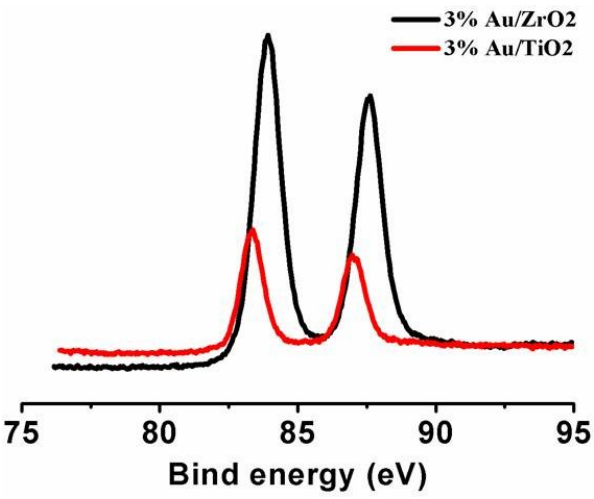


Fig. S2. XPS analysis of gold nanoparticles supported on TiO_2 and ZrO_2.

4. Figure S3

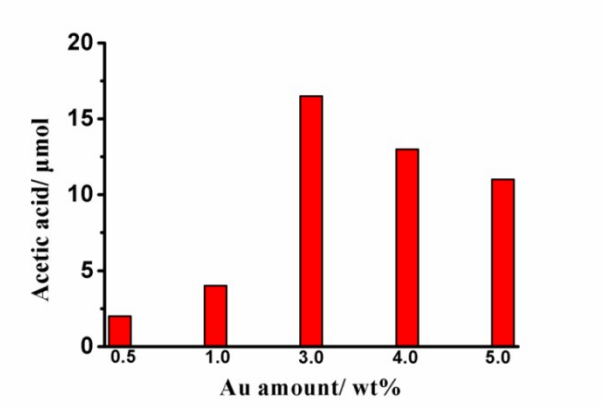


Fig. S3. The effect of the content of Au on the photocatalytic activity. Reaction conditions: ethanol, 100 μmol; water, 1 mL; AuNPs/TiO_2, 0.025 g; visible light (λ = 420-780 nm, 0.3 W/cm^2); Na_2CO_3, 100 μmol; temperature, 30 ^oC.

5. Figure S4

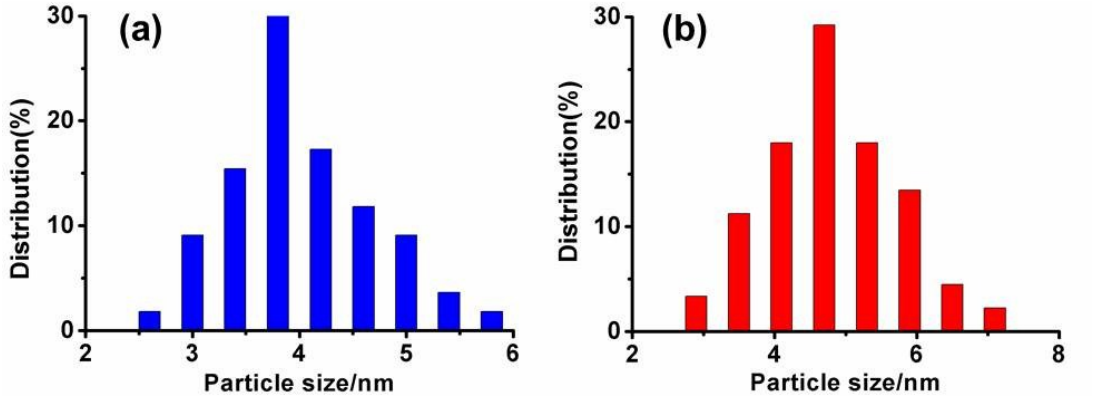


Fig. S4. The size distribution of AuNPs/TiO_2 with different AuNPs loading. 3 wt% (a) and 5 wt% (b).

6. Figure S5

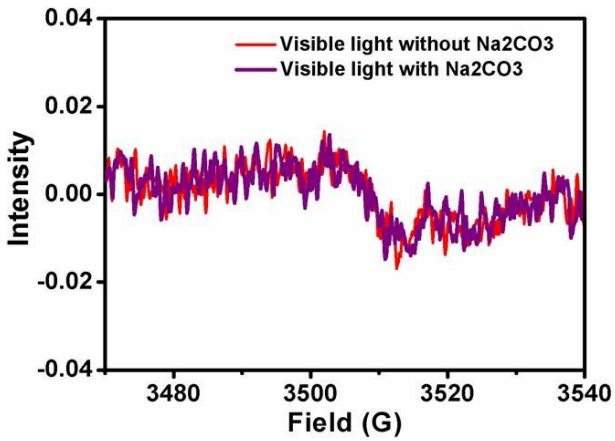


Fig. S5. Typical ESR spectra of DMPO trapped radical species upon photocatalytic oxidation of H_2O over AuNPs/TiO_2 with and without Na_2CO_3 under visible light irradiation.

7. Figure S6

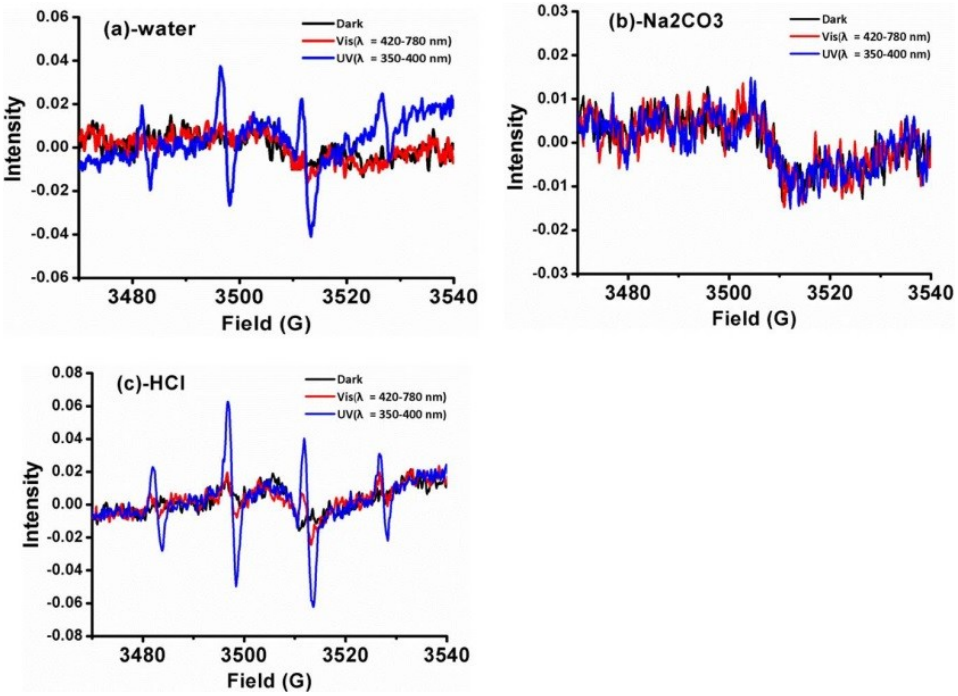


Fig. S6. Dependence of hydroxyl radical formation on the additives under UV and visible light irradiation.

8. Figure S7

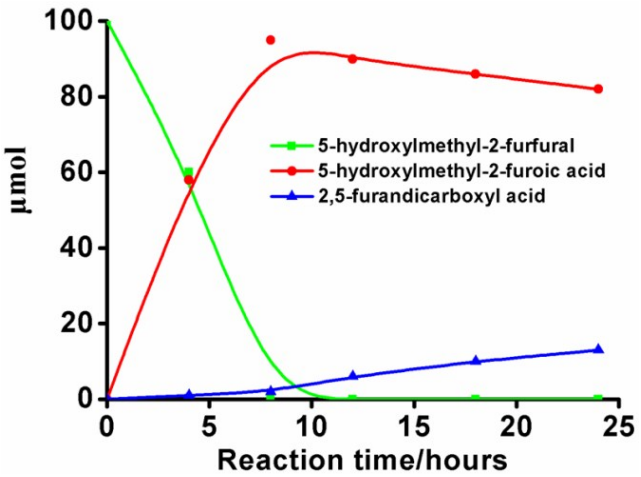


Fig. S7. Time course of the photoxidation of 5-hydroxymethyl-2-furfural over AuNPs/TiO_2 under visible light. Reaction conditions: substrate, 100 μmol; water, 1 mL; AuNPs/TiO_2 with 3 wt% Au, 0.025 g; visible light (λ = 420-780 nm, 0.3 W/cm^2); Na_2CO_3, 200 μmol; temperature, 30 °C.

9. Figure S8

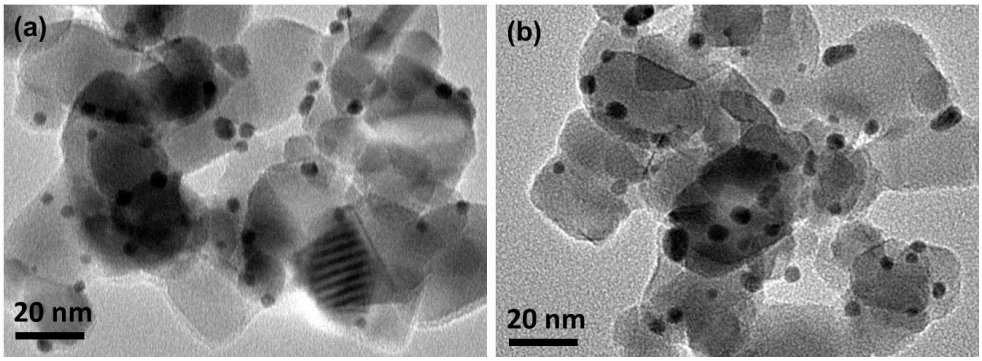


Fig. S8. TEM images of fresh AuNPs/TiO_2 and AuNPs/TiO_2 after four cycle reuse.