

Supported cobalt oxide nanoparticles as catalyst for aerobic oxidation of alcohols in liquid phase

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Supplementary information

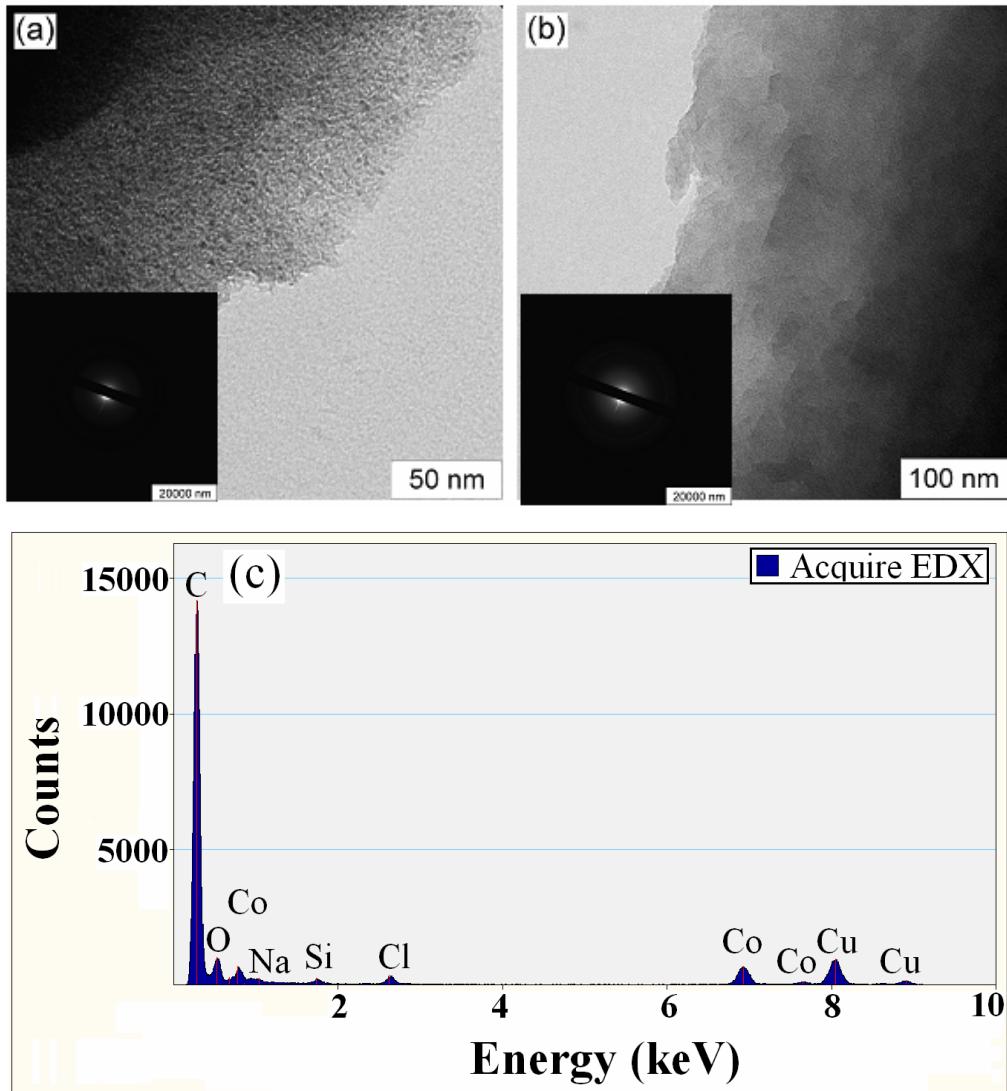


Figure S1. TEM images of samples (a) $\text{Co}_3\text{O}_4/\text{AC}$ and (b) $\text{Co}_3\text{O}_4/\text{CTF}$, and (c) the corresponding EDX patterns of $\text{Co}_3\text{O}_4/\text{AC}$

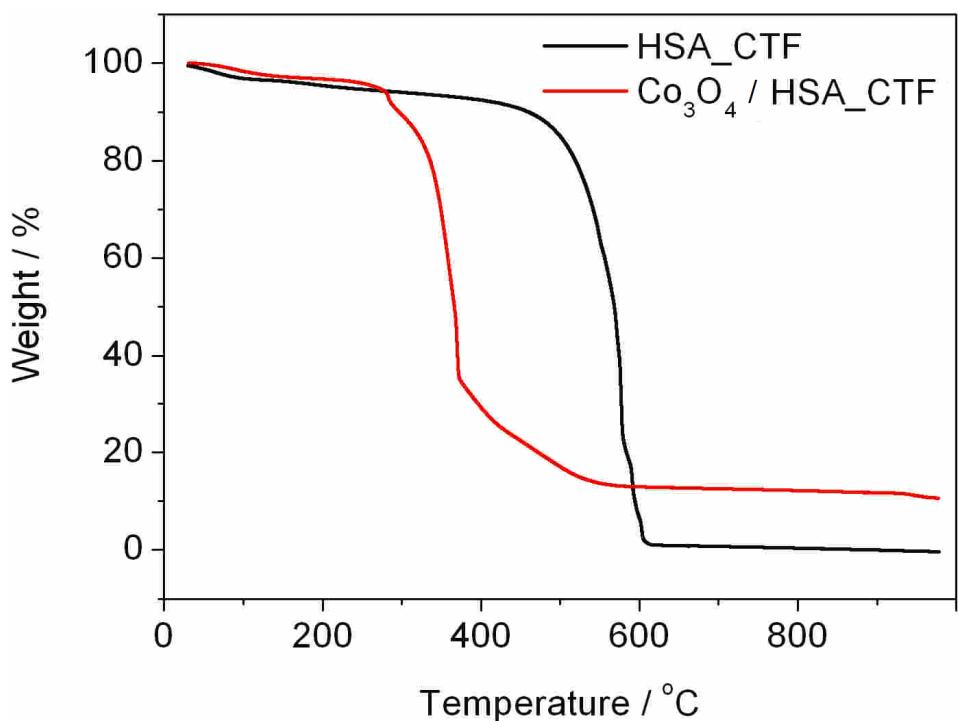


Figure S2. TGA curves of the high surface area HSA_CTF and Co₃O₄/HSA_CTF.

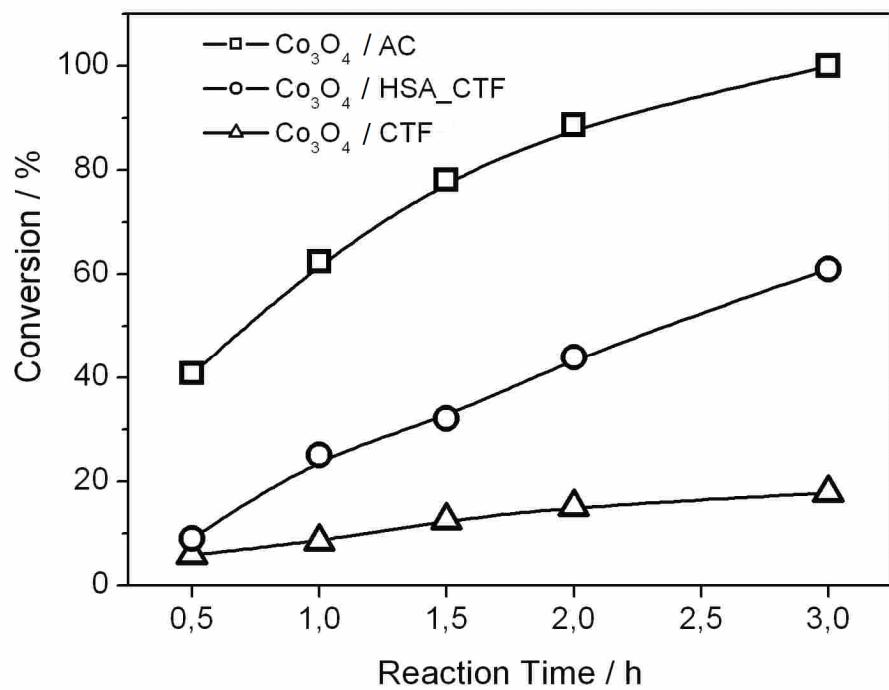


Figure S3. Dependence of activities of the supported cobalt oxide catalysts on the reaction time for aerobic oxidation of benzyl alcohol in liquid phase

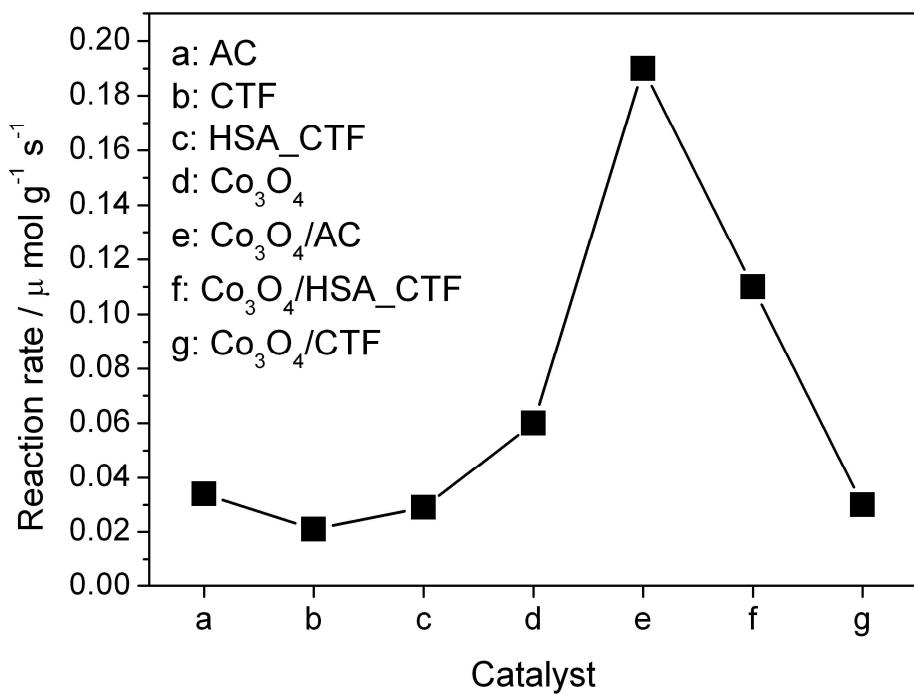


Figure S4: Reaction rate of the benzyl alcohol oxidation reaction carried out on various catalysts (data were taken at reaction time of 3 h).

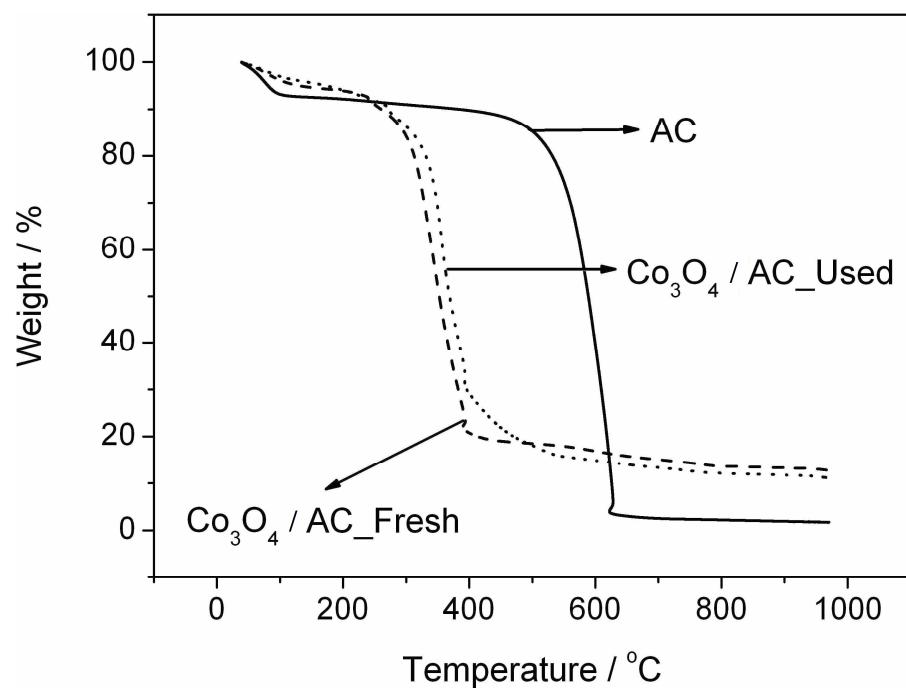


Figure S5. TGA curves of $\text{Co}_3\text{O}_4/\text{AC}$ before and after reactions

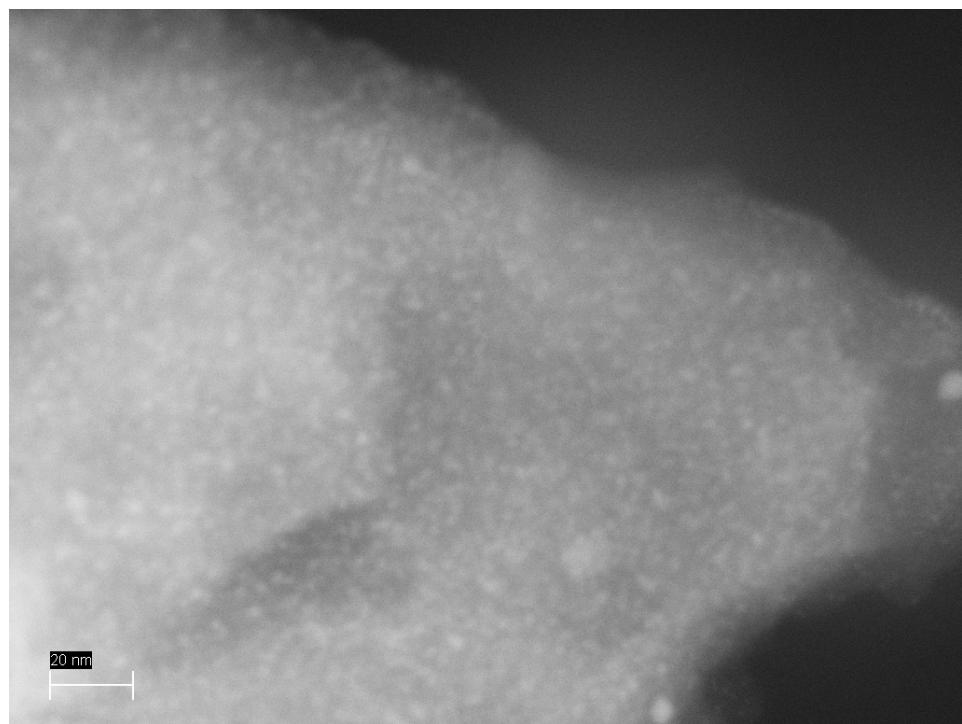


Figure S6. A higher magnification STEM image (scale bar of 20 nm) of the $\text{Co}_3\text{O}_4/\text{AC}$ catalyst

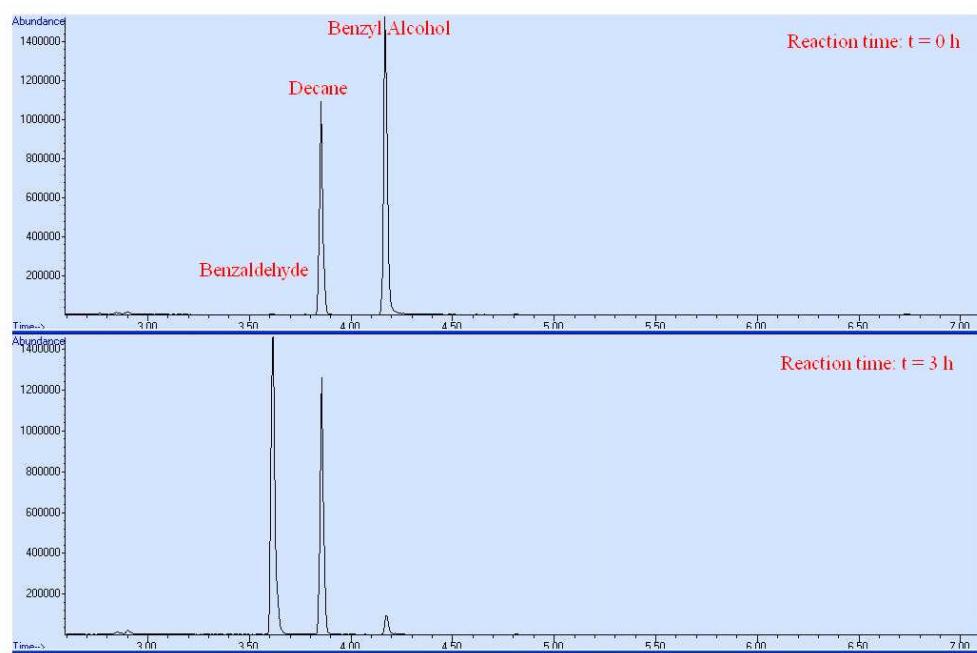


Figure S7. The direct activity profiles obtained from GC-MS. It should be noted that a small peak ascribed to benzyl alcohol still exists after the reaction proceeds for 3 h, but the area is too small and can not be collected by the instrument, we therefore took it as 100% alcohol conversion.

Table S1. Activity of $\text{Co}_3\text{O}_4/\text{AC}$ for the oxidation of various alcohols

No.	Substrate	Product	Conversion ^a (%)
1			22
2	$\text{CH}_3(\text{CH}_2)_7\text{CH}_2\text{OH}$	$\text{CH}_3(\text{CH}_2)_6\text{CH}_2\text{C}(=\text{O})\text{H}$	26
3	$\text{CH}_3(\text{CH}_2)_8\text{CH}_2\text{OH}$	$\text{CH}_3(\text{CH}_2)_7\text{CH}_2\text{C}(=\text{O})\text{H}$	16
4			100
5			94
6			85
7			60

Reaction Conditions: Alcohol = 20 μl ; Toluene (solvent) = 20 ml; F_{O_2} = 50 ml/min.; T = 80 $^{\circ}\text{C}$; t = 3 h.^a Aldehyde is the only product, other products are not detected or out of the detection limit of GC-MS