

A copper single-atom catalyst towards efficient and durable oxygen reduction for fuel cells

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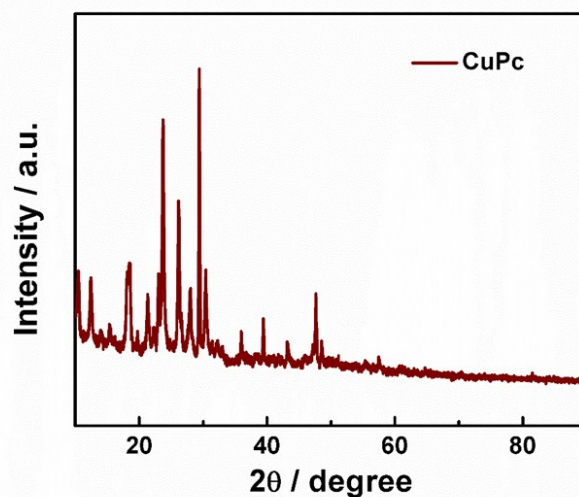


Fig. S1 XRD pattern of Cu phthalocyanine.

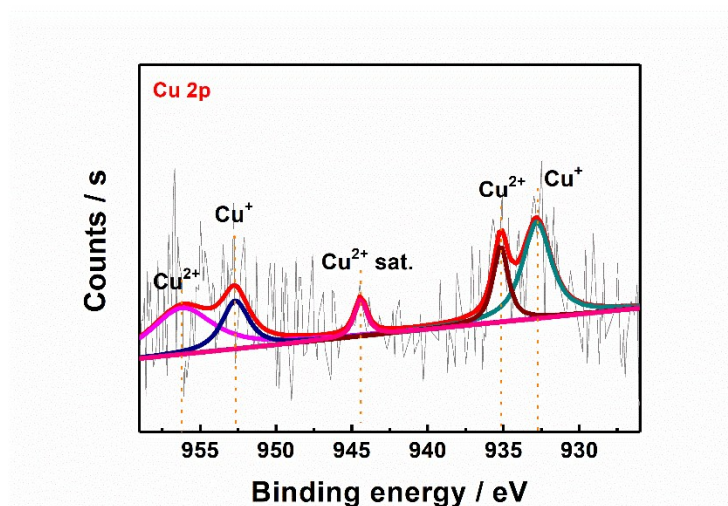


Fig. S2 XPS spectra of Cu SAC.

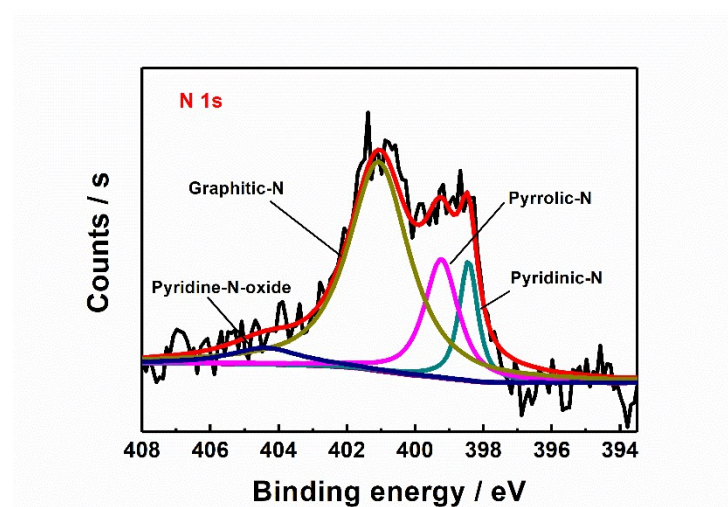


Fig. S3 N 1s XPS spectrum of Cu SAC.

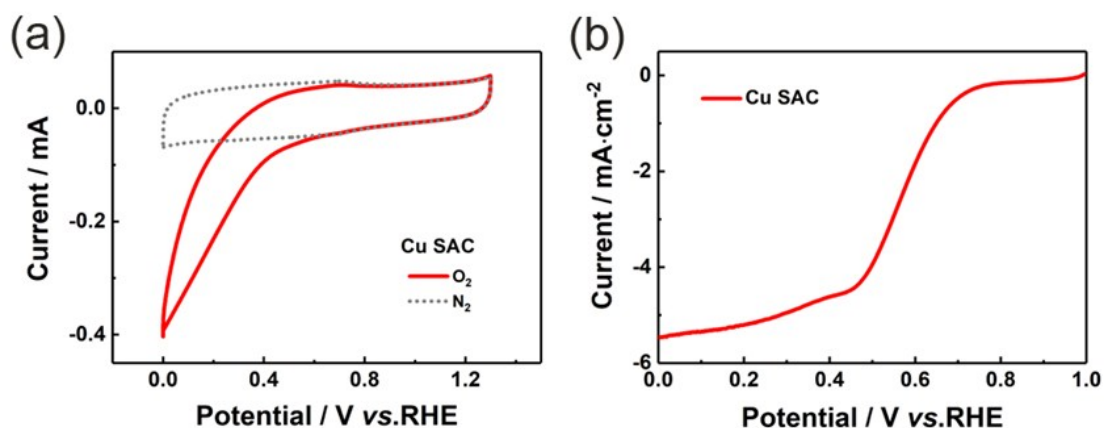


Fig. S4 (a) CV curves of Cu SAC in nitrogen or oxygen saturated 0.1 mol L⁻¹ HClO₄ solution at a scan rate of 50 mV s⁻¹. (b) Corresponding LSV curve in oxygen saturated 0.1 mol L⁻¹ HClO₄ solution at a scan rate of 10 mV s⁻¹ and a stirring rate of 1600 rpm.

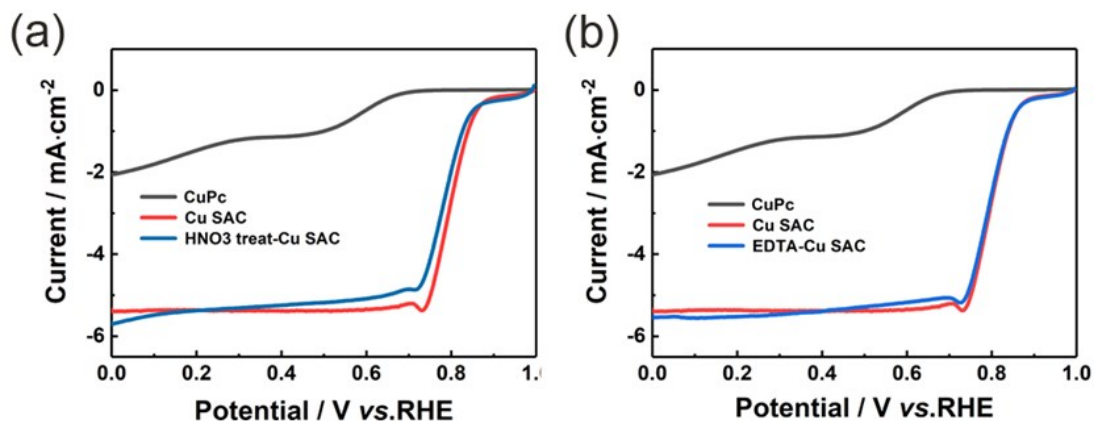


Fig. S5 LSV curves of Cu SAC compared with CuPc and Cu SAC after (a) HNO₃ treatment and (b) EDTA treatment from the RRDE test at a scan rate of 10 mV s⁻¹ and a rotating speed of 1600 rpm.

Table S1. The turnover frequencies (TOF) of Cu SAC and Pt/C at different potentials.

Potential (V vs. RHE)	Cu SAC (s ⁻¹)	Pt/C (s ⁻¹)
0.80	1.03	0.46
0.85	0.11	0.24