Supplementary Material

Facile synthesized Cu_2O nanoparticles for efficient electrocatalytic nitrate reduction to ammonia in ultralow nitrate concentration

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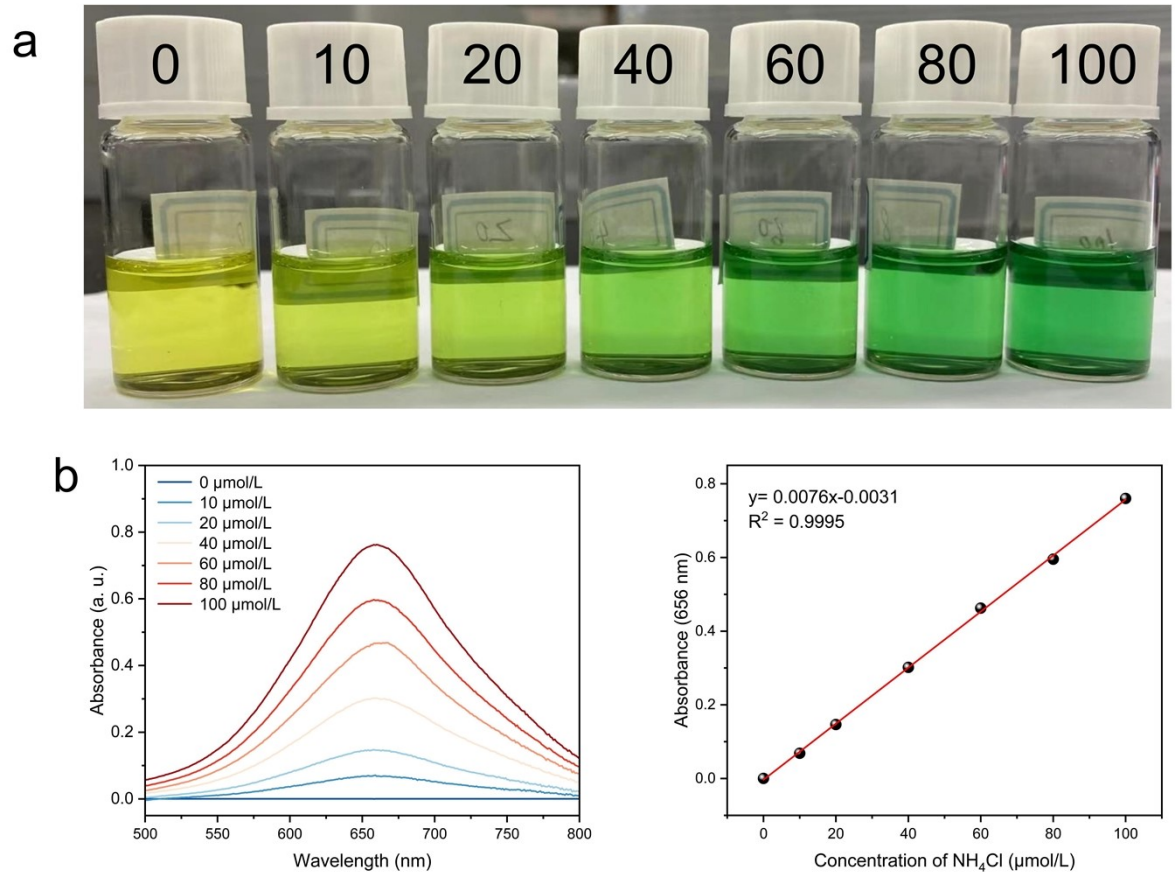

Fig. S1 (a) Ammonium chloride solutions of different concentrations; (b) UV spectrum and (c) standard calibration curve fitted to the absorption intensity at 656 nm.

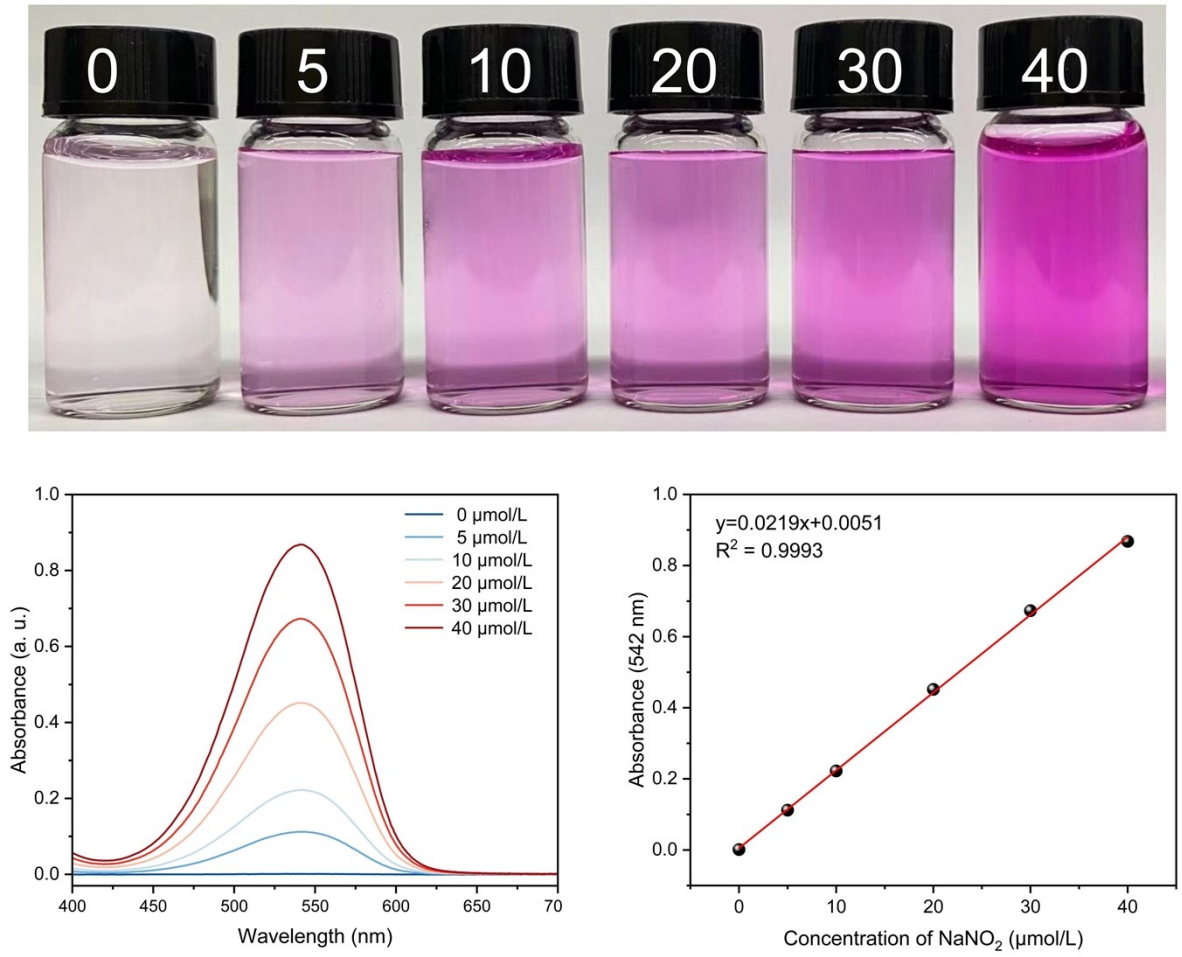

Fig. S2 (a) Sodium nitrite solutions of different concentrations; (b) UV spectrum and (c) standard calibration curve fitted to the absorption intensity at 542 nm.

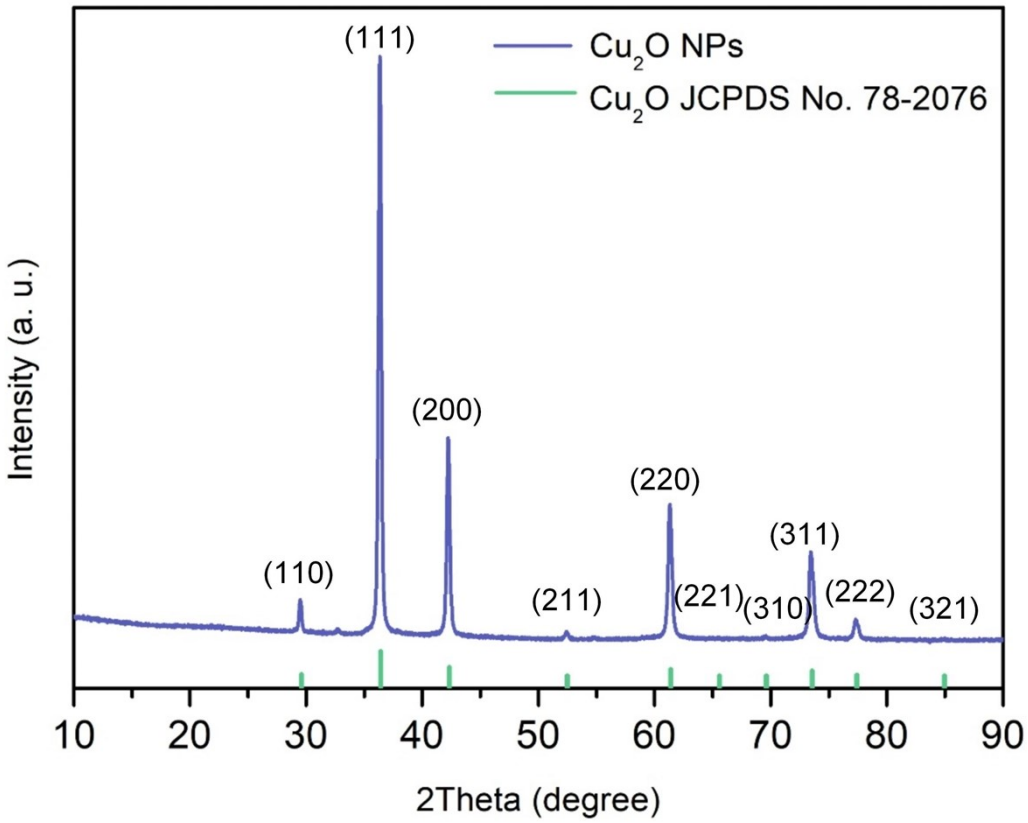

Fig. S3 XRD pattern of Cu_2O NPs.

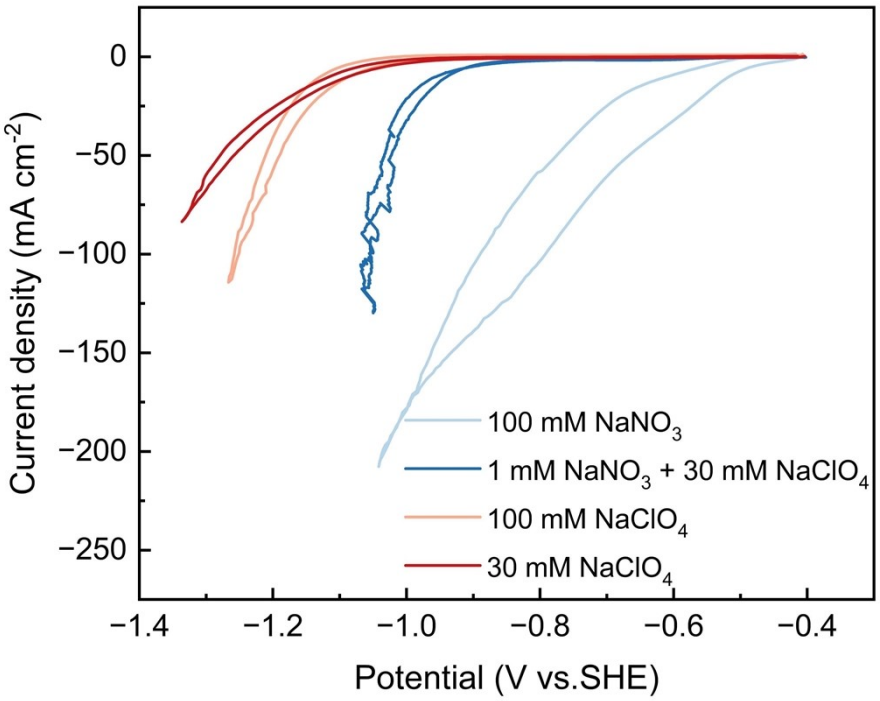

Fig. S4 Comparison of CV curves of Cu_2O NPs in different electrolytes.

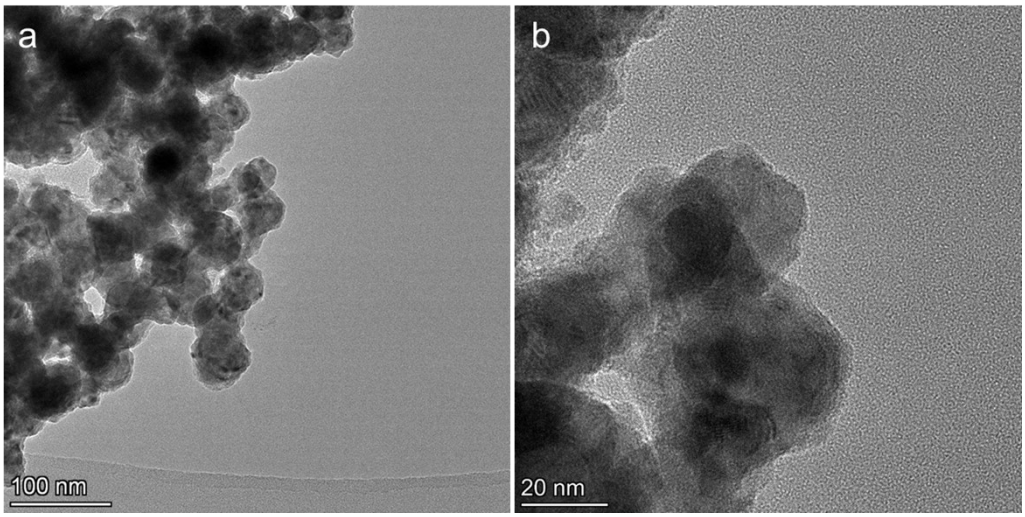

Fig. S5 TEM images of Cu_2O NPs after NO_3RR.

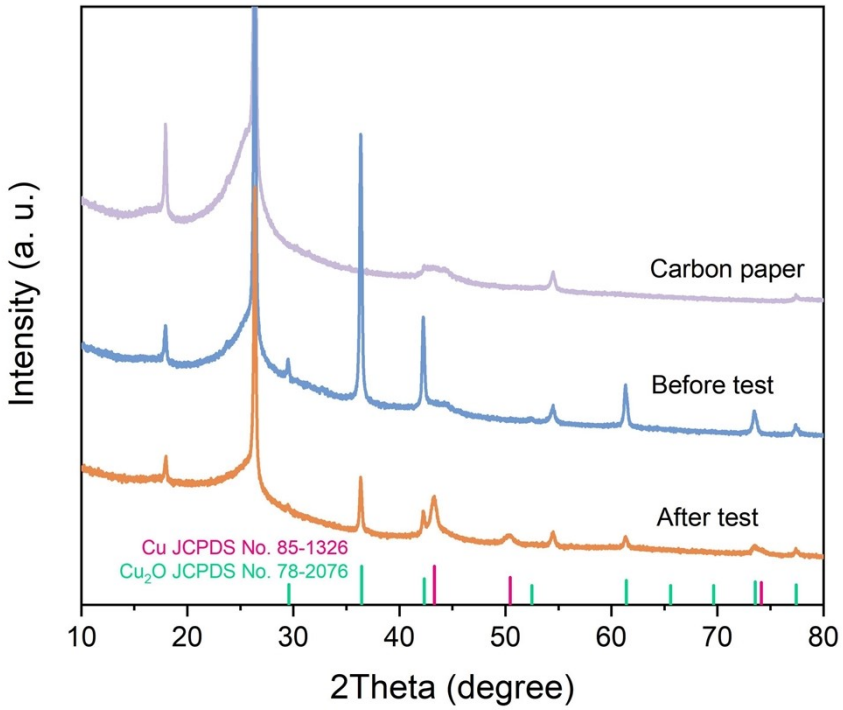

Fig. S6 XRD patterns of Cu_2O NPs after NO_3RR.

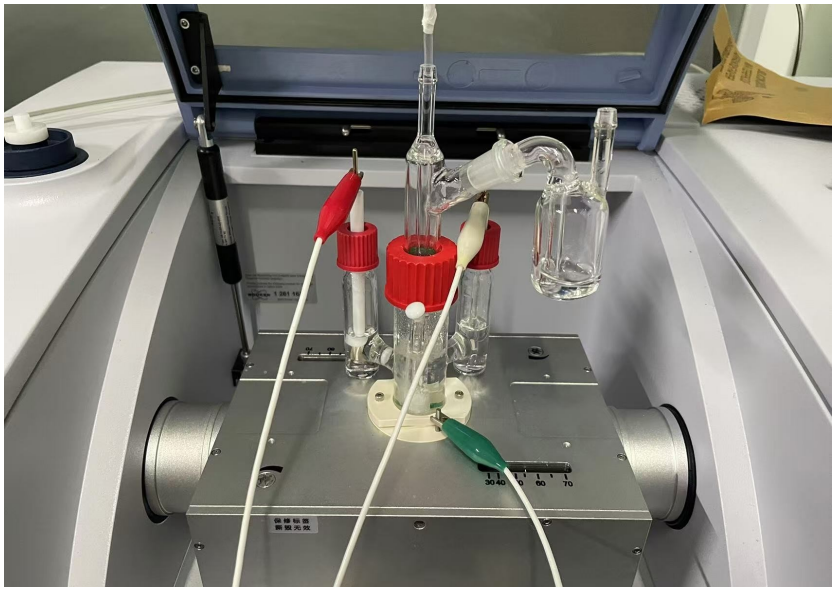

Fig. S7 In-situ FTIR characterization of NO_3RR.

Table. S1 Comparison of performance of Cu-based catalysts.

Catalyst	electrolytes	FE of NH_3	j_{NH3} （$mA^{-1}cm^2$）	NH_3 yield （$mmol\ cm^{-2}\ h^{-1}$）	Reference
Cu_2O NPs	0.1 M $NaNO_3$	95.74%	151	0.71 (-1.0 vs. SHE)	**This work**
p-CuNi@NF	0.1 M KOH + 0.01 M KNO_3	97.50%	101	0.47 (-1.37 vs. SHE)	1
OD-Cu cubes	0.1 M PBS + 0.1 M KNO_3	93.88%	48	0.22 (-1.32 vs. SHE)	2
CuCo alloy	1 M KOH + 0.1 M KNO_3	80%	90	0.25 (-1.1 vs. SHE)	3
Cu/Cu_xO/GDY	1.0 M KOH 0.1 M KNO_3	99.80%	290	1.50 (-1.6 vs. SHE)	4
Cu nanosheets	1 M KOH + 0.2 M KNO_3	82%	665	1.41 (-1.39 vs. SHE)	5
$Cu_{50}Ni_{50}$	1 M KOH + 0.1 M KNO_3	95%	85	———	6
Rh@Cu–0.6%	0.1 M Na_2SO_4 + 0.1 M KNO_3	93%	162	0.79 (-0.88 vs. SHE)	7
Cu_2O+Co_3O_4	0.1 M NaOH + 0.1 M $NaNO_3$	85.40%	135	0.75 (-1.07 vs. SHE)	8
CuCoSP	0.1 M KOH + 0.1 M KNO_3	90.60%	250	1.17 (-0.94 vs. SHE)	9
Cu-N-C SAC	0.1 M KOH + 0.1 M KNO_3	84.70%	85	0.27 (-1.77 vs. SHE)	10
FOSP-Cu-0.1	0.5 M Na_2SO_4 + 0.1 M KNO_3	93.90%	22	0.1 (-0.68 vs. SHE)	11
BCN@Cu	0.1 M KOH + 0.1 M KNO_3	88.90%	98	0.46 (-1.37 vs. SHE)	12

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