Supporting Information

Rational Design of Mesoporous CuO-CeO_2 Catalysts for NH_3-SCR Applications Guided by Multiple *In Situ* Spectroscopies

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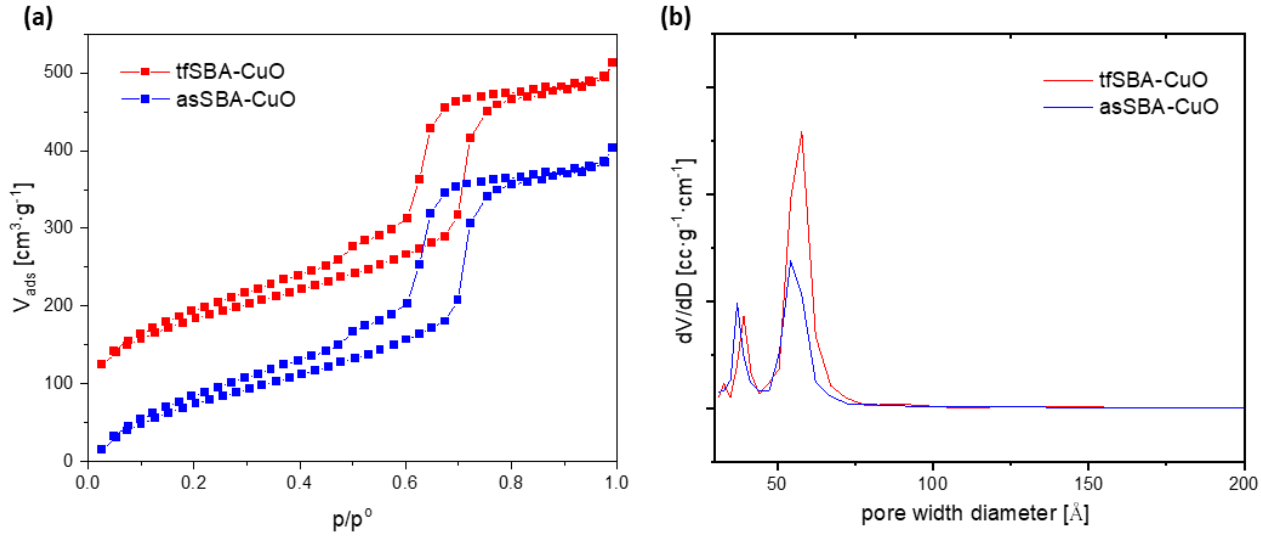

Figure S1. (a) N_2 adsorption/desorption isotherms, and (b) NLDFT pore size distributions of tfSBA-CuO and asSBA-CuO. The N_2 adsorption/desorption experiments were carried out at 77 K using on an Autosorb-3B (Quantachrome Instruments, USA) device.

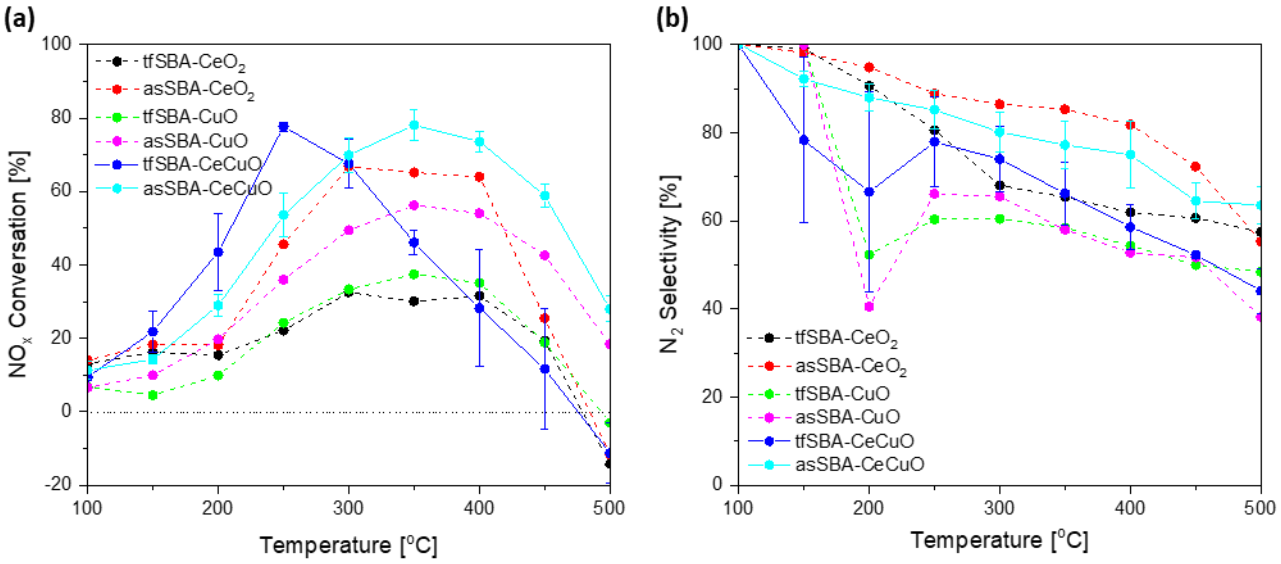

Figure S2. Temperature-dependent NH_3 SCR performance for the synthesized samples: (a) NO_x conversion, (b) N_2 selectivity.

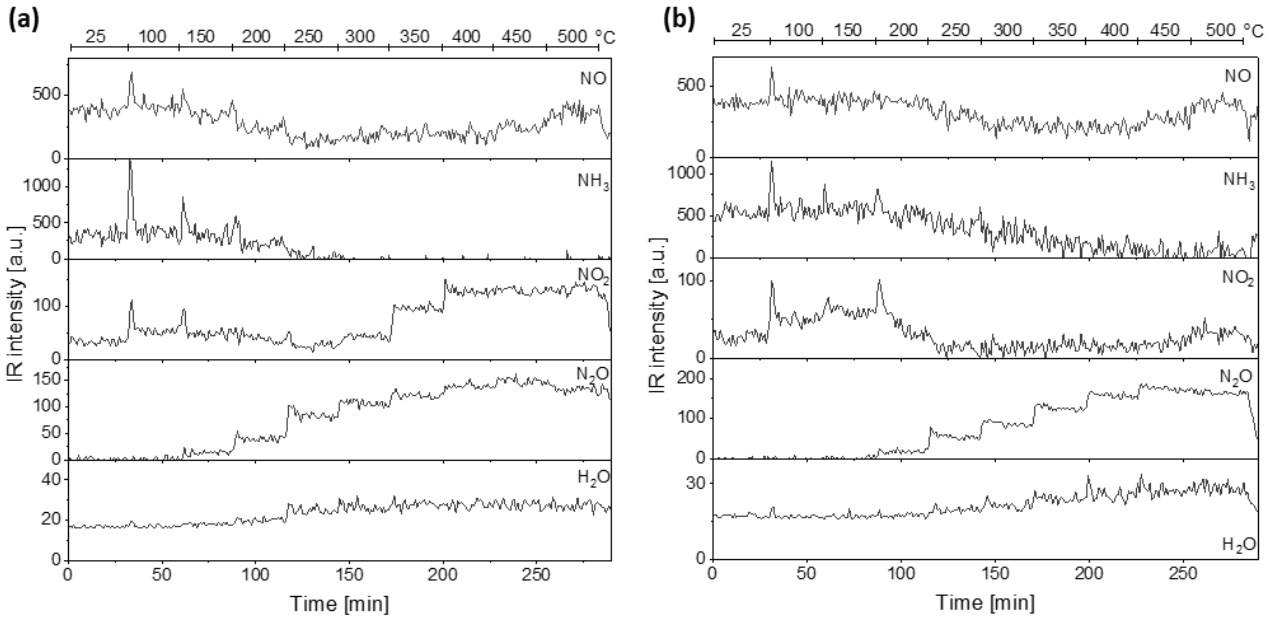

Figure S3. *In situ* detection of the exhaust gas during NH_3-SCR reaction of (a) tfSBA-CeCuO, (b) asSBA-CeCuO. The temperature was increased stepwise from 25°C to 500°C. The feed consisted of 500 ppm NH_3, 500 ppm NO, and 5% O_2 (balanced with N_2) at a total flow rate of 50 NmL/min (GHSV = 60,000 h^{-1}).

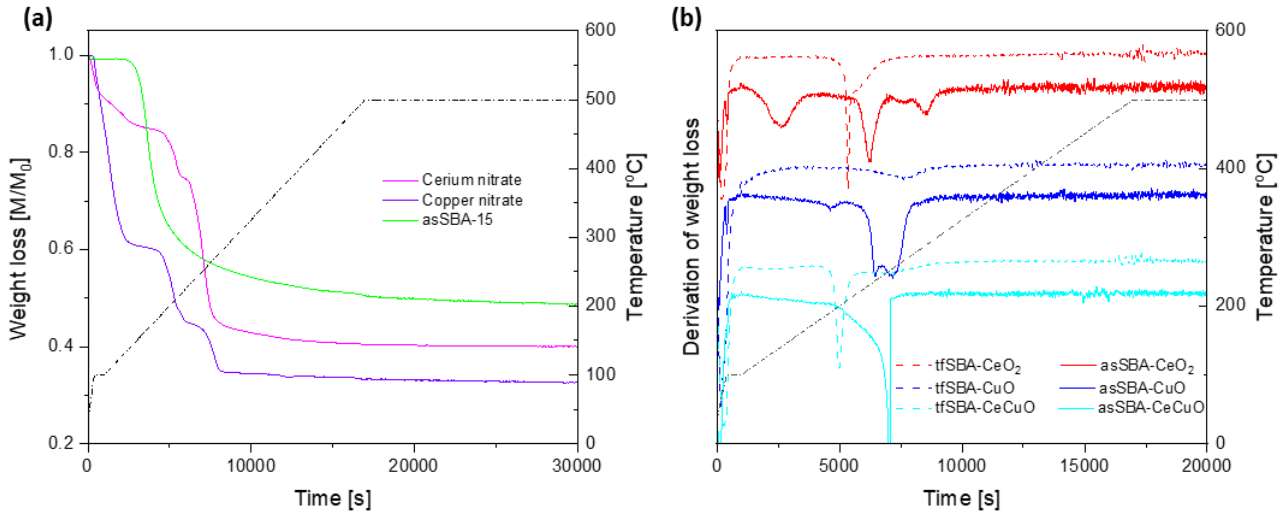

Figure S4. (a) TGA profiles of asSBA-15, bare cerium nitrate and bare copper nitrate, (b) DTG profiles of tf/asSBA-CeO_2, tf/asSBA-CuO, and tf/asSBA-CeCuO during heating to 500 °C in air or inert N_2 (heating rate: 1.5 °C/min).

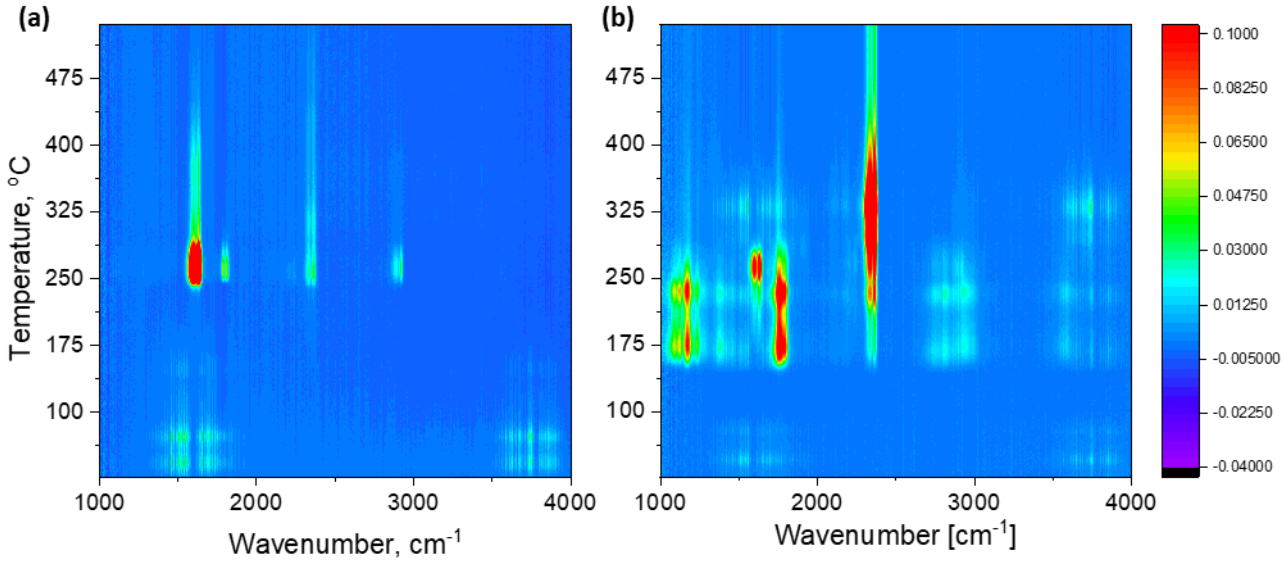

Figure S5. Online IR detection of the exhaust gases during air calcination of the precursor samples (a) tfSBA-CeO_2, (b) asSBA-CeO_2. The temperature was raised from 25 °C to 500 °C at a heating rate of 1.5 °C/min.

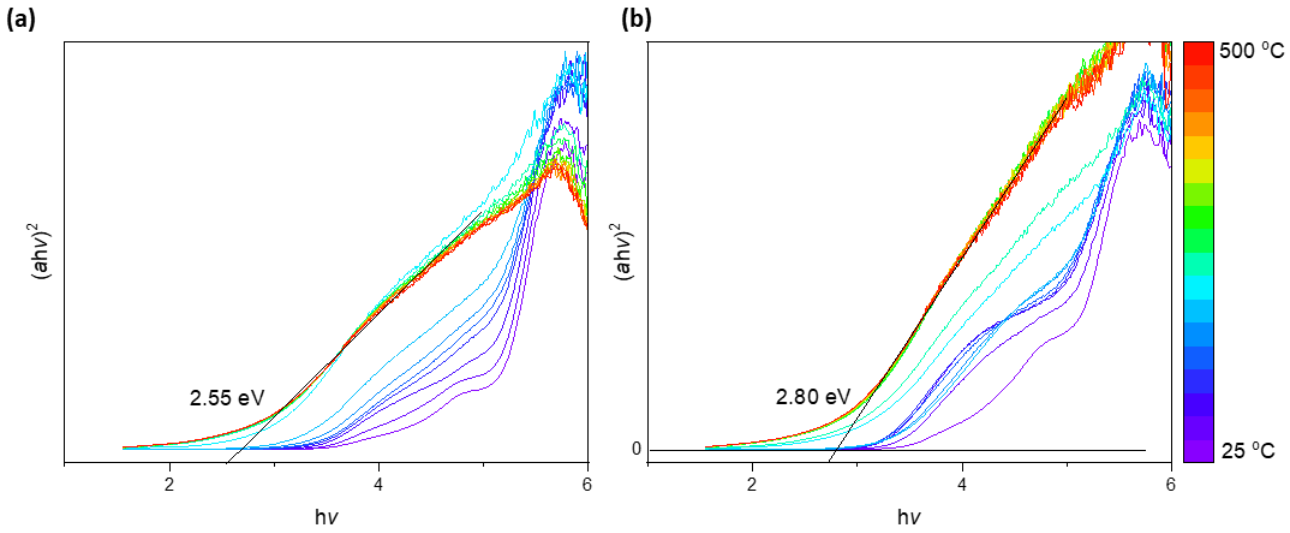

Figure S6. Calculation of band gap energies based on the *in situ* DR UV-vis spectra shown in Figure 8 by applying Tauc's method. (a) tfSBA-CeCuO and (b) asSBA-CeCuO.