

## Electronic Supplementary Information

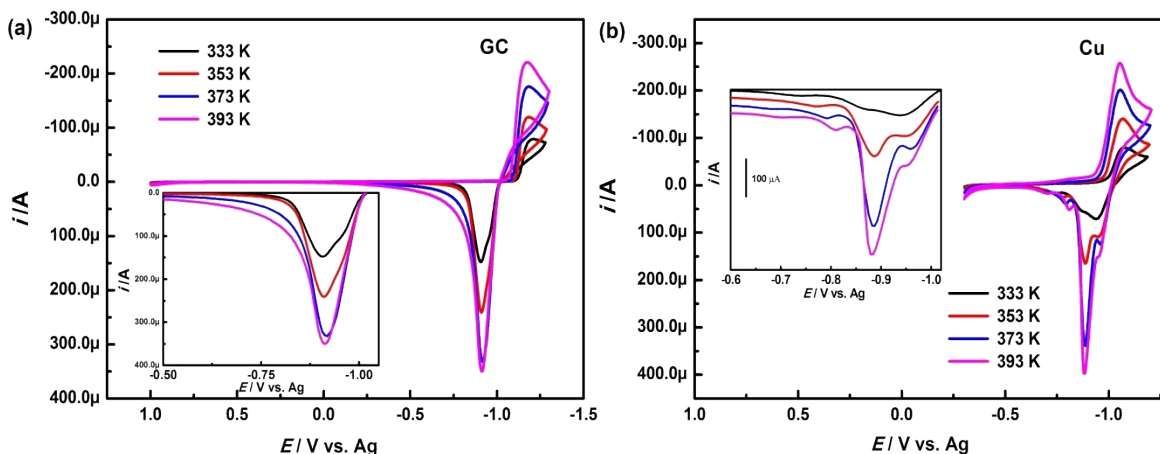


Fig. S1 Comparison of CVs for zinc deposition and stripping recorded at (a) glassy carbon (GC) and (b) copper electrodes from 0.1 M ZnO/ChCl-urea eutectic melt at various temperatures with a scan rate of 0.02 V s<sup>-1</sup>. Inset shows an enlarge vision of the corresponding anodic stripping region.

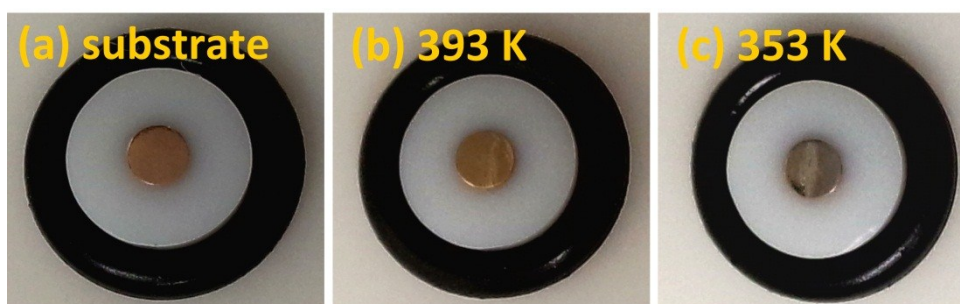


Fig. S2 Optical photographs. Front views of the top surface of copper electrodes ( $\Phi$  2 mm) before (a) and after a single CV measurement at (b) 393 K and (c) 353 K.

Table S1 Effect of temperature on the charge passed during the cathodic deposition process  $Q_c$ , the anodic stripping process,  $Q_a$ , and  $Q_a/Q_c$  recorded at GC and Cu electrodes, respectively, taken from CVs in Fig. S1.

Temperature/K	$Q_c/10^3 C^{Cu}$	$Q_a/10^3 C^{Cu}$	$Q_c/10^3 C^{GC}$	$Q_a/10^3 C^{GC}$	$ Q_a/Q_c ^{Cu}$	$ Q_a/Q_c ^{GC}$
333	-1.022	0.742	-0.813	0.752	72.60	92.50
353	-1.720	1.210	-1.587	1.440	70.35	90.74
373	-2.543	1.663	-2.558	2.229	65.40	87.14
393	-3.373	1.918	-3.139	2.567	56.86	81.78

Table S2 Mean  $\pm$  one standard deviation (SD) values of roughness and peak-to-valley height of the samples prepared at different conditions using atomic force microscopy (AFM)

Current density /mA cm <sup>-2</sup>	Deposition temperature /K	Dealloying temperature /K	Charge density /C cm <sup>-2</sup>	Mean roughness /nm	Mean peak-to-valley height /nm
1.0	393	393	1.25	50.2 $\pm$ 4.5	237 $\pm$ 22
1.0	393	373	1.25	48.3 $\pm$ 2.7	226 $\pm$ 21
1.0	393	353	1.25	45.2 $\pm$ 2.1	221 $\pm$ 18
0.75	393	393	1.25	50.7 $\pm$ 4.1	326 $\pm$ 23
0.50	393	393	1.25	53.2 $\pm$ 4.8	393 $\pm$ 26
1.0	393	393	0.625	36.7 $\pm$ 3.1	203 $\pm$ 19
1.0	393	393	2.50	80.6 $\pm$ 6.5	405 $\pm$ 28
1.0	373	393	1.25	48.1 $\pm$ 2.0	201 $\pm$ 12
1.0	353	393	1.25	25.2 $\pm$ 2.2	158 $\pm$ 10