

Supplementary Information

Carbon Nanotube-Supported Copper-Cobalt Catalyst for the Production of Higher Carbon Number Alcohols through Carbon Monoxide Hydrogenation

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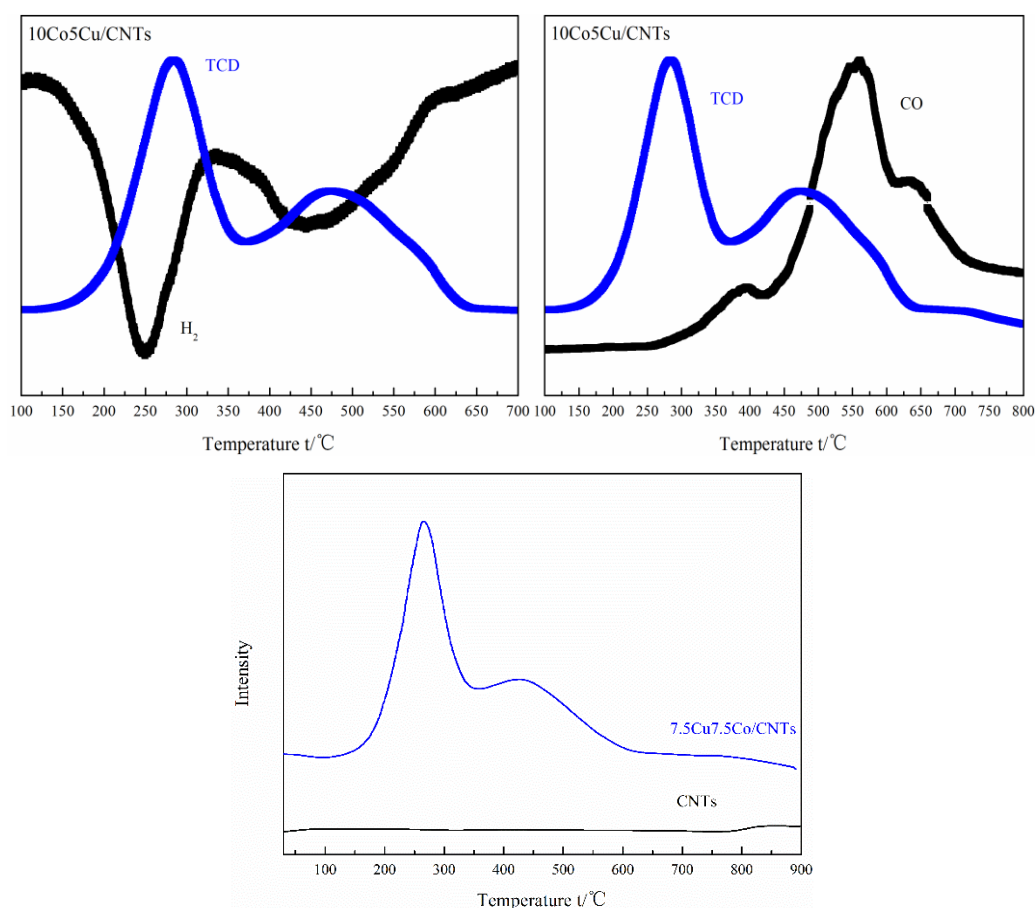


Figure S1. H_2 -TPR-MS profiles of 10Co5Cu/CNTs and TPR profiles of 7.5Cu7.5Co/CNTs and CNTs samples.

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Temperature-programmed reduction mass spectrometry analysis of 10Co5Cu/CNTs is shown in Figure S1. It is observed that the reduction peak of temperature-programmed reduction (TPR) profile was in good accordance with the obvious signal change of hydrogen in mass spectrometry analysis for the sample, which indicates the reduction of metallic oxide. In addition, the peak location of CO detected by mass spectrometry analysis was consistent with the location of the broad peak of TPR profile at high temperature for both samples. Therefore, it is concluded that the broad peaks ca. 480 °C are assigned partially to the reduction of metallic oxide and partially to the decomposition of carbon nanotubes.

The TPR profile of 7.5Cu7.5Co/CNTs and CNTs were also shown in Figure S1 for comparison. The first decomposition step of pure CNTs was observed at a higher temperature of 787 °C. Thus, this result indicated that the addition of metals and metal oxides, accelerated the decomposition of the nanotubes.

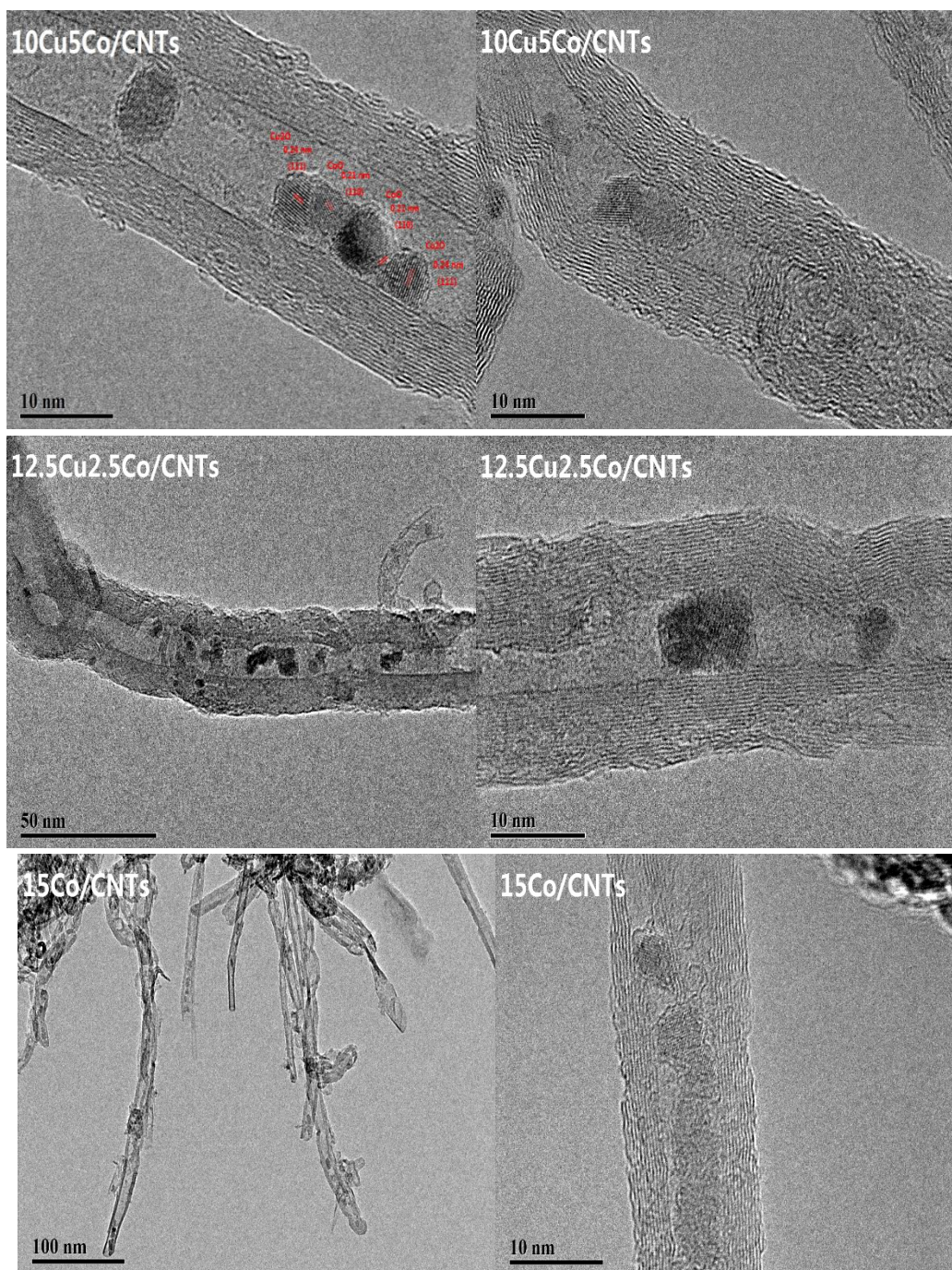


Figure S2. HRTEM images of fresh 10Cu5Co/CNTs, 12.5Cu2.5Co/CNTs and 15Co/CNTs catalysts.

Table S1. Analysis of bulk atomic concentrations over fresh catalysts obtained via ICP

Sample	Bulk atomic concentration / (wt.%)	
	Co	Cu
15Co/CNTs	14.7	–
10Co5Cu/CNTs	9.30	4.64
7.5Co7.5Cu/CNTs	7.68	6.36
10Cu5Co/CNTs	9.05	4.27