Supporting Information

Identification of active sites over Fe_2O_3-based architecture: The promotion effect of H_2SO_4 erosion synthetic protocol

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Catalytic performance evaluation

The performance of catalysts for the NH_3-SCR of NO was carried out in a fixed bed glass reactor with inner diameter of 6 mm under steady state reaction conditions. The composition of gas mixture was: 600 ppm NO, 600 ppm NH_3, 3 vol% O_2, 300 ppm SO_2 (when used), 10 vol% H_2O (when used) and N_2 as the balance. The flow rate of the feeding gases was 600 mL min^{-1}. The catalysts (0.5 g) were pressed into blocks, crushed and sieved with 40–60 meshes before used. The concentrations of NO were continually monitored by a testo 340 flue gas analyzer. N_2 selectivity and outlet N_2O concentration were measured by Thermo Scientific Antaris IGS analyzer.

To calculate the NO conversion ratio, we use the next formula:

$$\text{NO Conversion } (\%) = \frac{[\text{NOx}]\text{in} - [\text{NOx}]\text{out}}{[\text{NOx}]\text{in}} \times 100\ \%$$

Additional Figures and Data

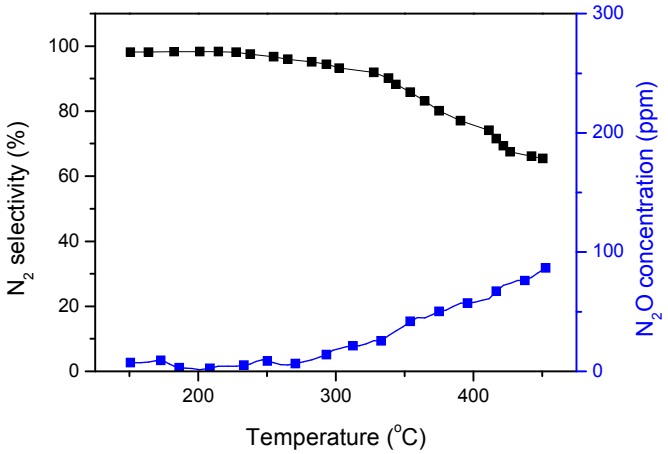

Figure S1. N_2 selectivity and outlet N_2O concentration versus temperature data over parent Fe_2O_3. Reactant feed contains 600 ppm of NO, 600 ppm of NH_3, 3 vol% O_2, balanced with N_2.

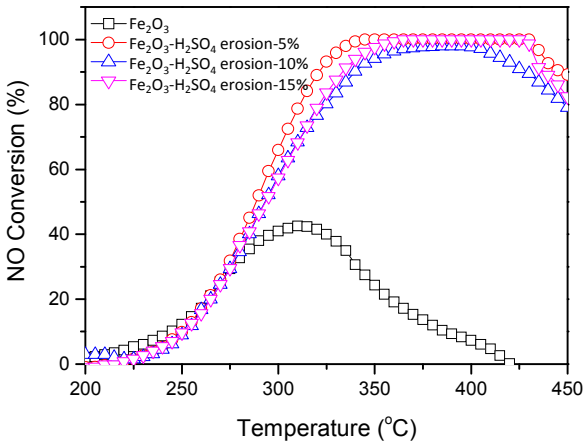

Figure S2. NO conversion versus temperature data over parent Fe_2O_3 and Fe_2O_3-H_2SO_4 erosion samples. Reactant feed contains 600 ppm of NO, 600 ppm of NH_3, 3 vol% O_2, balanced with N_2.

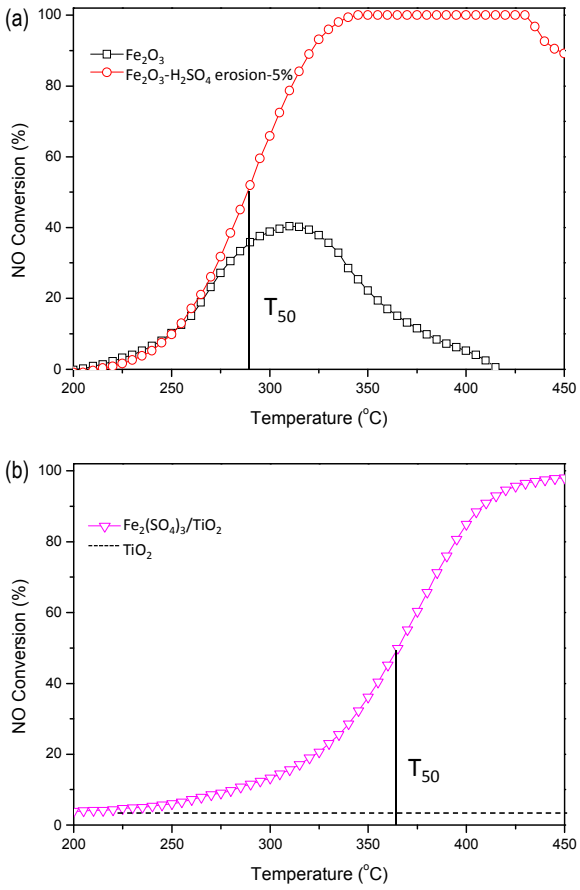

Figure S3. NO conversion versus temperature data over (a) Fe_2O_3-H_2SO_4 erosion-5%, Fe_2O_3 samples and (b) $Fe_2(SO_4)_3/TiO_2$, TiO_2 samples. Reactant feed contains 600 ppm of NO, 600 ppm of NH_3, 3 vol% O_2, balanced with N_2. T_{50} (temperature of 50% conversion) of Fe_2O_3-H_2SO_4erosion-5% sample is much lower than that of $Fe_2(SO_4)_3/TiO_2$, despite that these two catalyst has identical $Fe_2(SO_4)_3$ loading amount.

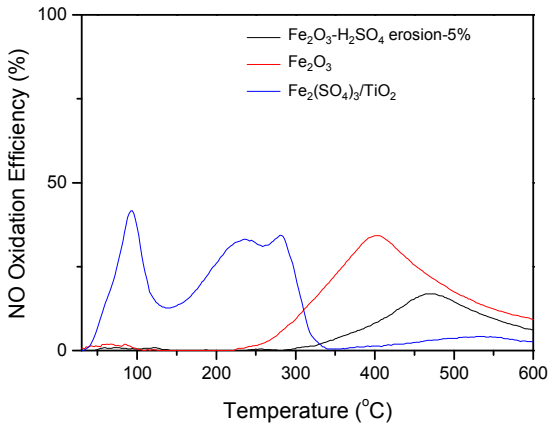

Figure S4. The NO probe molecule temperature-programmed oxidation (TPO) of as-prepared Fe_2O_3-H_2SO_4 erosion sample, Fe_2O_3 and $Fe_2(SO_4)_3/TiO_2$. Reactant feed contains 600 ppm of NO, 3 vol% of O_2, balanced with N_2.

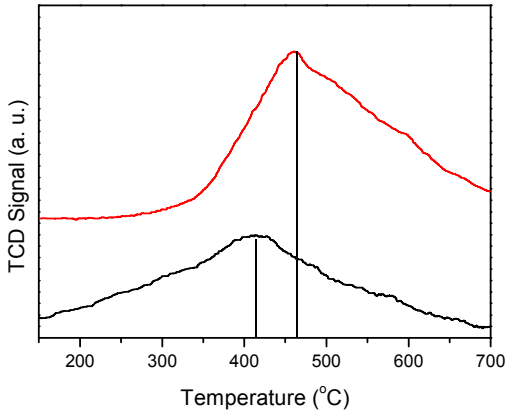

Figure S5. The NH_3 temperature-programmed desorption (TPD) of Fe_2O_3 (black) and Fe_2O_3-H_2SO_4 erosion-5% sample (red).