Electronic Supplementary Material (ESI) for Catalysis Science & Technology

Supplementary materials

Fischer-Tropsch Synthesis on cobalt/Al_2O_3-modified SiC catalysts: effect of cobalt-alumina interactions

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Supplementary **Table S1** shows the concentration of SiC support itself with the main elements of Si, C, and O, and it found to be formed with SiC species coated on SiOxCy layers with the surface area of ~ 25.2 m^2/g, which are well matched with the results of SICAT reports in their homepage (http://www.sicatcatalyst.com/). The Fourier-transformed infrared-spectroscopy (FT-IR) in supplementary **Figure S1** showed the characteristic vibration peaks of Si-O, Si-C and Si-O-Si species are assigned to the wavenumbers of 697, 845 and 1100 cm^{-1}, respectively,[14] and it supports that the structures of beta-SiC can be in the phases of SiC species coated on SiOxCy layers as well.

Supplementary **Figure S2** shows the profiles of NH_3-TPD patterns of Al_2O_3-modified SiC supports after 500°C calcination without cobalt component, which are assigned to AS (in main manuscript) and Al_2O_3(x)/SiC (in supplementary data) with the digit of x for Al_2O_3wt% on beta-SiC support. The number of acid sites is only assigned to the integrated area (corresponding to the desorbed mmolNH_3/g) of the peak below 300°C, which can be assigned to the weak acid sites, and the higher desorption temperature above 300°C seems to be the possible desorption of surface hydroxyl groups or strongly adsorbed H_2O molecules. The number of acid sites is also summarized in supplementary **Table S2** with the amounts of

weak acid sites (mmolNH_3/g) below the desorption temperature of 300°C. The strong acid sites assigned to the desorption peak above 300°C can be attributed to the desorption of water molecules, which is strongly adsorbed on the surfaces or it is desorbed from Al_2O_3 structures at high temperature.

Supplementary **Table S1**. Results of XRF analysis of beta-SiC support itself

Formula	Concentration (wt%)
Si	24.79
C	32.99
O	41.95
Fe	0.17
Al	0.07
Ca	0.03

Supplementary **Table S2**. Summarized results of NH_3-TPD of Al_2O_3-modifed SiC support

Support	Amount of acidic sites (adsorbed NH_3; cm^3/g)		
	Weak (<300°C)	Strong (>300°C)	Total
Al_2O_3(2.5)/SiC	0.325	2.006	2.331
Al_2O_3(5)/SiC	0.787	1.360	2.147
Al_2O_3(10)/SiC	0.813	2.245	3.058
Al_2O_3(15)/SiC	0.621	0.725	1.346

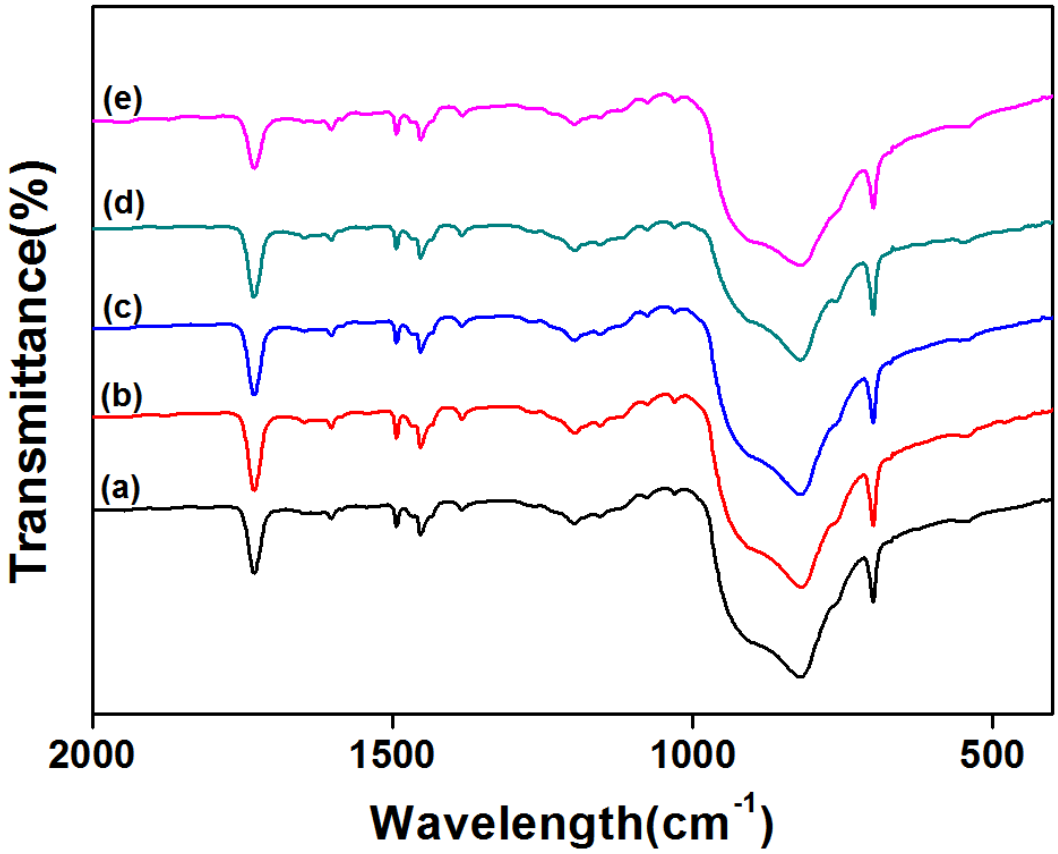

Figure S1. FT-IR spectra of Al_2O_3-modified SiC supports

(a) Beta-SiC, (b) Al_2O_3(2.5)/SiC, (c) Al_2O_3(5)/SiC, (d) Al_2O_3(10)/SiC, (e) Al_2O_3(15)/SiC

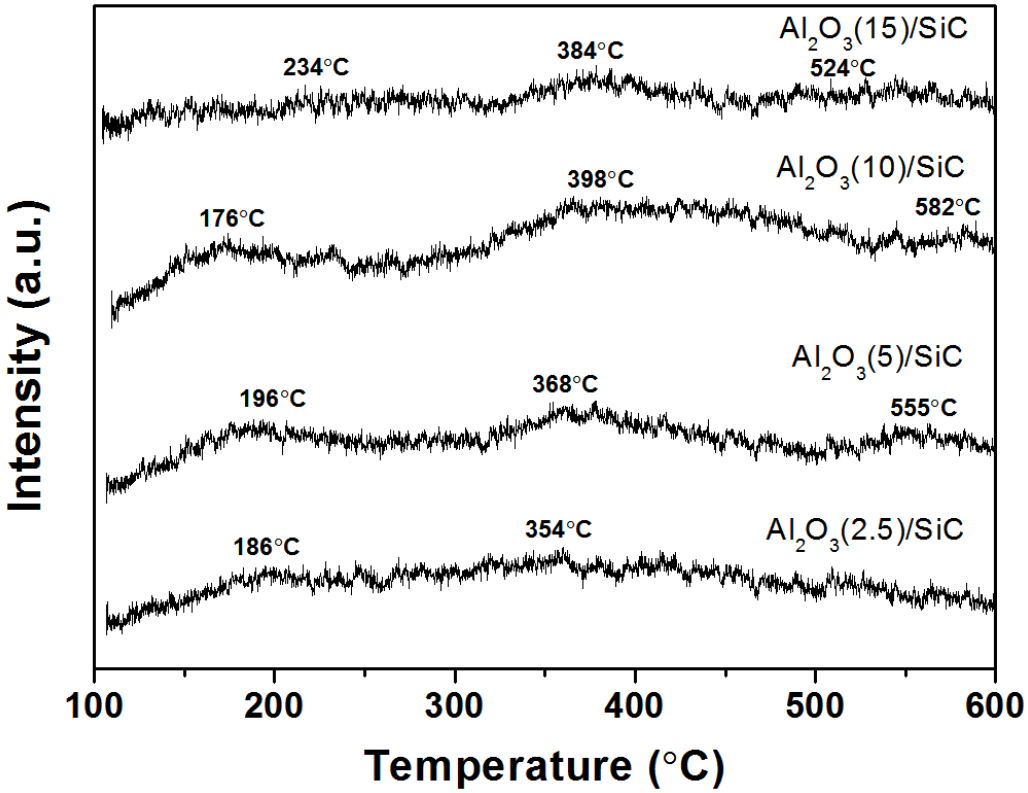

Figure S2. Profiles of NH_3-TPD on Al_2O_3-modified SiC supports