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**Supporting Information**

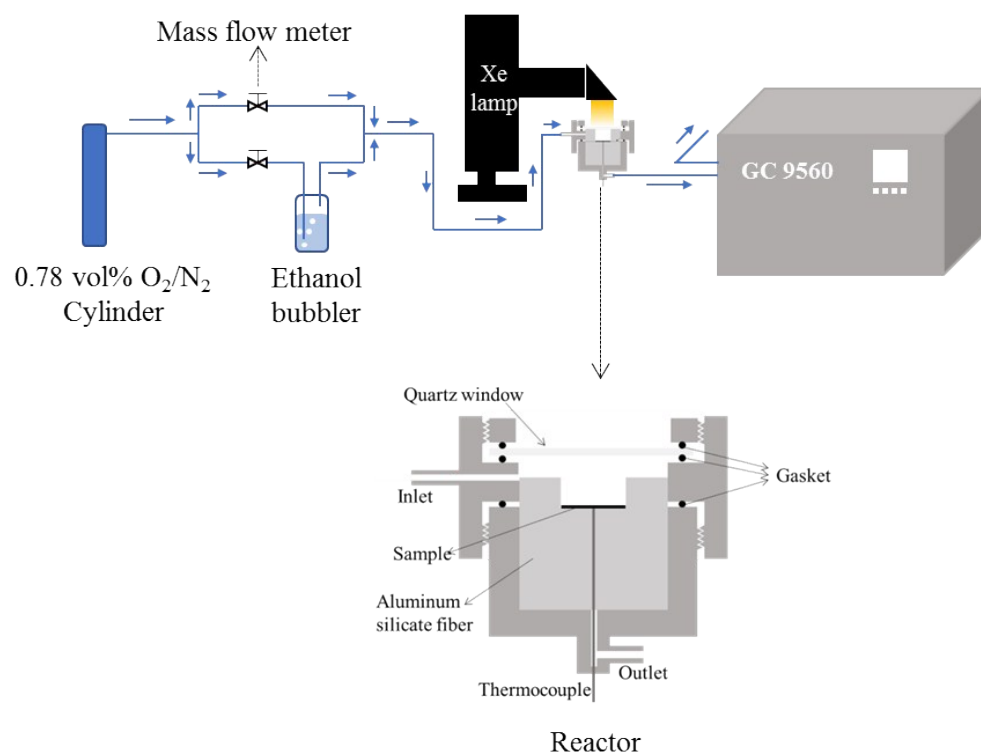
**Efficient UV-vis-IR photothermocatalytic selective ethanol oxidation on  $\text{MnO}_x/\text{TiO}_2$  nanocomposite significantly enhanced by a novel photoactivation**

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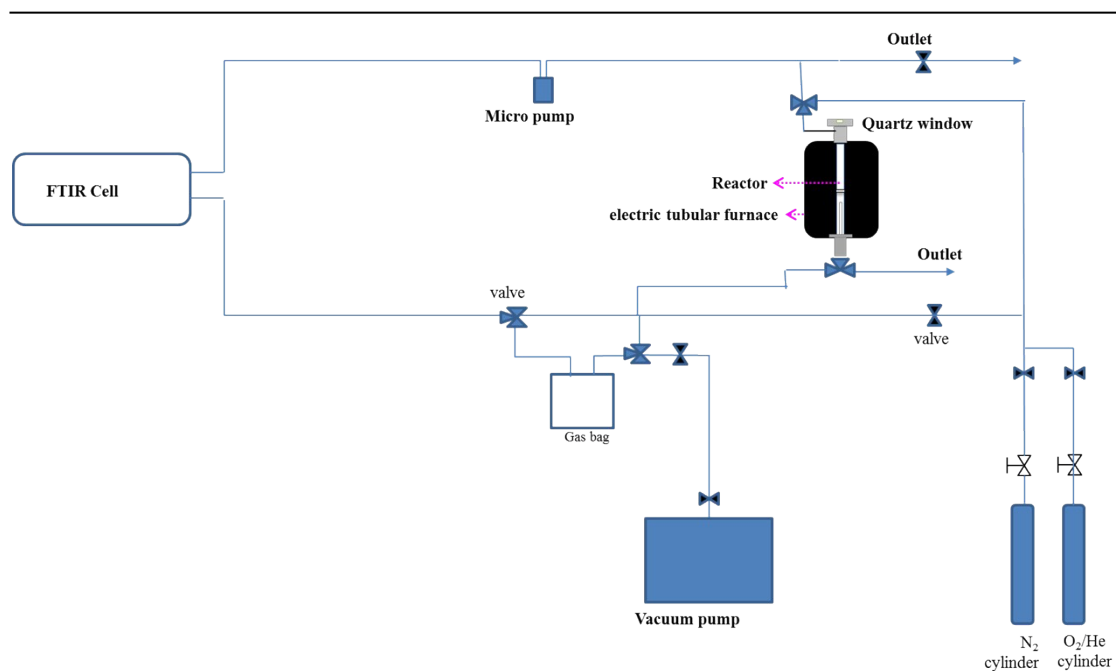
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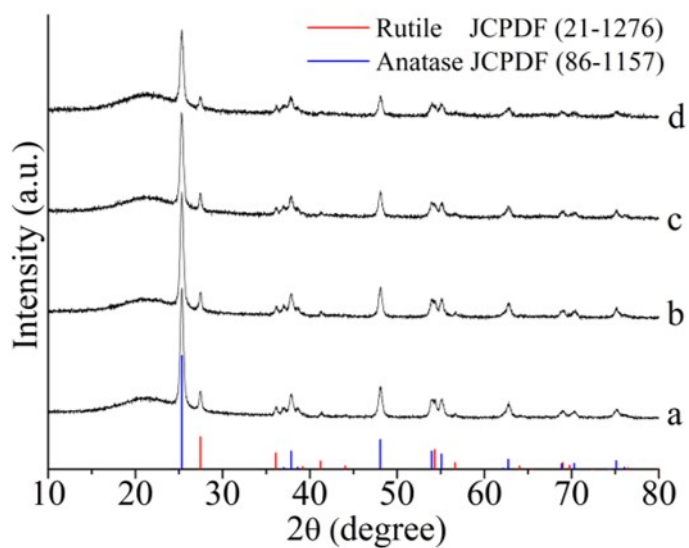
<sup>b</sup>College of Science, Huazhong Agricultural University, Wuhan 430070, P. R. China.



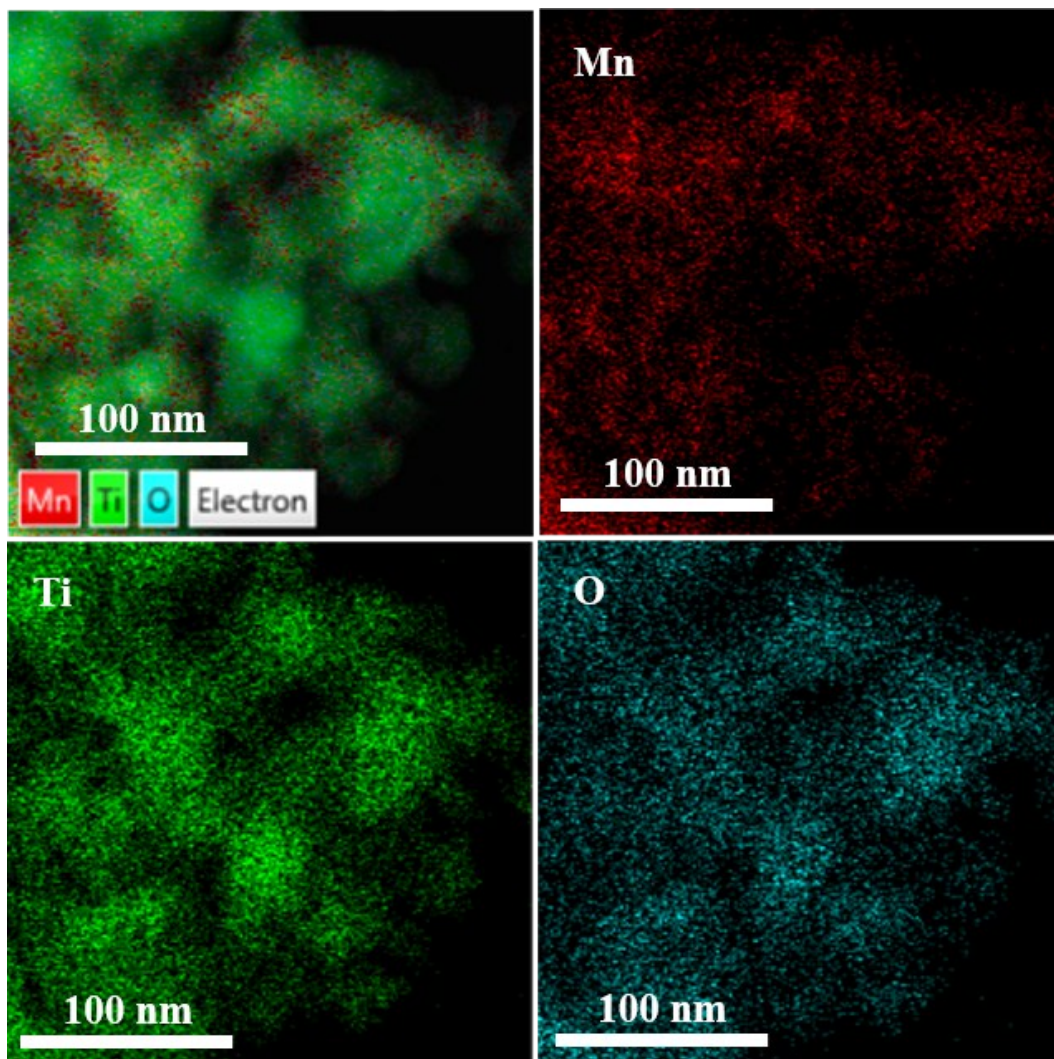
**Scheme S1.** Schematic illustration of a setup for testing photothermocatalytic activity of the samples for selective ethanol oxidation under the irradiation from a Xe lamp.



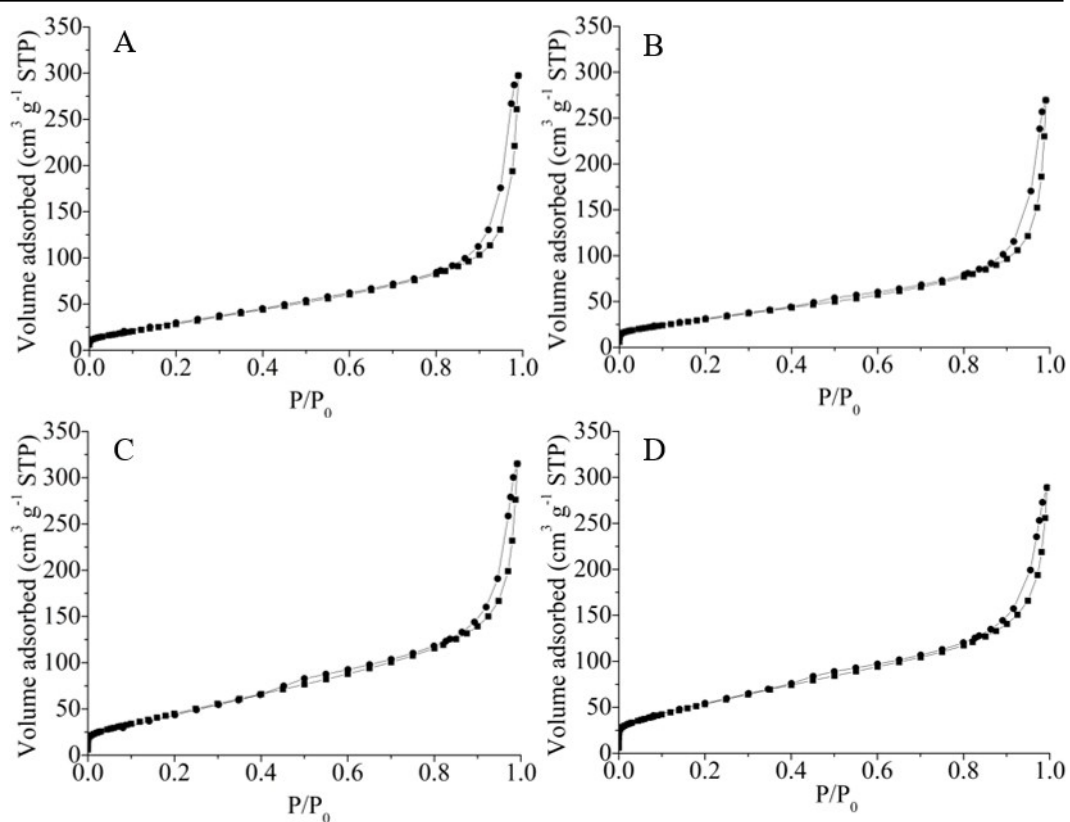
**Scheme S2.** Schematic illustration of a setup for conducting temperature programmed ethanol oxidation in the absence O<sub>2</sub> in the dark and under UV-vis-IR irradiation.



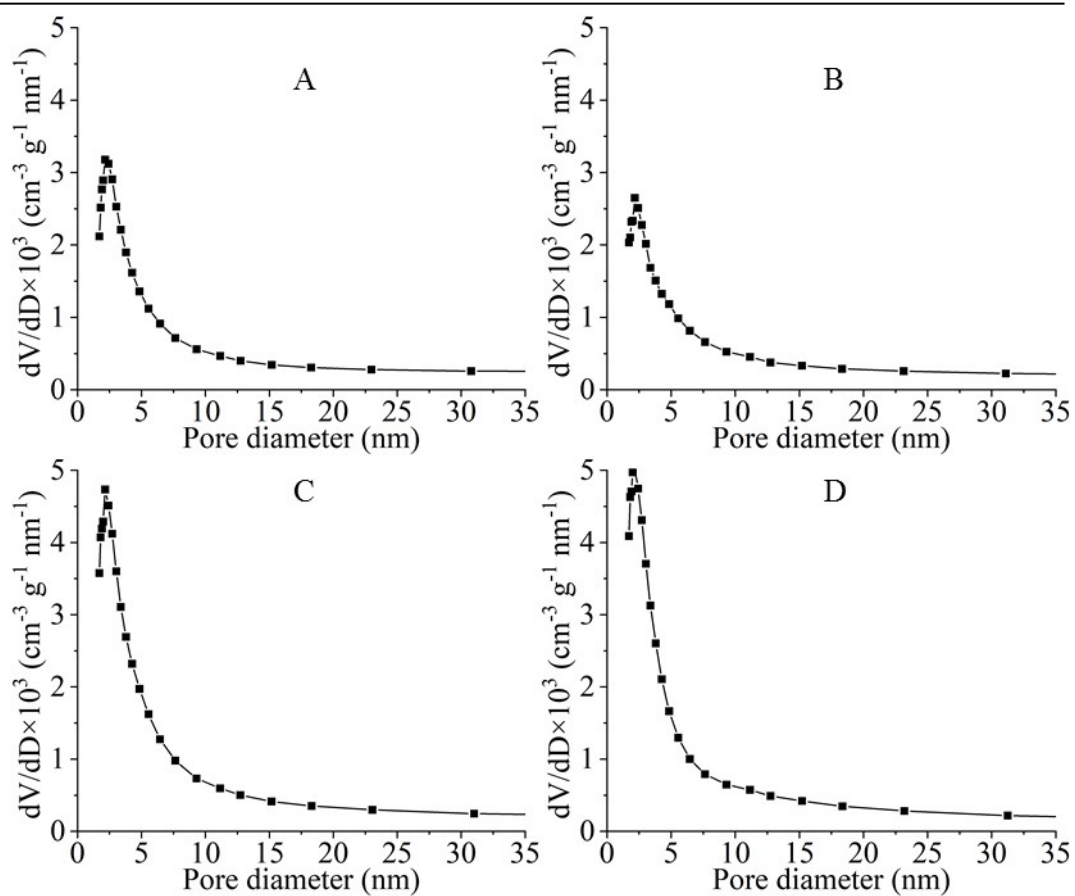
**Figure S1.** XRD patterns of the samples: MnO<sub>x</sub>/TiO<sub>2</sub>-A (a), MnO<sub>x</sub>/TiO<sub>2</sub>-B (b), MnO<sub>x</sub>/TiO<sub>2</sub>-C (c) and MnO<sub>x</sub>/TiO<sub>2</sub>-D (d).



**Figure S2.** TEM EDX mapping of the elements in MnO<sub>x</sub>/TiO<sub>2</sub>-C



**Figure S3.** N<sub>2</sub> adsorption-desorption of the samples: MnO<sub>x</sub>/TiO<sub>2</sub>-A (A), MnO<sub>x</sub>/TiO<sub>2</sub>-B (B), MnO<sub>x</sub>/TiO<sub>2</sub>-C (C), and MnO<sub>x</sub>/TiO<sub>2</sub>-D (D).



**Figure S4.** BJH adsorption pore size distribution of the samples:  $\text{MnO}_x/\text{TiO}_2$ -A (A),  $\text{MnO}_x/\text{TiO}_2$ -B (B),  $\text{MnO}_x/\text{TiO}_2$ -C (C), and  $\text{MnO}_x/\text{TiO}_2$ -D (D).