

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

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Supplementary information

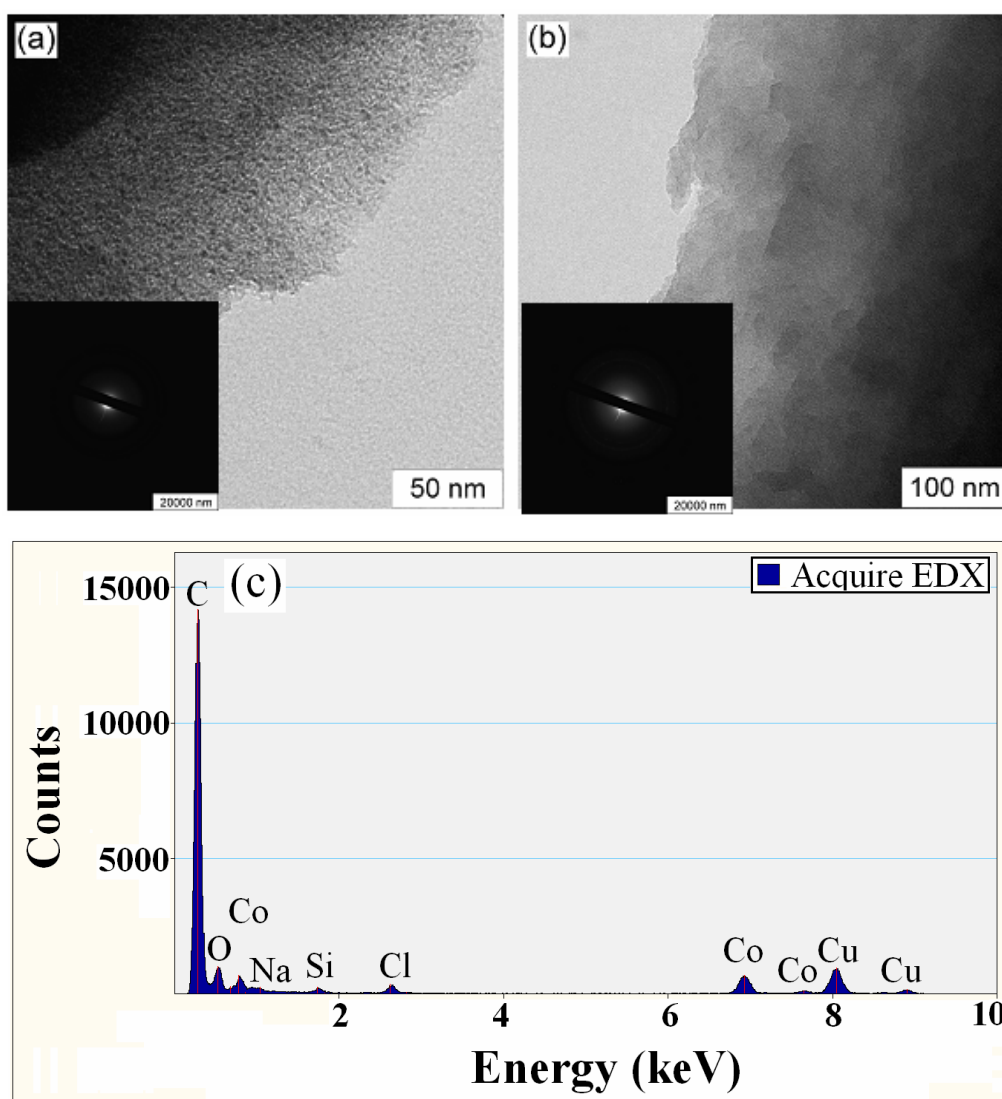


Figure S1. TEM images of samples (a) Co₃O₄/AC and (b) Co₃O₄/CTF, and (c) the corresponding EDX patterns of Co₃O₄/AC

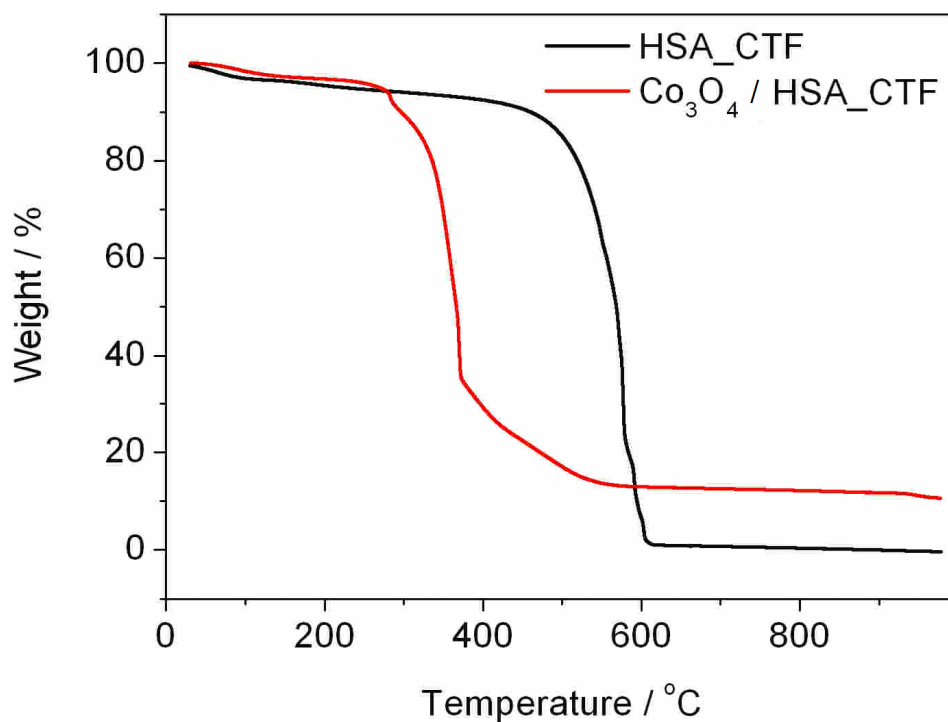


Figure S2. TGA curves of the high surface area HSA_CTF and Co₃O₄/HSA_CTF.

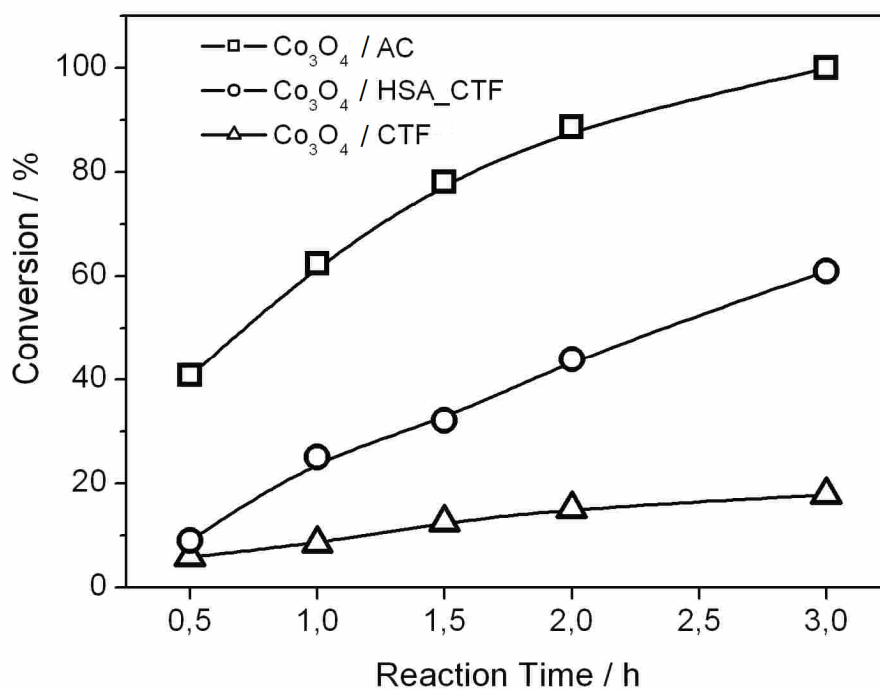


Figure S3. Dependence of activities of the supported cobalt oxide catalysts on the reaction time for aerobic oxidation of benzyl alcohol in liquid phase

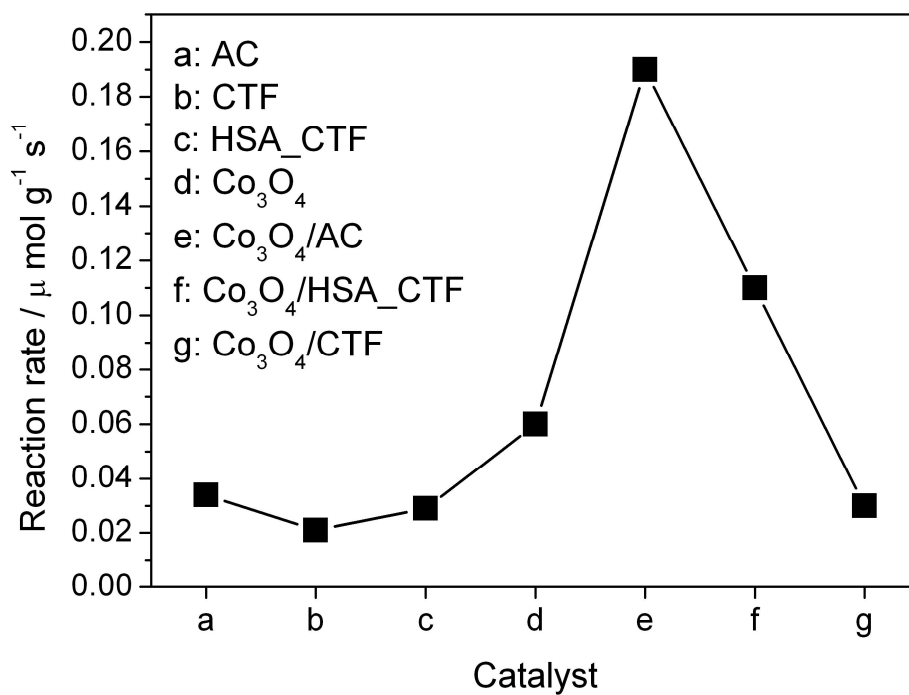


Figure S4: Reaction rate of the benzyl alcohol oxidation reaction carried out on various catalysts (data were taken at reaction time of 3 h).

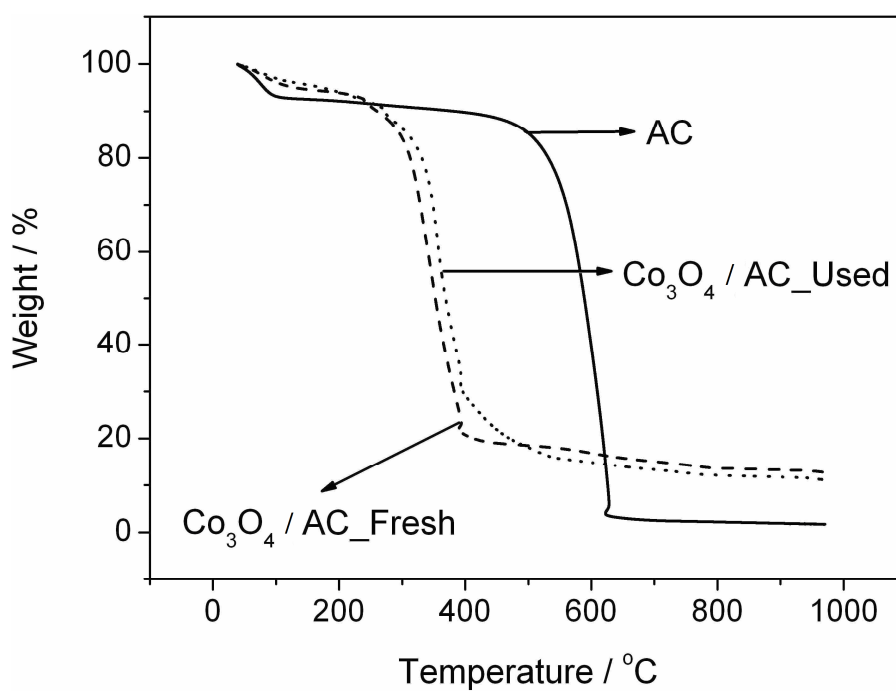


Figure S5. TGA curves of $\text{Co}_3\text{O}_4/\text{AC}$ before and after reactions

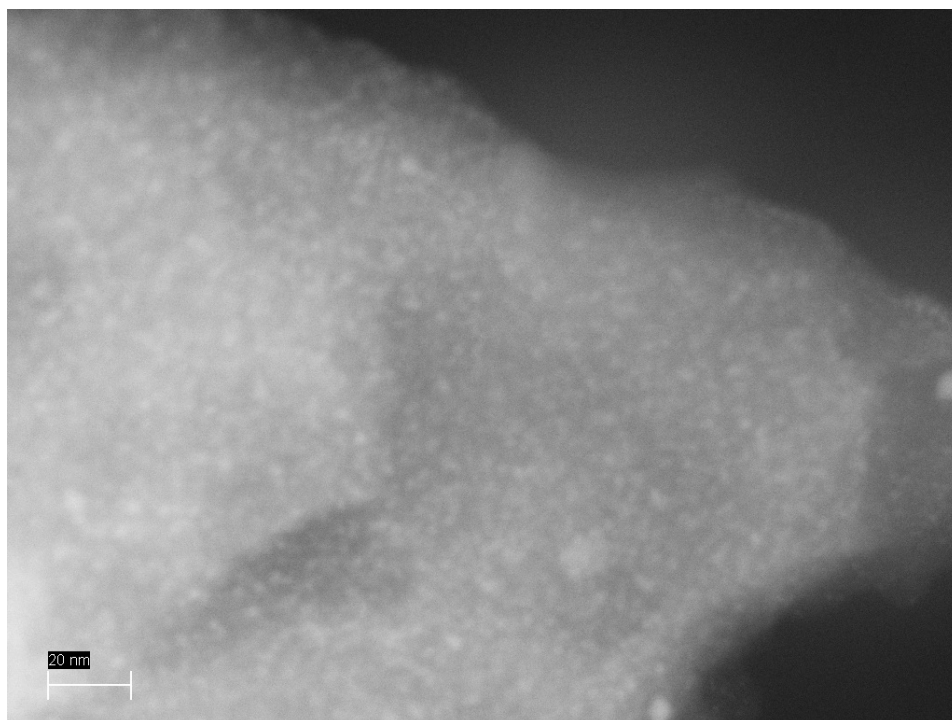


Figure S6. A higher magnification STEM image (scale bar of 20 nm) of the $\text{Co}_3\text{O}_4/\text{AC}$ catalyst

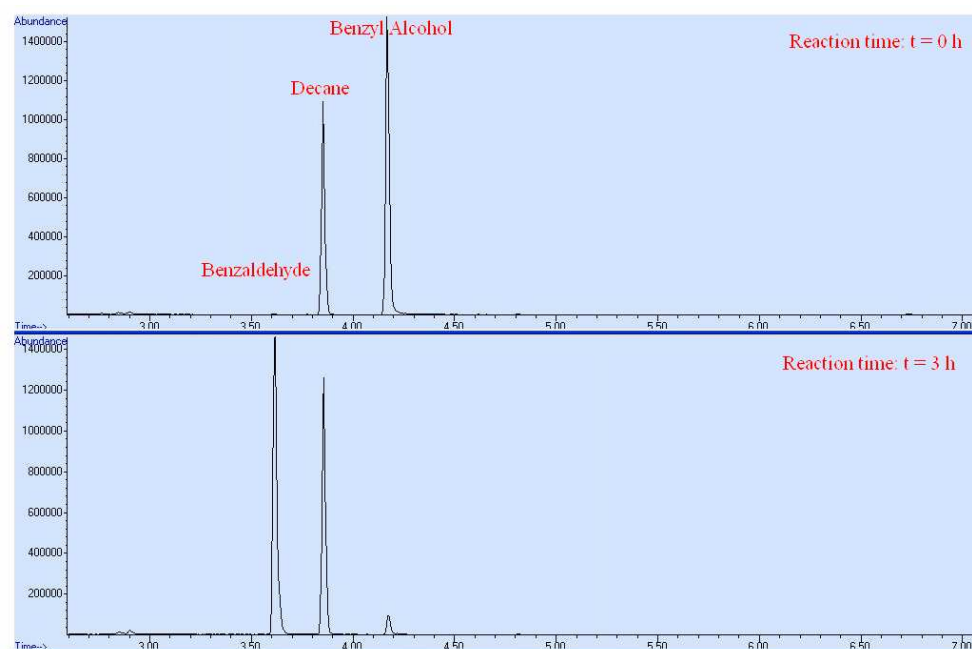
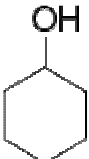
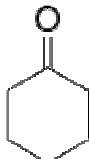
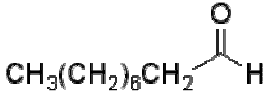
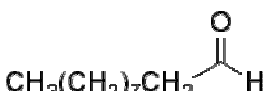
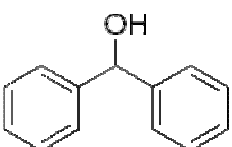
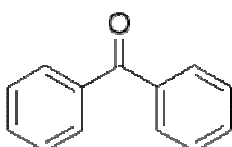
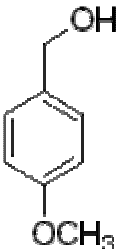
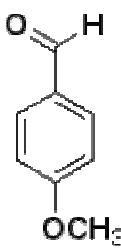

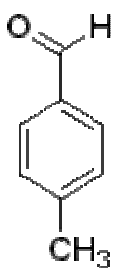
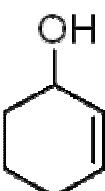
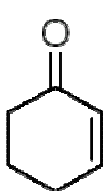


Figure S7. The direct activity profiles obtained from GC-MS. It should be noted that a small peak ascribed to benzyl alcohol still exists after the reaction proceeds for 3 h, but the area is too small and can not be collected by the instrument, we therefore took it as 100% alcohol conversion.

Table S1. Activity of Co₃O₄/AC for the oxidation of various alcohols

No.	Substrate	Product	Conversion ^a (%)
1			22
2	CH ₃ (CH ₂) ₇ CH ₂ OH		26
3	CH ₃ (CH ₂) ₈ CH ₂ OH		16
4			100
5			94
6			85
7			60

Reaction Conditions: Alcohol = 20 µl; Toluene (solvent) = 20 ml; F_{O₂} = 50 ml/min.; T = 80 °C; t = 3 h.^a Aldehyde is the only product, other products are not detected or out of the detection limit of GC-MS