S1:The catalyst were carried out at 77 K by a Builder SSA-6000 surface area and pore size analyzer (Builder Co. Ltd, China). The crystal phases of all catalyst samples were analyzed by XRD with Cu Kα radiation on a XRD difractometer (X'Pert Pro, PANalytical B.V., Netherlands). FE-SEM images were recorded on an S-4800 microscope (Hitachi, Japan). TEM images were recorded on a microscope with an acceleration voltage of 200 kV (FEI Tecnai G2F30, USA). In order to identify the element valence on the catalyst surface, XPS measurements were performed on an AXIS ULtrabld instrument (Kratos, UK) with Mg Kα radiation. Before the measurement, the sample was degassed and pretreated at room temperature with a basic pressure of about 5×10^{-8} mbar. Calibration of binding energies of Cu 2p, O 1 s ,Sb 3d and Ti 2p was obtained by using C 1 s peak (284.8 eV). H_2 temperature-programmed reduction (H_2-TPR) and NH_3 temperature-programmed desorption (NH_3-TPD) analyses were performed on the PCA1200 chemisorption analyzer with TCD as dector (Builder Co. Ltd, China). Prior to testing, all catalysts were pretreated in He gas flow at 300 ° C for 60 minutes. Under the condition of 5% H_2/Ar gas flow rate (40 mL/min), the H_2-TPR process is carried out at a stable heating rate (10 °C/min) at a temperature of 100 to 500 °C. For the NH_3-TPD experiment, the catalyst was pretreated with a 4% NH_3/He mixed gas at a rate of 40 mL/min for 30 minutes, and then subjected to NH_3-TPD test by heating at a rate of 10 °C/min from 100 to 450 °C. *In situ* DRIFT study was conducted on Bruker Tensor 37 FTIR (Bruker Co. Ltd, German). The spectrometer was equipped with an MCT detector. The sample was heated in a N_2 flow at 400 °C for 40 minutes first. The background spectrum was collected when the temperature dropped to 100 ° C. All spectra were collected at 4000-1000 cm^{-1} with 100 scans and 4 cm^{-1}. *In situ* DRIFT tests conditions: 2000 ppm NO + 4% O_2 or / and 2000 ppm NH_3 and balanced with N_2.