Supplementary Material

The Fischer-Tropsch synthesis performance over cobalt supported on silicon-based materials: the effect of thermal conductivity of support

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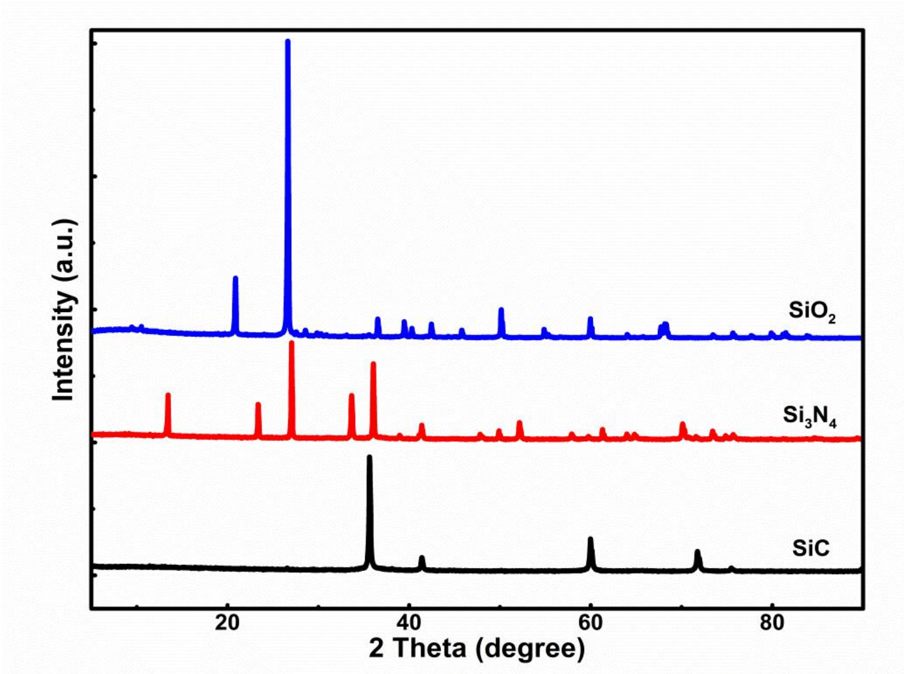

Fig. S1 The XRD pattern of support materials

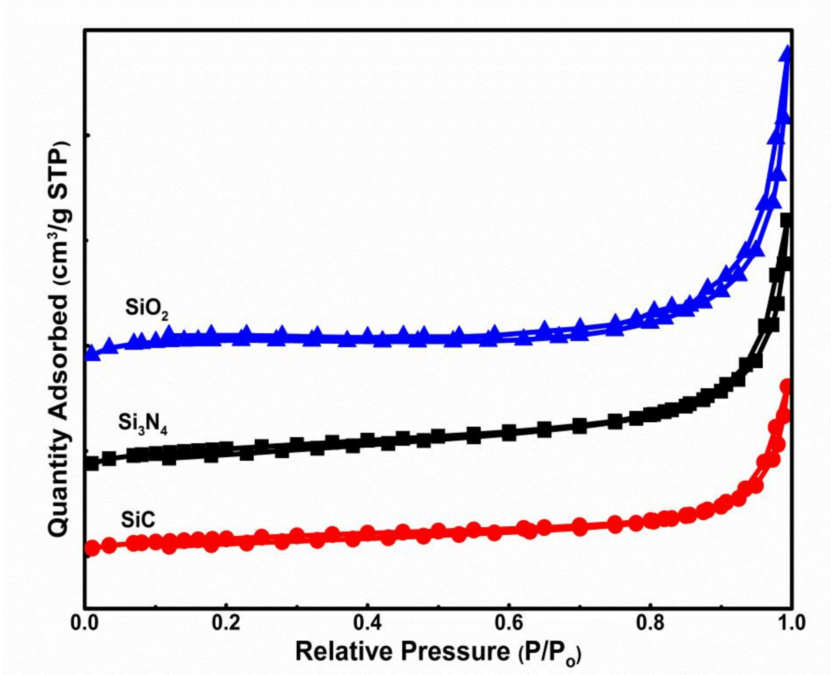

Fig. S2 The N_2-adsorption/desorption isotherms of the supports

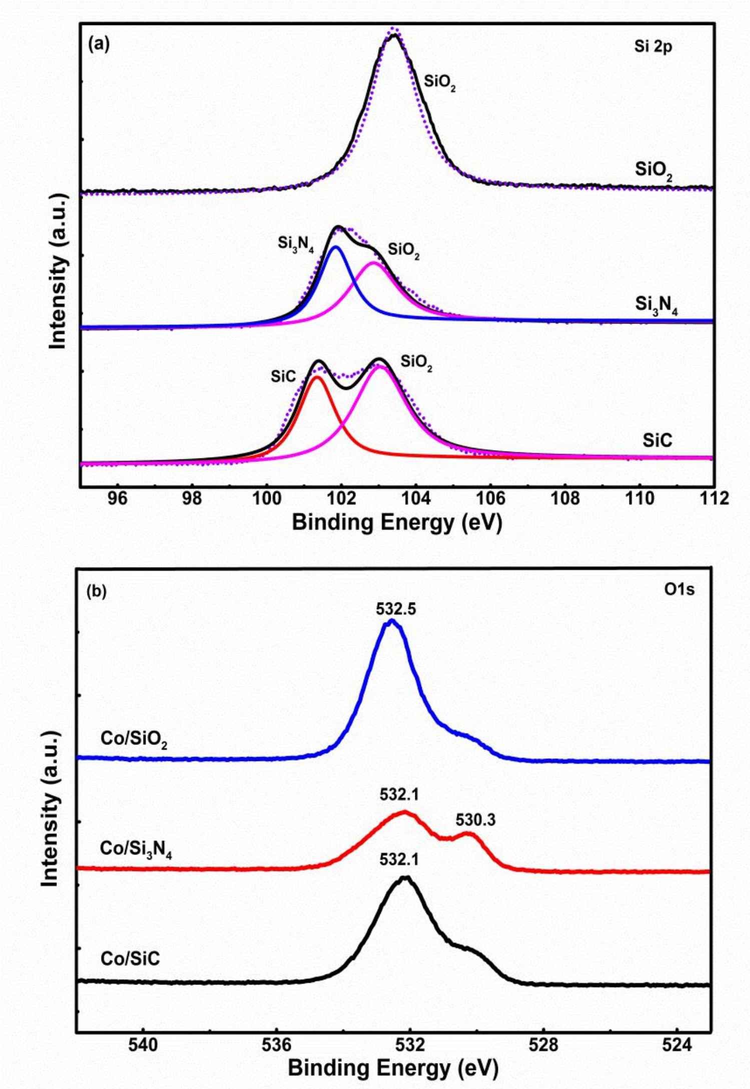

Fig. S3 The XPS spectra: a) Si 2p; b) O 1s

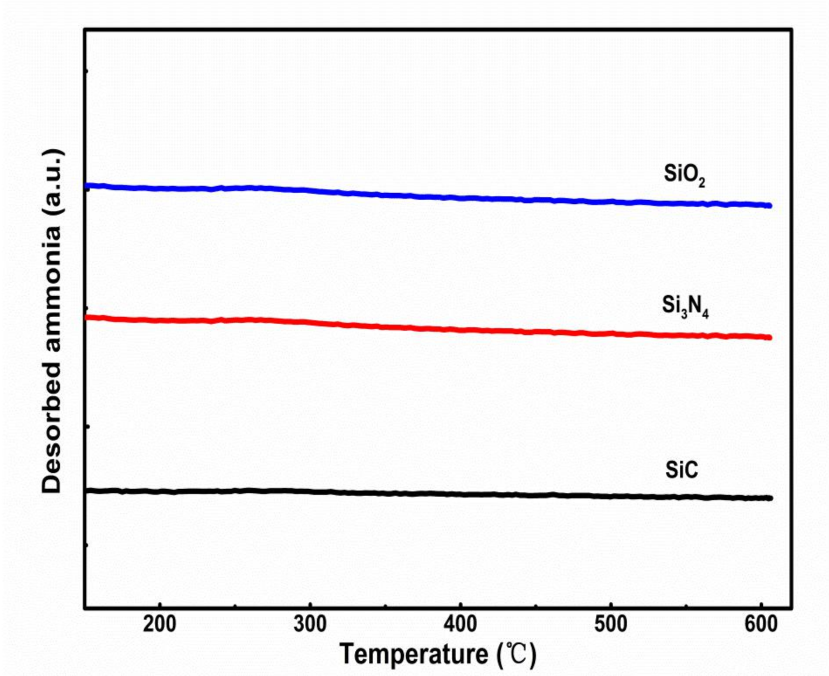

Fig. S4 The NH_3-TPD spectrum of supports

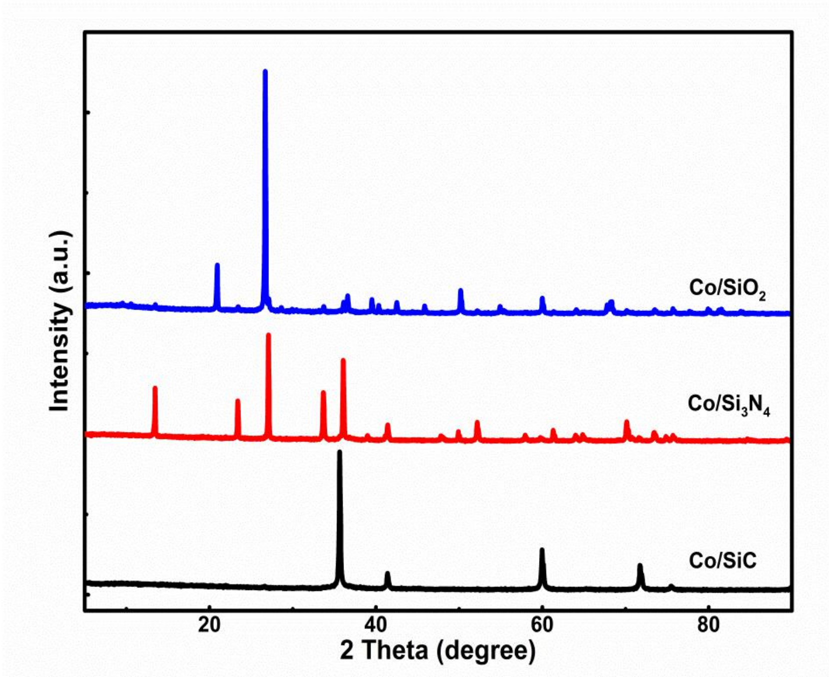

Fig. S5 The XRD pattern of calcined catalysts

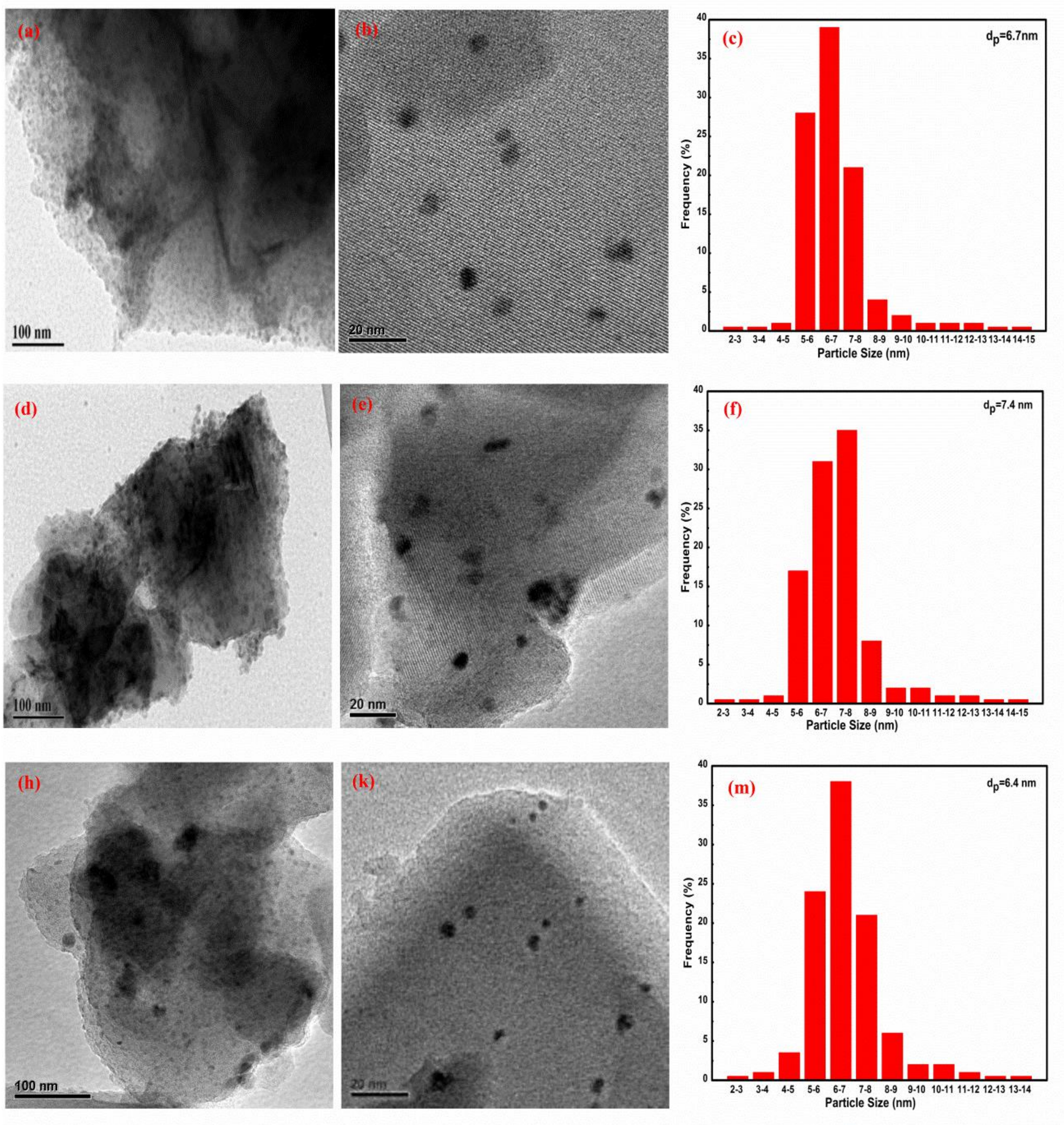

Fig. S6 The TEM images of fresh catalysts and the histogram of Co_3O_4 particle size distribution: a, b, c) Co/SiC; d, c, e) Co/Si_3N_4; h, k, m) Co/SiO_2

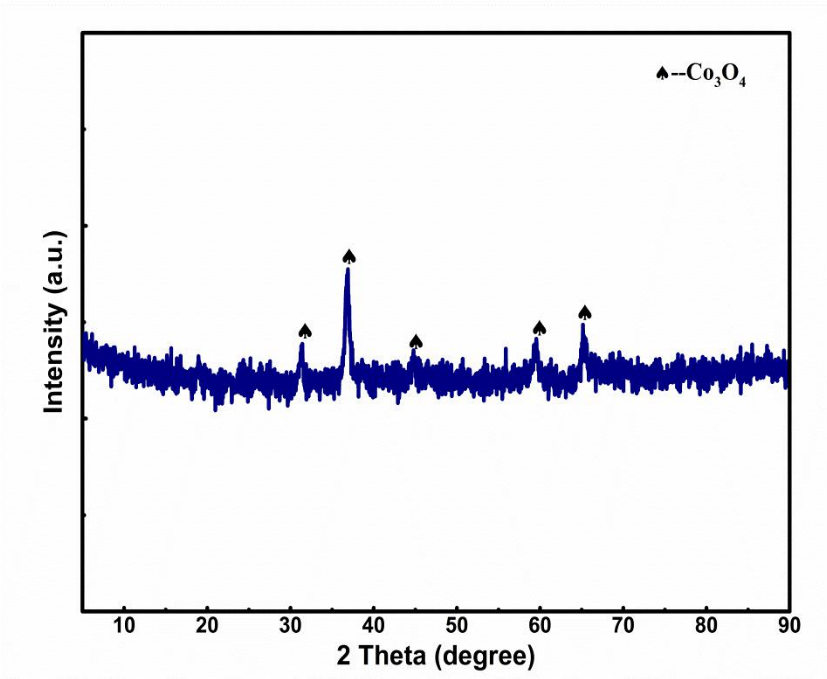

Fig. S7 The XRD pattern of pure cobalt oxide sample

In order to confirm the phase of cobalt oxide in all catalysts, the pure cobalt oxide obtained by the thermal decomposition of cobalt(Ⅱ) acetylacetonate, and the preparation method was same as the catalyst preparation. As shown in **Fig. S7**, the XRD result manifested that spinel Co_3O_4 was predominant cobalt species in all calcined catalysts.

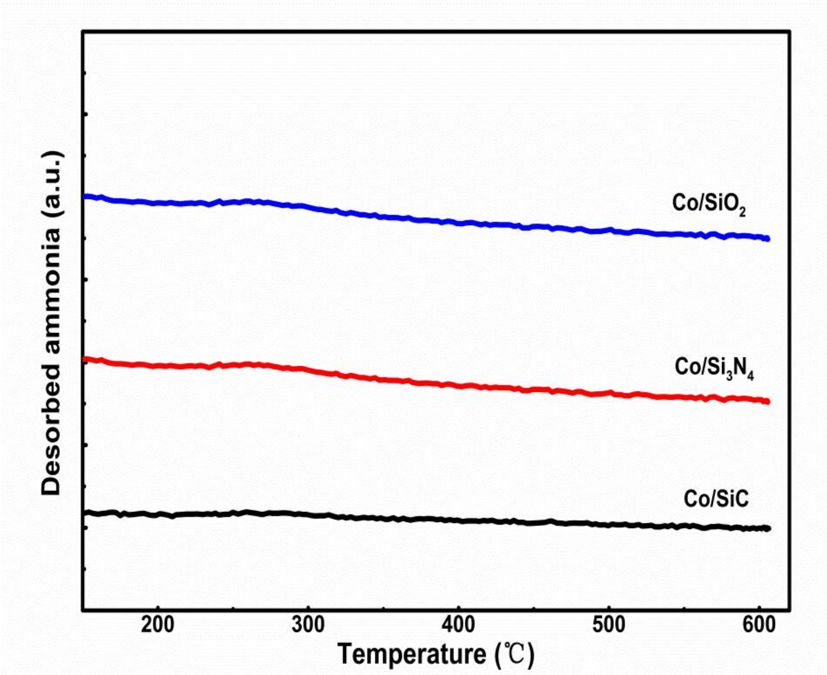

Fig. S8 The NH_3-TPD spectrum of catalyst samples

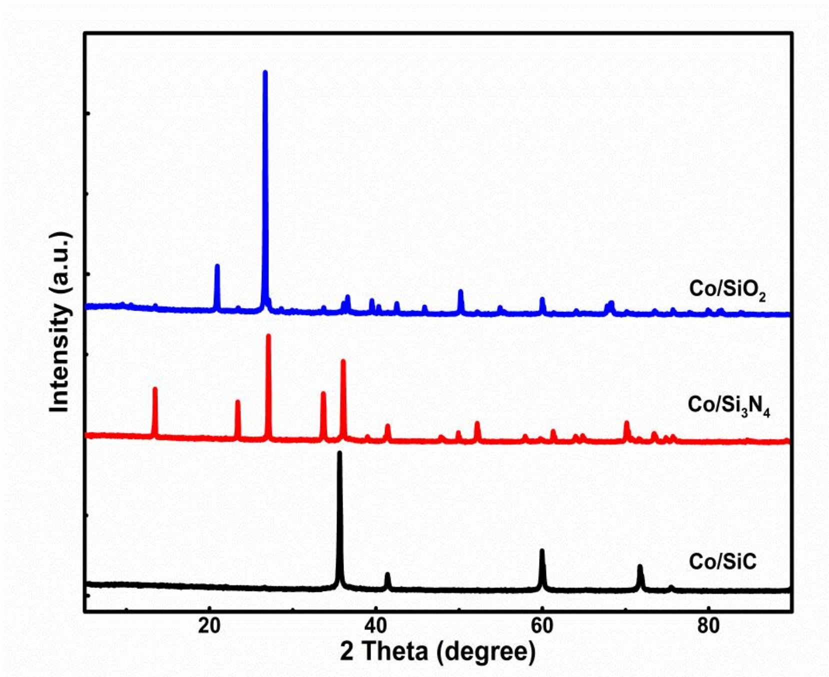

Fig. S9 The XRD pattern of reduced catalyst samples

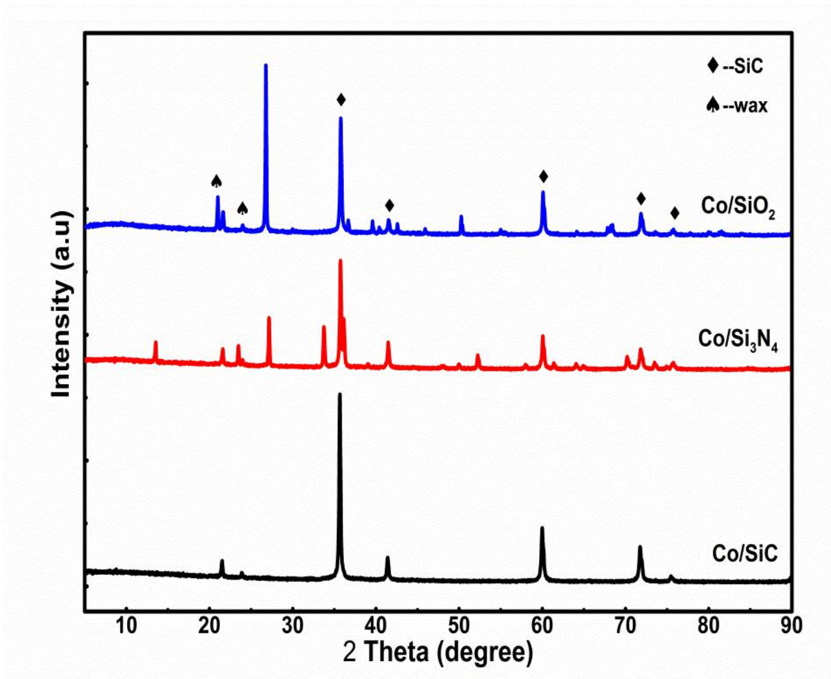

Fig. S10 The XRD pattern of spent catalysts

As seen in **Fig. S10**, no diffraction peak which attributed to cobalt species was observed in the spent catalyst samples beside those belonged to supports, diluent (SiC) and wax.

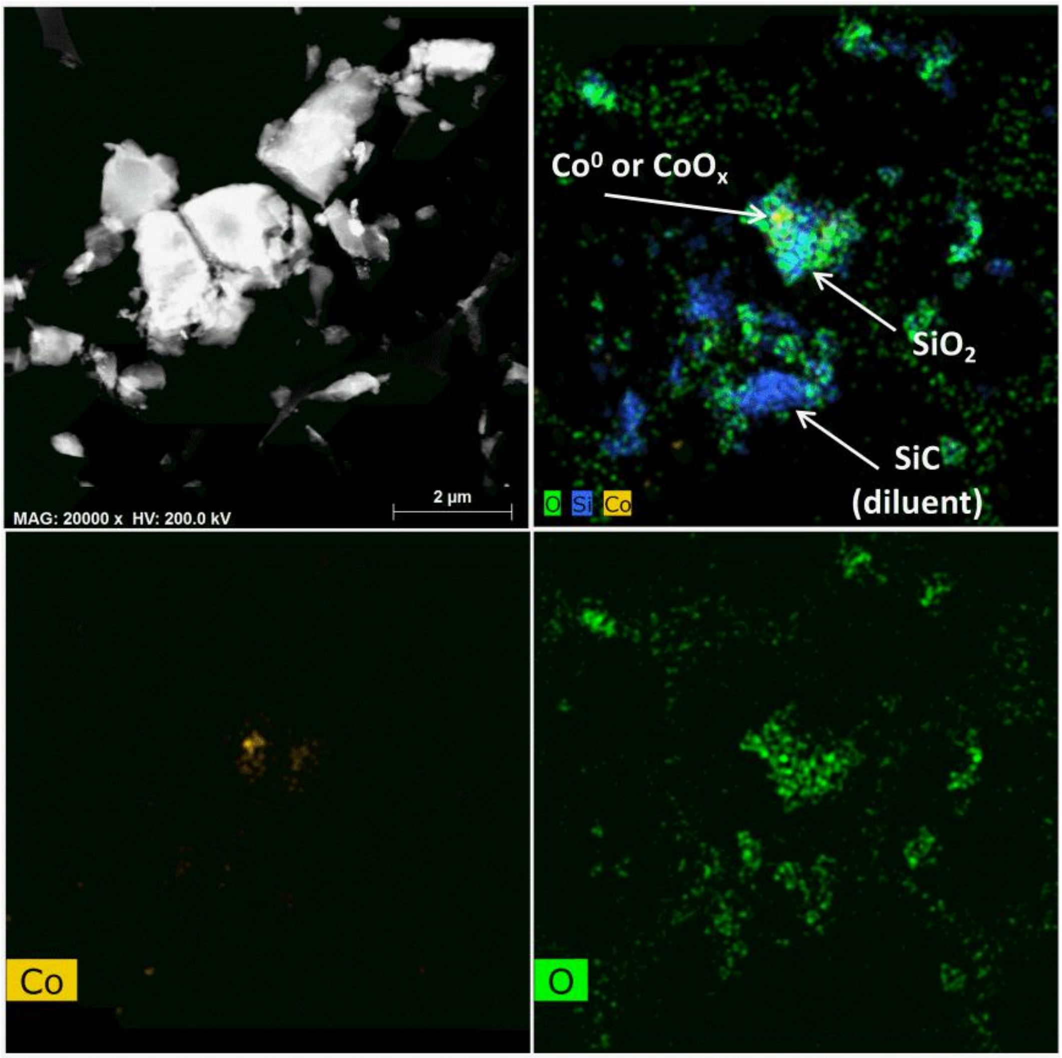

Fig. S11 The elemental mapping of the spent catalysts (such as Co/SiO_2 catalyst)

As shown in Fig. S11, the elemental mapping of spent catalysts (e.g., Co/SiO_2 sample) showed that a certain amount of SiC diluent could remain in the spent catalysts after the separation treatment. In addition, the cobalt phase could not migrate to the SiC diluent during the thermal activation and reaction process.

Table S1 The XPS data of catalysts

Catalyst sample	BE (Co $2p_{3/2}$)	BE (Co $2p_{1/2}$)	Δ BE
Co/SiC	780.7	796.3	15.6
Co/Si_3N_4	780.5	795.9	15.4
Co/SiO_2	780.7	796.1	15.4