

**In situ design of Cu and Co nanoparticles encapsulated in N-doped graphene  
with core-shell structure derived 8-hydroxyquinoline complexes for the selective  
catalytic reduction of NO<sub>x</sub> by NH<sub>3</sub>**

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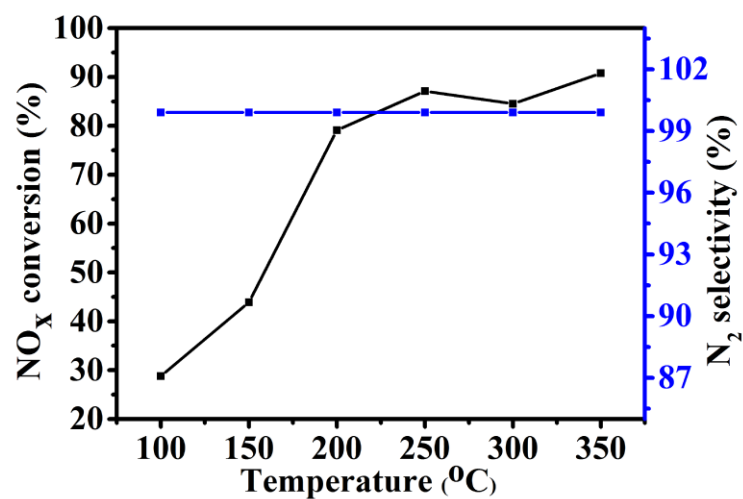


Fig. S1 NH<sub>3</sub>-SCR activity and N<sub>2</sub> selectivity of Co@N-Gr-800.

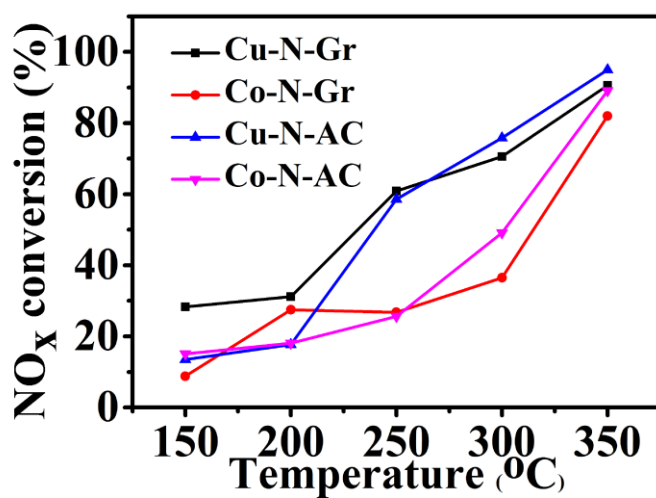
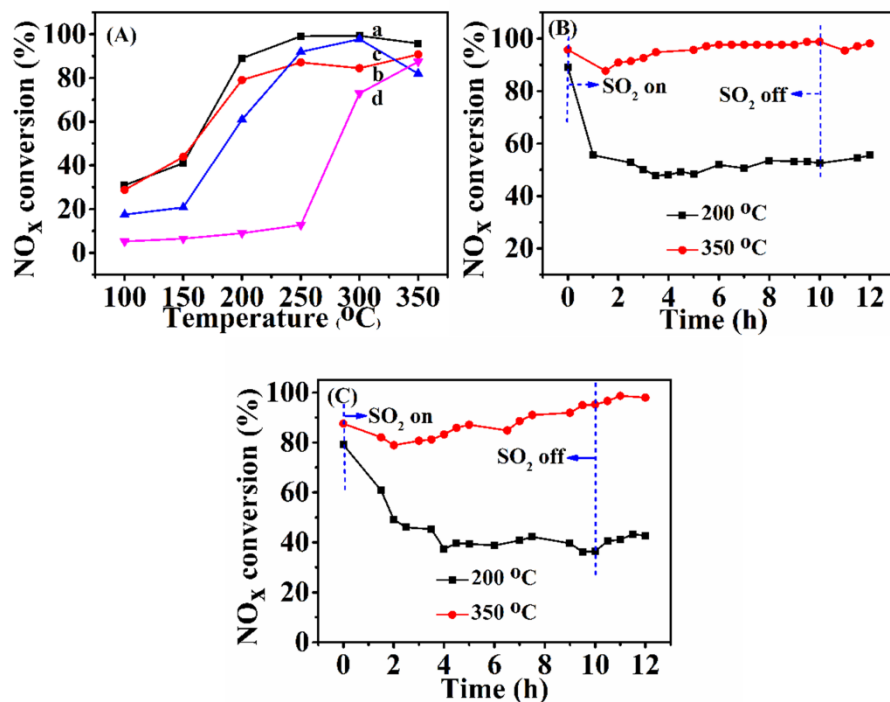


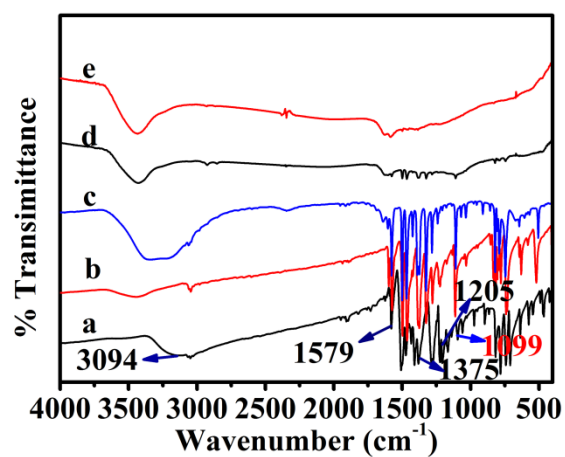
Fig. S2 NH<sub>3</sub>-SCR activity of Cu-N-Gr, Co-N-Gr, Cu-N-AC and Co-N-AC.



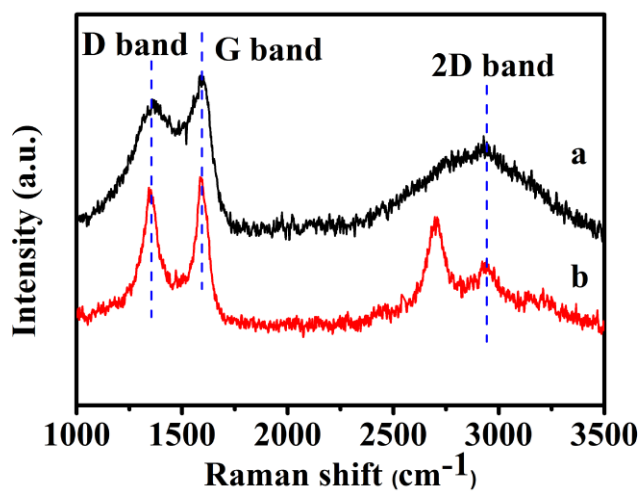
**Fig. S3** Influences of SO<sub>2</sub> on NO<sub>x</sub> conversion (A) (a) Cu@N-Gr-800 without SO<sub>2</sub>, (b) Co@N-Gr-800 without SO<sub>2</sub>, (c) Cu@N-Gr-800 with SO<sub>2</sub>, (d) Co@N-Gr-800 with SO<sub>2</sub> at different temperature (B) Cu@N-Gr-800 and (C) Co@N-Gr-800 at 200 °C and 350 °C for different reaction time.

**Table S1** The textural properties of Cu@N-Gr-800 and Co@N-Gr-800

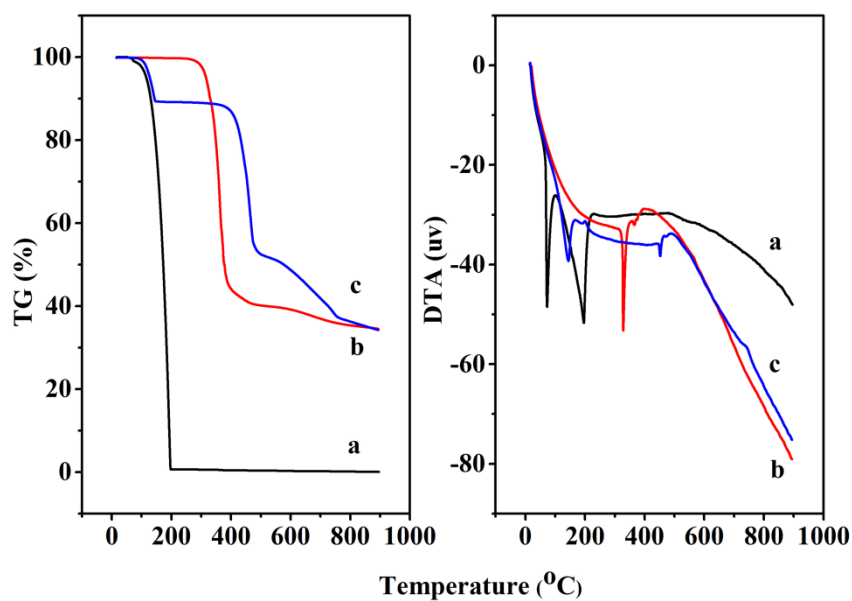
Sample	Surface area (m <sup>2</sup> /g)	Average pore diameter (nm)
Cu@N-Gr-800	<5	4.1
Co@N-Gr-800	174	4.2



**Fig. S4** FT-IR spectra of (a) 8-Q, (b) Cu-8-Q, (c) Co-8-Q, (d) Cu@N-Gr-800 and (e) Co@N-Gr-800



**Fig. S5** Raman spectra of (a) Cu@N-Gr-800 and (b) Co@N-Gr-800.

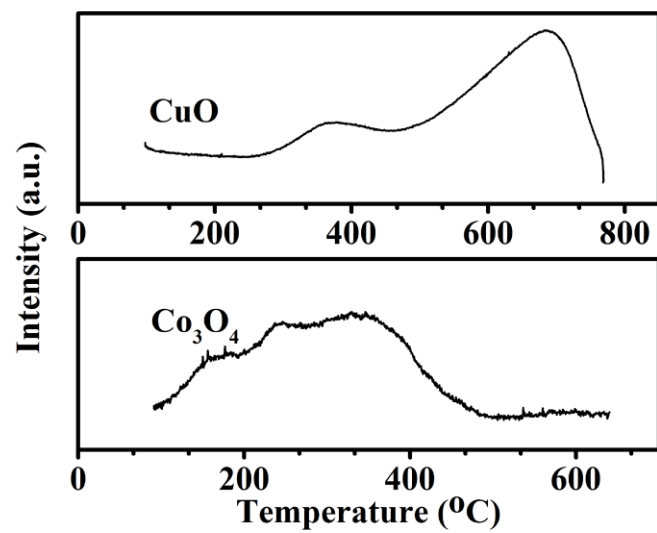


**Fig. S6** TG/DTA curves of (a) 8-Q, (b) Cu-8-Q and (c) Co-8-Q

The contents of C, H, N, Cu and Co were measured by carbon hydrogen nitrogen elements analysis instrument and ICP-AES. The contents of C, H, N, Cu and Co are as follows.

Found for Cu-8-Q: C, 61.24%; H, 3.80; N, 7.90; Cu, 17.65%. Calc. for  $C_{18}H_{14}N_2O_2Cu$ : C, 60.96%; H, 3.95; N, 7.90; Cu, 18.06%.

Found for Co-8-Q: C, 61.69%; H, 3.96; N, 7.95; Co, 16.50%. Calc. for  $C_{18}H_{14}N_2O_2Co$ : C, 61.83%; H, 4.0; N, 8.02; Co, 16.89%.



**Fig. S7**  $\text{NH}_3$ -TPD of  $\text{CuO}$  and  $\text{Co}_3\text{O}_4$ .