Electronic Supplementary Material (ESI) for Catalysis Science & Technology.

The influence of ceria on Cu/TiO_2 catalysts to produce abundant oxygen vacancies and induce highly efficient CO oxidation

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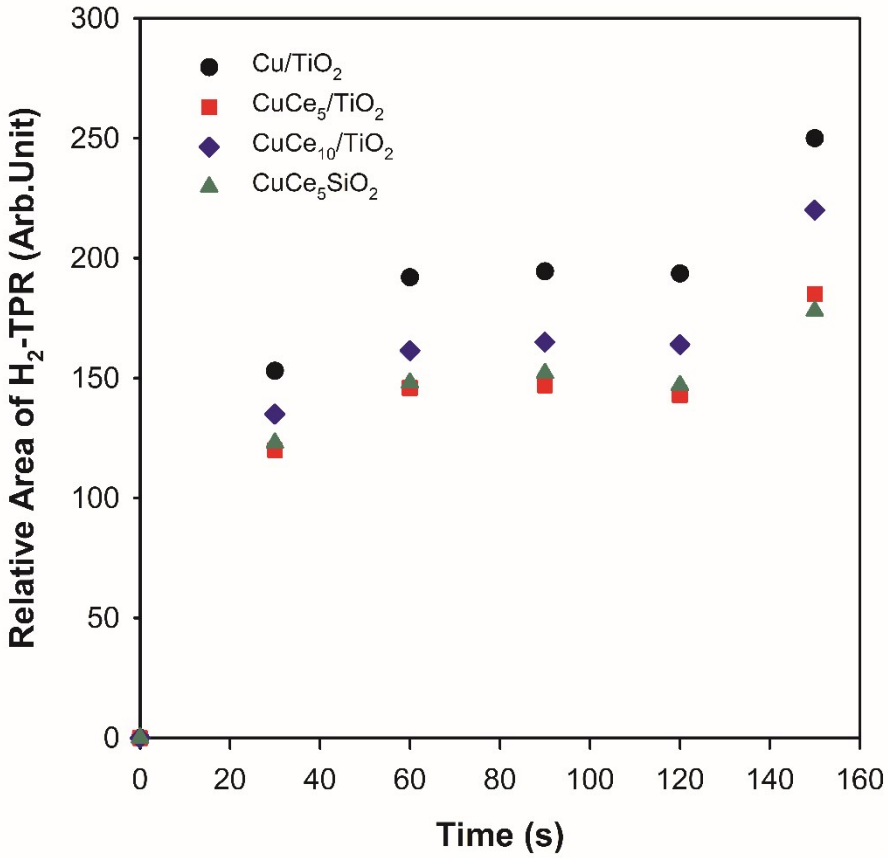

Fig. S1 Dependence of the relative area of H_2-TPR experiments for the reduced Cu/TiO_2, $CuCe_x/TiO_2$ and $CuCe_5/SiO_2$ samples versus the different oxidation time. The as-impregnated Cu samples was calcined in air stream and reduced in H_2 at 573 K for 5 h, respectively. The reduced Cu samples were oxidized by a 10% N_2O/N_2 stream at 343 K.

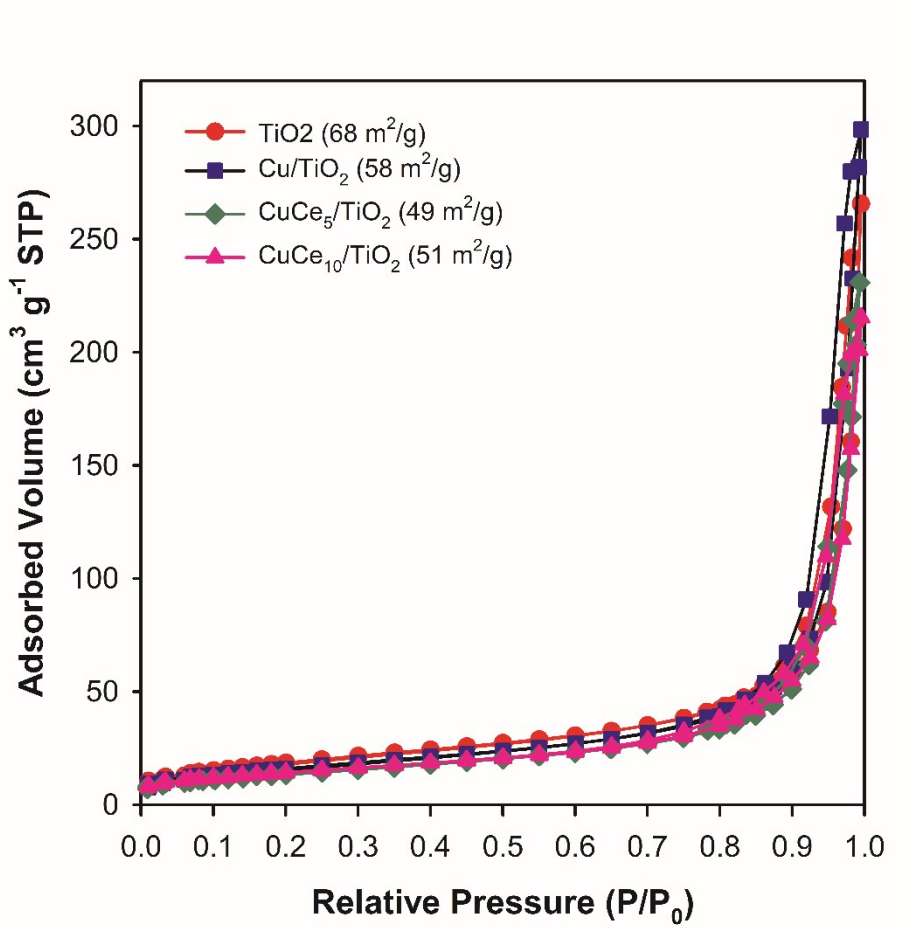

Fig. S2 N_2 adsorption-desorption isotherms of the TiO_2, Cu/TiO_2 and $CuCe_x/TiO_2$ catalysts.

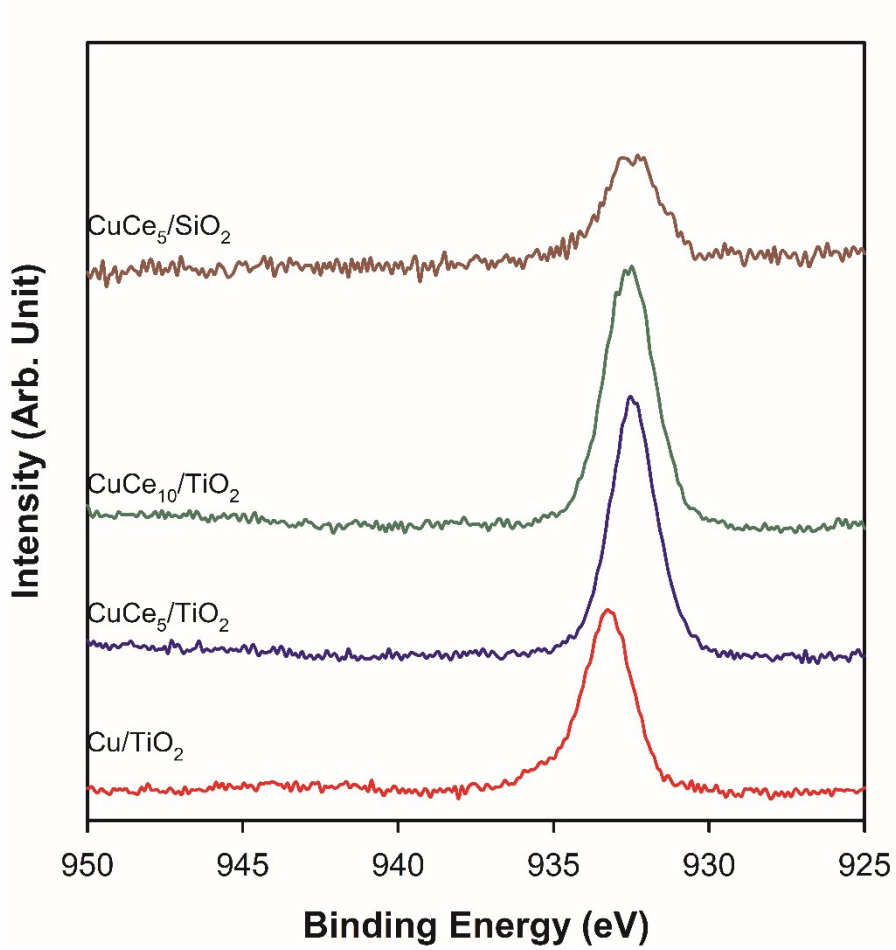

Fig. S3 XPS spectra of Cu $2p_{3/2}$ for the Cu/TiO_2, $CuCe_x/TiO_2$ and $CuCe_5/SiO_2$ samples.

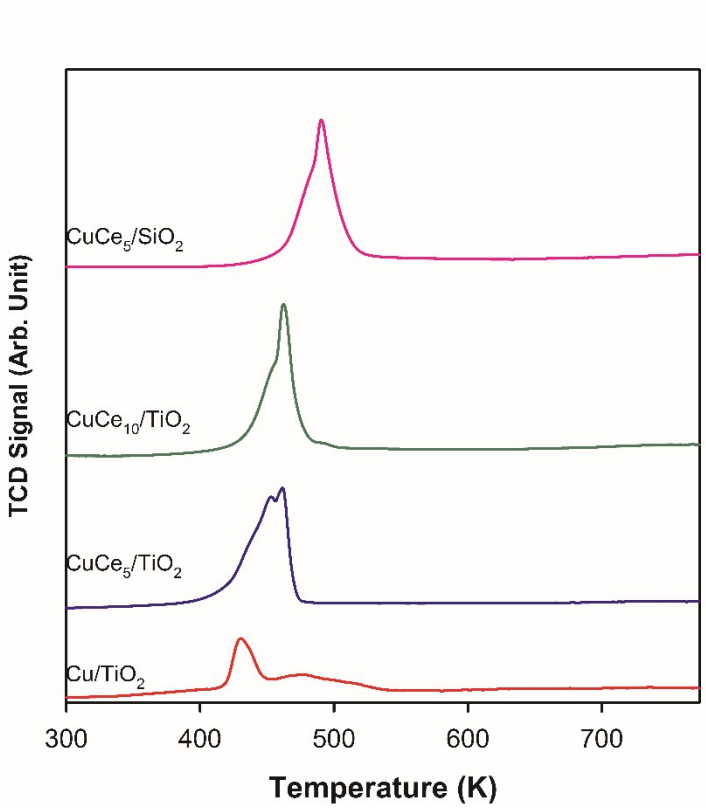

Fig. S4 H_2-TPR profiles of the calcined Cu/TiO_2, $CuCe_x/TiO_2$ and $CuCe_5/SiO_2$ samples. The as-impregnated Cu samples was calcined in air stream at 573 K for 5 h.

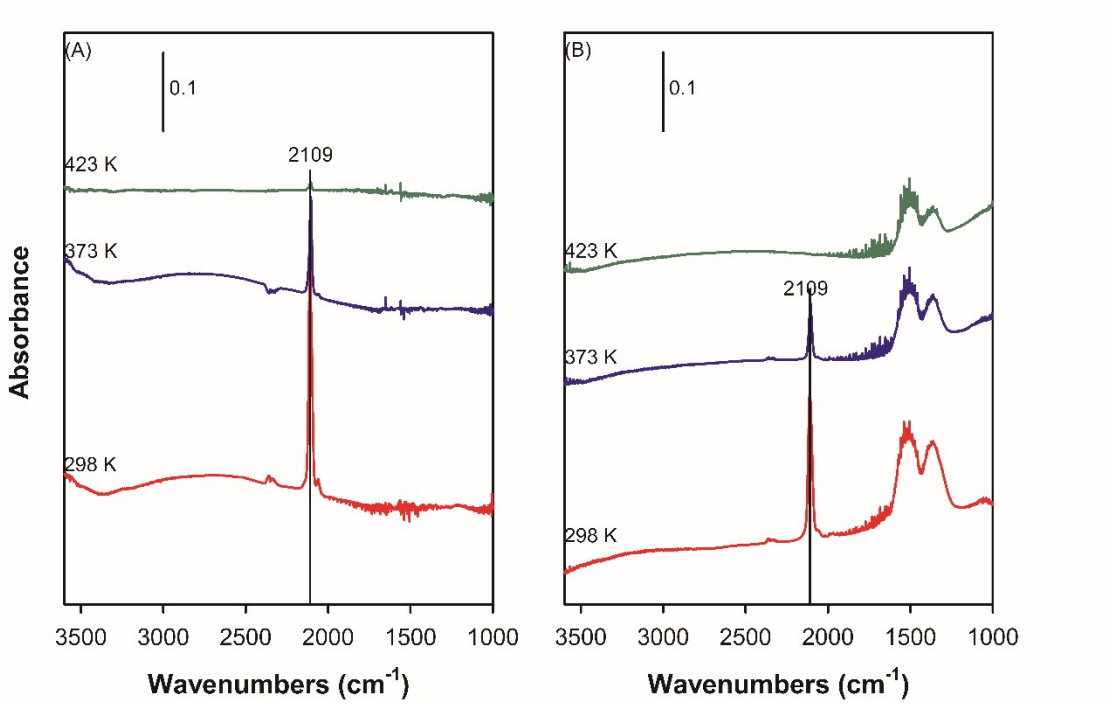

Fig. S5 Temperature-dependent IR spectra of CO adsorbed onto the reduced (A) Cu/TiO_2 and (B) $CuCe_{10}/TiO_2$ samples. CO adsorptions were performed via exposure to a 20 mL/min pure CO stream for 30 min at room temperature, followed by a 20 mL/min helium stream for 50 min to purge the CO gas.

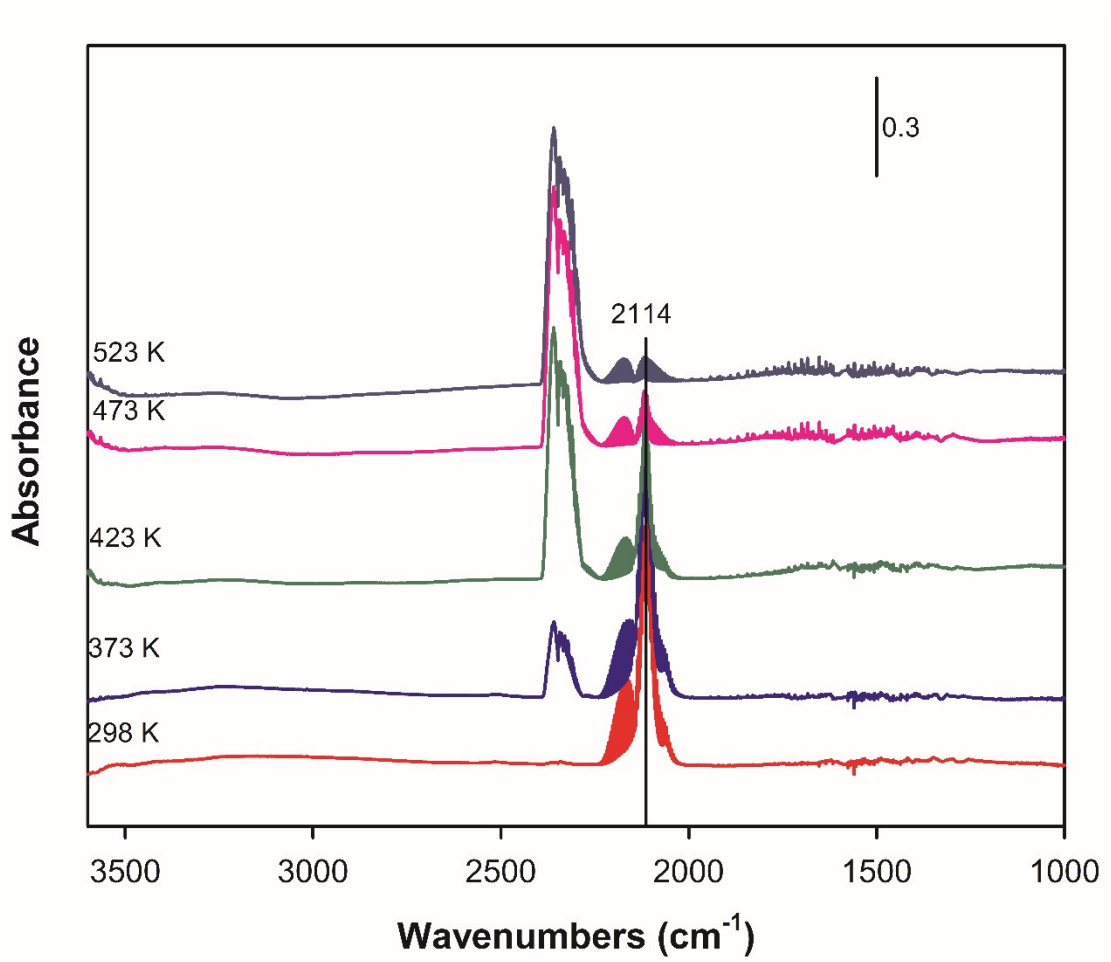

Fig. S6 Temperature-dependent IR spectra of a CO/air stream adsorbed on the reduced Cu/TiO_2. A gaseous mixture of 4.5% CO and 2.23% O_2 with a flow rate of 50 mL/min was passed through 50 mg of catalyst over the course of CO oxidation.

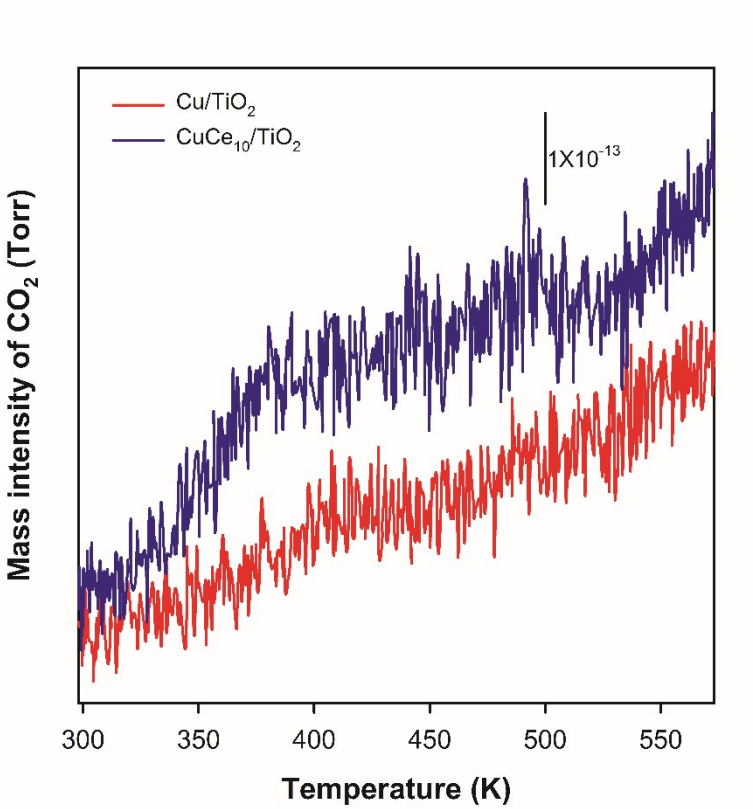

Fig. S7 CO-TPR plots of CO_2 desorbed from the reduced $CuCe_{10}/TiO_2$ and Cu/TiO_2 samples in a 100 mL/min CO stream with a 10 K/min heating rate.