Supporting Information

Outstanding performance of CuO/Fe-Ti spinel for Hg^0 oxidation as a co-benefit of NO abatement: Significant promotion of Hg^0 oxidation by CuO loading

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1. Activity assessment system

As shown in Fig. S1, the assessment system for Hg^0 oxidation mainly included four parts: a gas distribution system, a fixed-bed reaction system, a mercury detector, and an exhaust gas treatment system.

The gas distribution system consisted of different gas paths, which produced a simulated flue gas with 90 μg m^{-3} Hg^0, 10 ppm HCl, 5% O_2, chemical components (i.e., 8% H_2O, 500 ppm SO_2, 500 ppm NH_3, and 500 ppm NO when used), and N_2 balance. The stable concentrations of O_2, HCl, SO_2, NO, NH_3 and N_2 were all provided by the gas cylinders, the stable Hg^0 concentration was provided by a Hg permeation tube (provided by Green Calm Instruments of Suzhou, China), and the stable H_2O concentration was provided by the bubbling method. All the gas flows were controlled by the mass flowmeters. Gaseous Hg^0, O_2, HCl, SO_2, NO and N_2 balance were mixed by a gas mixer, which then was introduced into the fixed-bed reaction system. However, NH_3 and H_2O was directly introduced into the fixed-bed reaction system to void the reaction with HCl, respectively.

The fixed-bed reaction system was mainly composed of a reaction furnace, a temperature controller with a thermocouple, and a quartz reaction tube. The simulated flue gas generated by the gas distribution system was introduced into the quartz reaction tube with an inner diameter of 6 mm, and its temperature was controlled by the reaction furnace with a temperature controller. Before each experiment, the prepared catalyst with 40-60 mesh was packed in the quartz reaction tube using silica wool.

The Hg^0 concentration in the outlet was detected online by a cold vapor atomic adsorption spectrophotometer (Lumex R-915M).

The exhaust gas containing Hg^0 was purified by activated carbons and then emitted into the air.

Table S1 Percentages of Fe^{3+} and Cu^{2+} on Fe-Ti and CuO/Fe-Ti spinel resulted from the XPS analysis /%

	Fe^{3+}	Cu^{2+}
Fe-Ti spinel	21.8	-
CuO/Fe-Ti spinel	21.0	0.9

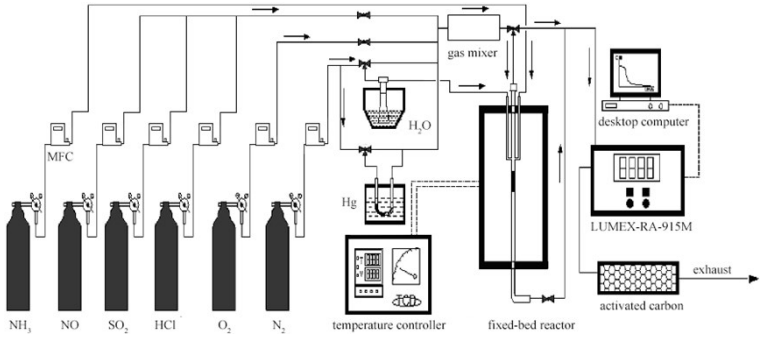

Fig. S1 Flow diagram of the experimental setup for Hg^0 oxidation.

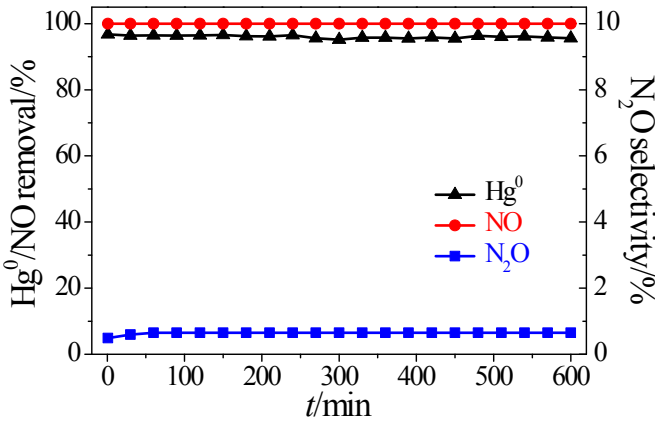

Fig. S2 Hg^0 and NO removal efficiencies and N_2O selectivity of CuO/Fe-Ti spinel under normal SCR conditions at 350 °C for 10 h. Operating conditions: catalyst weight = 500 mg and MHSV = 6.0×10^4 cm^3 g^{-1} h^{-1}.

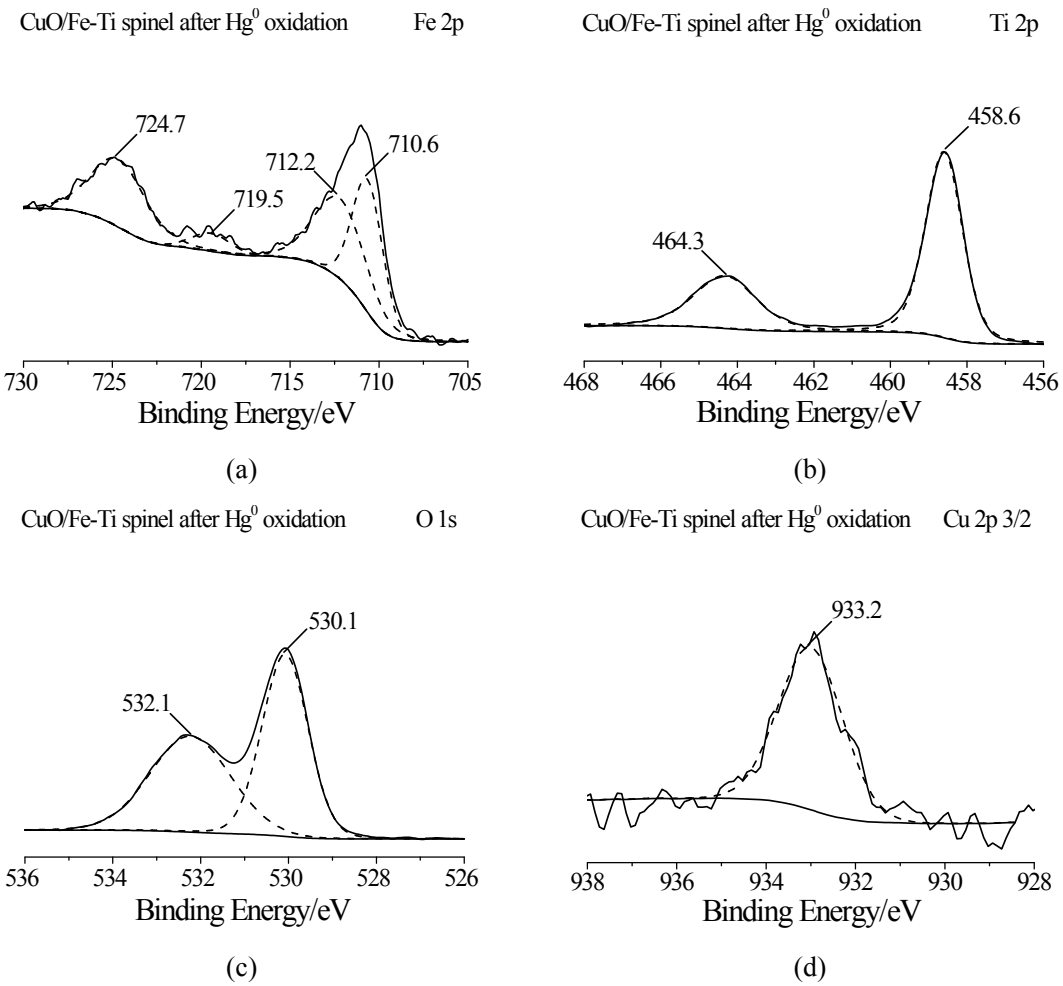

Fig. S3 XPS spectra for CuO/Fe-Ti spinel after Hg^0 oxidation in the Fe 2p, Ti 2p, O 1s, and Cu $2p_{3/2}$ spectral regions.

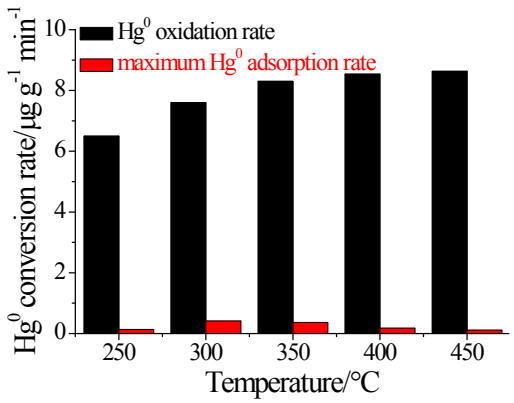

Fig. S4 Rates of Hg^0 oxidation and Hg^0 adsorption on CuO/Fe-Ti spinel resulted from Fig. 8b.