

Supplementary Information

Facile Synthesis of Highly Efficient Co/Cu@NC Catalyst for Base-free

Oxidation of Alcohols to Esters

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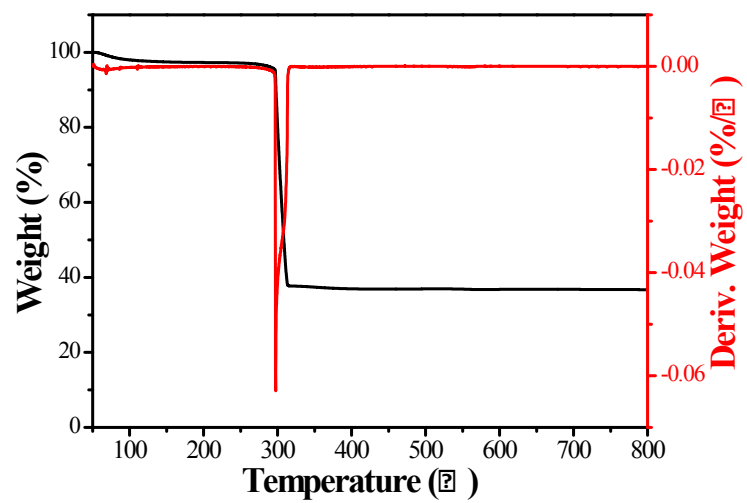


Fig. S1 TGA curves of CoCu@NC₂.

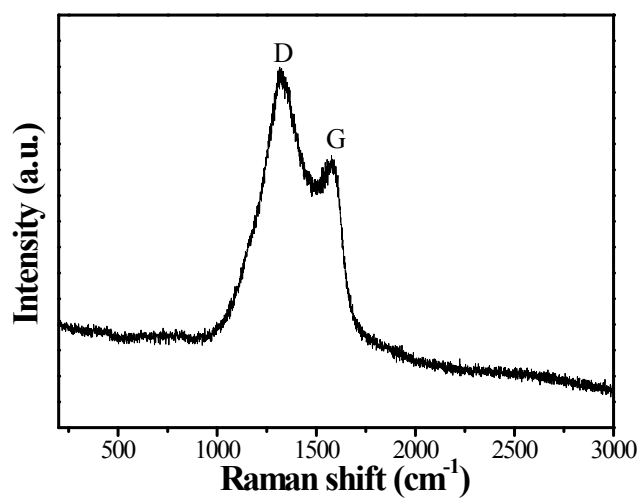


Fig. S2 Raman pattern of CoCu@NC₂.

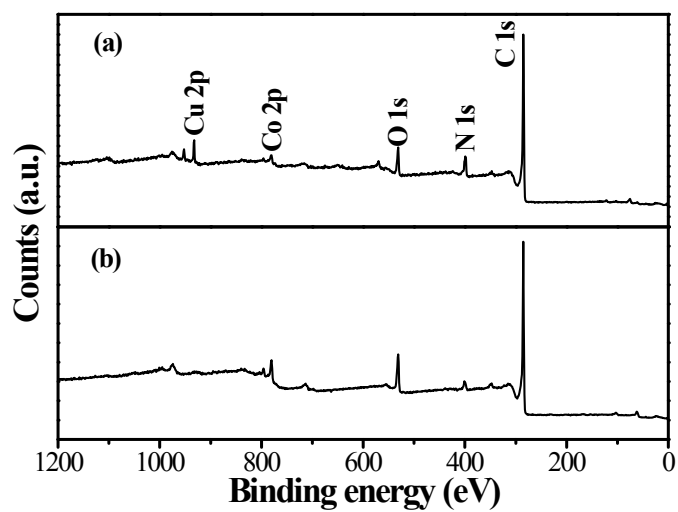


Fig. S3 XPS survey spectra of (a) CoCu@NC₂ (b) Co@NC₂.

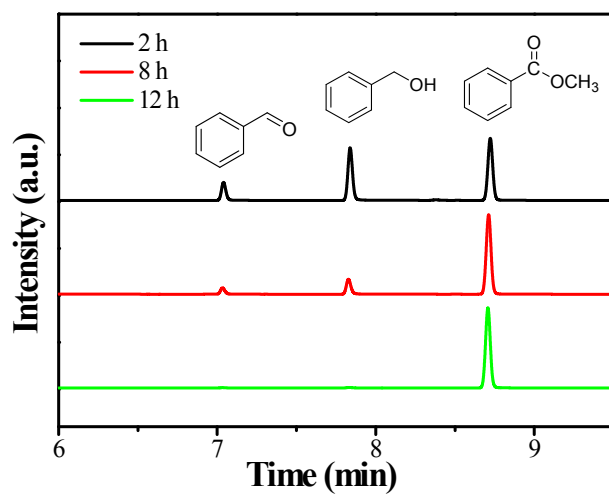


Fig. S4 GC spectra for Oxidative Esterification of Benzyl Alcohol over CoCu@NC₂

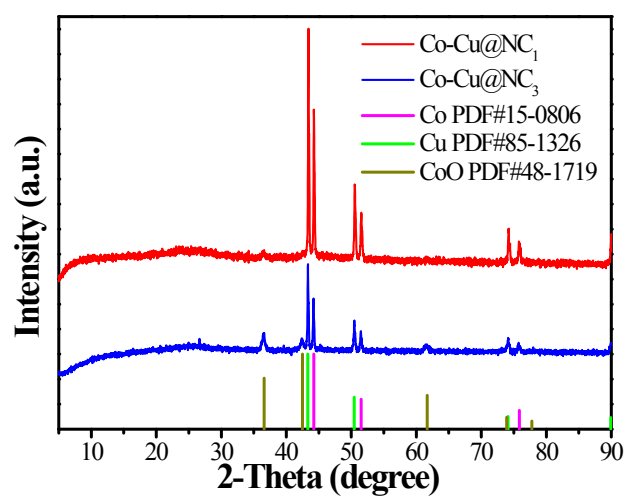


Fig. S5 XRD patterns of CoCu@NC₁ and CoCu@NC₃.

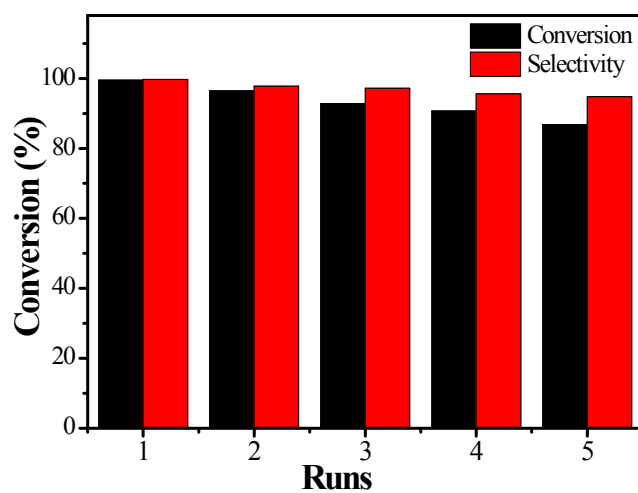


Fig. S6 Catalytic reusability of CoCu@NC₂ for oxidative esterification of benzyl alcohol

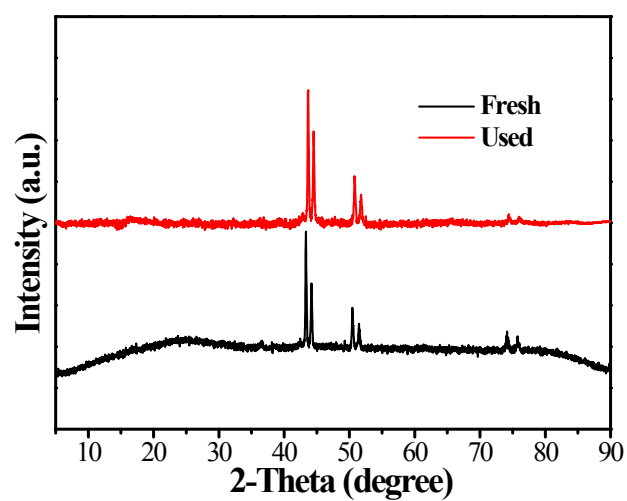


Fig. S7 XRD patterns of fresh and recycled CoCu@NC₂.



Fig. S8 SEM images of CoCu@NC₂.

Table S1: Comparative performance of CoCu@NC₂ catalyst with prior reported art.

Catalyst	Condition	Conv./Yield(%)	Select. (%)	Ref.
NaAuCl ₄ ·2H ₂ O	1 atm O ₂ , 80°C, 5 h, K ₂ CO ₃	98	99	1
Co–CoO@NC	1 bar O ₂ , 80°C, 12 h, K ₂ CO ₃	100	100	2
Co@NC	1 bar O ₂ , 80°C, 20 h, K ₂ CO ₃	100	98	3
Co ₃ O ₄ -N@C	1 bar O ₂ , 60°C, 24 h, K ₂ CO ₃	99	97	4
Co ₃ O ₄ /NGr@C	1 bar O ₂ , 60°C, 24 h, K ₂ CO ₃	97	--	5
NCI-Co/Cu 5	1 bar O ₂ , 70°C, 16 h, without K ₂ CO ₃	92 ± 2	--	6
Co@NC-4	1 bar O ₂ , 60°C, 12 h, without K ₂ CO ₃	99	98	7
Co@NOSC	O ₂ ball, 60°C, 24 h, without K ₂ CO ₃	97	98	8
Co@C-N(800)	1 atm air, 25°C, 96 h, 4ml Hexane as solvent	99	100	9
Au-Pd@HT-PO ₄ ³⁻	1 atm O ₂ , 55°C, 24 h, light intensity 0.5 W/cm ²	76	--	10
CoCu@NC₂	O₂ ball, 60°C, 12 h, without K₂CO₃	100	100	Present work

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