Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

CO-tolerance of Pt/Fe Catalyst in Both Thermal Catalytic H_2 Oxidation and Electrochemical CO Oxidation: the Effect of Pt Deficit Electron State

Lequan Liu, Feng Zhou, Rajesh Kodiyath, Shigenori Ueda, Hideki Abe, Defa Wang, Youquan Deng and Jinhua Ye

Catalyst Characterization

Pt loadings in the catalyst samples were determined with ICP-AES (IRIS Advantage ER/S).

High–resolution transmission electron microscopy (TEM) characterization was performed with a JEOL 2100F operated at 200 kV. Powder X-ray diffraction (XRD) patterns of the products were recorded on an X'Pert PRO diffractometer with Cu–Kα radiation. The Brunauer-Emmett-Teller (BET) surface areas were measured via nitrogen physisorption (Gemini-2360; Micromeretics Corp., U.S.A.).

Catalyst activity tests

The active test system was benchmarked with the standard catalyst of 4.4 wt% Au/Fe_2O_3-W. In our active test system, the temperature at 50% CO conversion is -30 ^oC, which is slightly higher than the provided temperature of -37 ^oC (100 mg, flow rate: 33 ml/min, space velocity (SV): 20000 $ml \cdot h^{-1} \cdot g^{-1}$), indicating that our active test system is reliable.

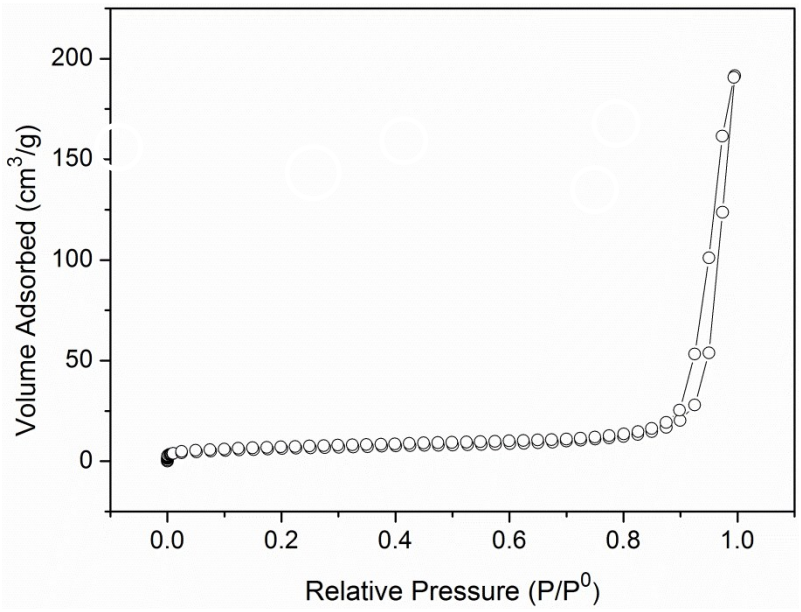

Fig. S1. Nitrogen physisorption isotherms of Pt/Fe catalyst

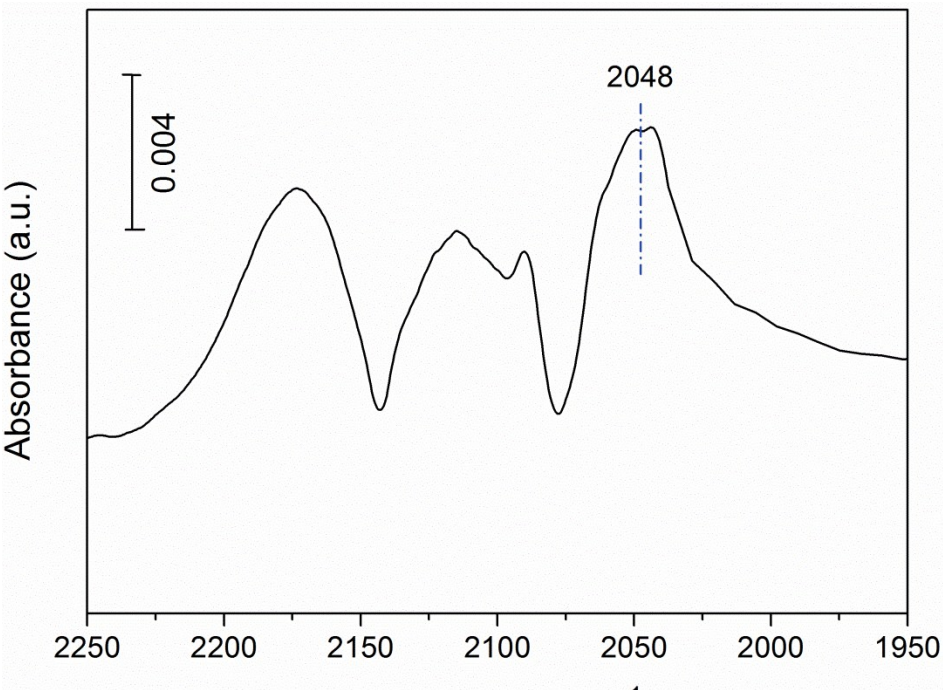

Fig. S2. In-situ DRIFTS spectrum of Pt/Fe catalyst. The sample was first flushed with Ar for 30 min, reduced with 10% H_2 for 1h, exposed to 1% CO for 30 min, followed by purging with Ar for 1 h, and then studied with DRIFT.