Supporting Information

Copper Decorated Nanoporous Gold by Galvanic Displacement as an Efficient Electrocatalyst for the Electrochemical Reduction of CO_2

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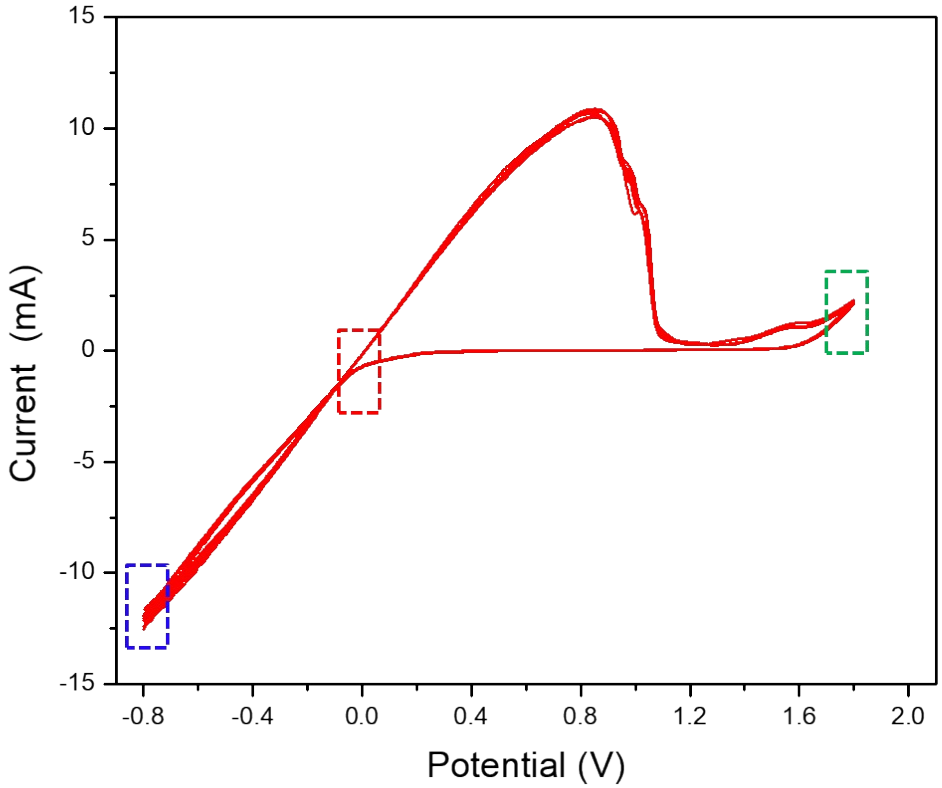

Fig. S1 Cyclic voltammetry curves of a gold wire in $ZnCl_2$/ethylene glycol electrolyte at 110°C. Scan rate: 10 mV s^{-1}.

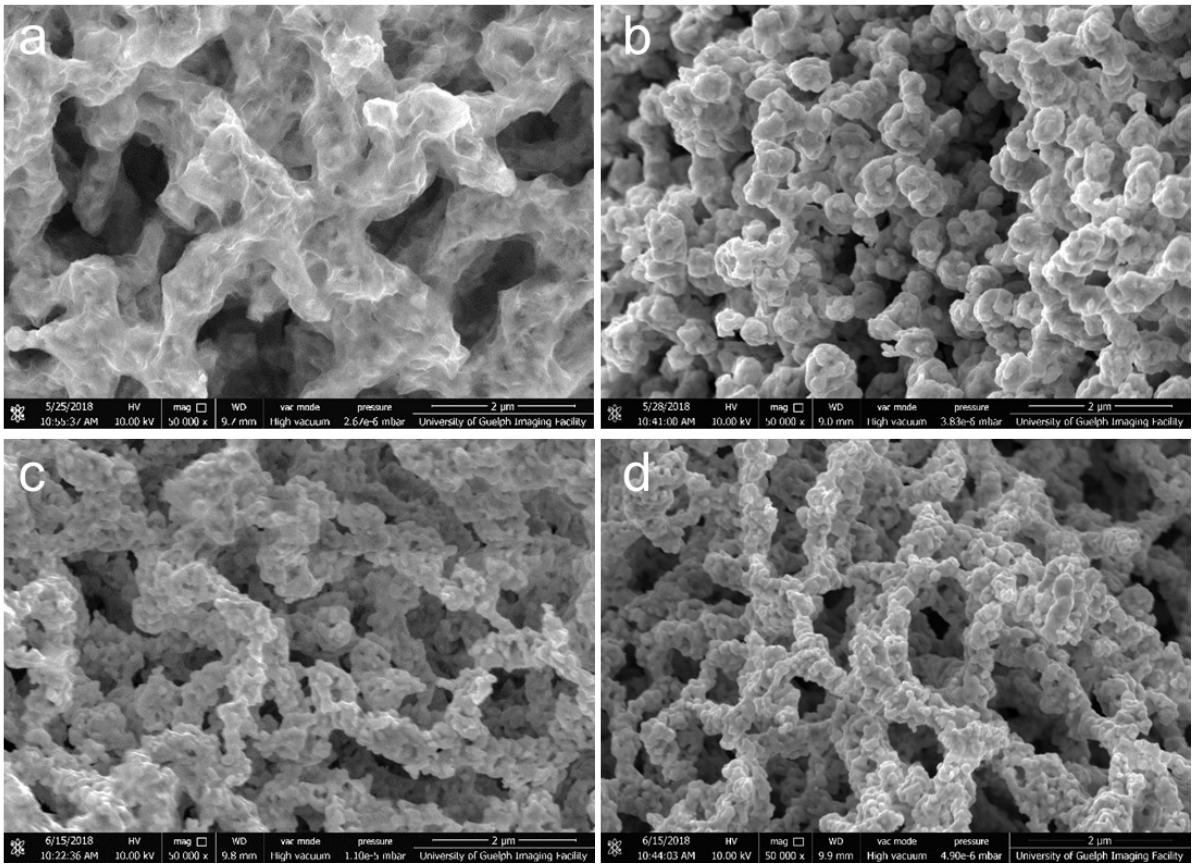

Fig. S2 SEM images of nanoporous gold with the electrode potential stopped at (a, b) -0.80 V and (c, d) +1.8 V (vs. Zn) prior to (a, c) and following (b, d) immersion in a 0.5 M Cu(II) solution for 24 h.

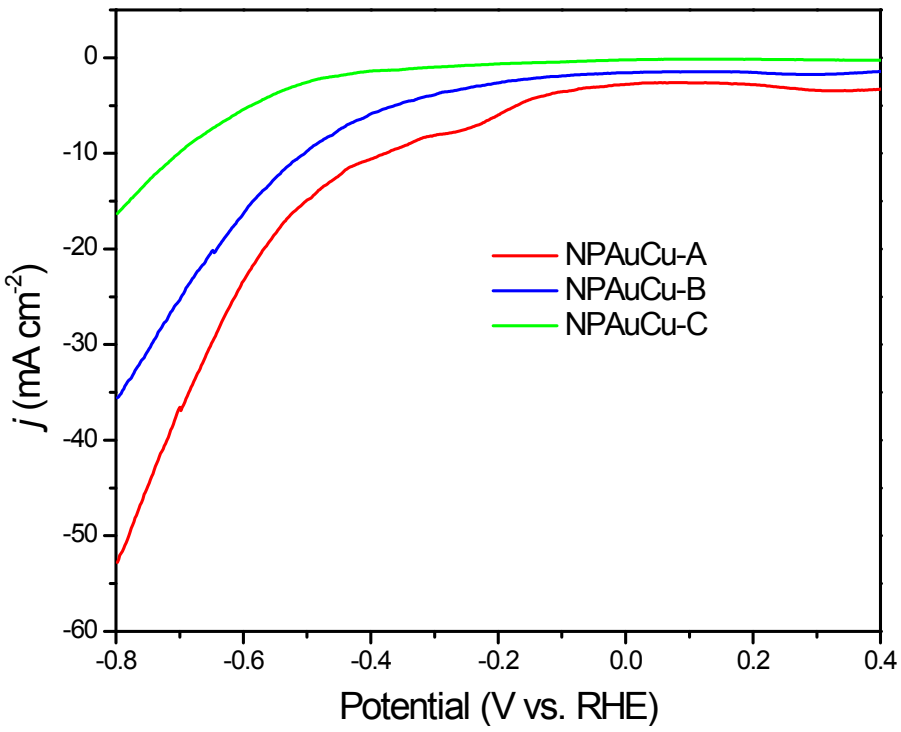

Fig. S3 LSV curves of NPAuCu electrodes in a CO_2 saturated $NaHCO_3$ solution (0.1 M), where the NPAu electrodes were fabricated by stopping at 0.0 V (red curve), -0.80 V (blue curve), +1.80 V (green curve) during the electrochemical alloying/dealloying process. Scan rate: 20 mV s^{-1}.

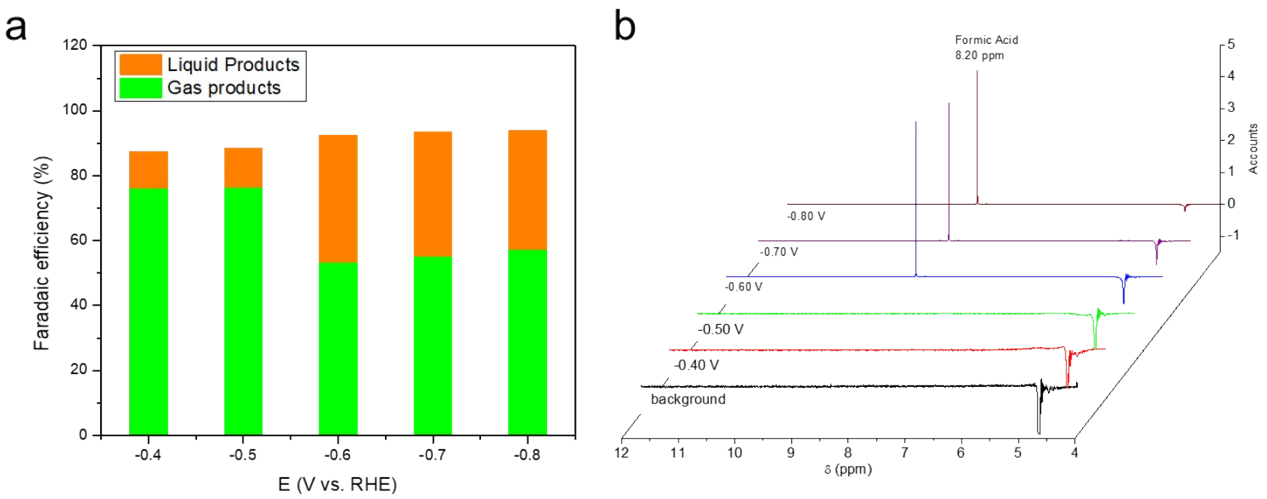

Fig. S4 (a) FEs for gas and liquid products under various cathodic potentials at the NPAuCu-A electrode. (b) ^{1}H NMR spectra for liquid product analysis. The CO_2 saturated $NaHCO_3$ solution without the application of cathodic potential was analyzed as the control (black curve).

Table S1 The amount of zinc on the surfaces of the different NPAuZn electrodes obtained by ICP-OES.

Electrode	Zn Amount (nmol)
NPAuZn-A	1657.52±584.05
NPAuZn-B	1191.01±133.11
NPAuZn-C	5.48±2.88

Table S2 The integrated charge and quantity of copper for the different NPAuCu electrodes.

Electrode	1st scan		2nd Scan	
	Q (mC)	n (nmol)	Q (μC)	n (nmol)
NPAuCu-A	396 ±11.4	2052.0±59.1	80.4±10.4	0.42±0.05
NPAuCu-B	171 ± 26.9	886.0±139.0	45.87±6.88	0.24±0.03
NPAuCu-C	0.668 ± 0.101	3.5±0.5	3.561±0.534	0.0018 ±0.0003