Electronic Supplementary information (ESI)

An eco-friendly electrolyte additive for high-power primary aqueous Mg-air batteries

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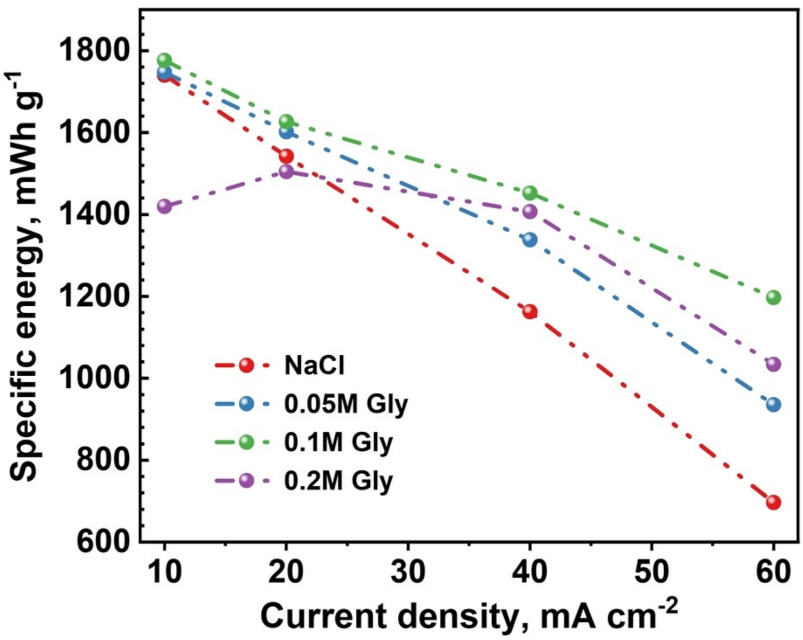

Fig. S1. Specific energy density for AZ31 alloys in different electrolytes.

Table S1. Comparison of the discharge performance of several Mg-based materials for Mg-air batteries.

Magnesium anode	Current density ($mA\ cm^{-2}$)	Average voltage (V)	Anodic efficiency (%)	Power density ($mW\ cm^{-2}$)	Refs.
AZ31 in NaCl+0.1M Gly	40	1.02	63.86	40.72	
	60	0.81	65.94	48.6	This work
T6 treated Mg-Gd-Zn	40	0.91	57.22	36.4	
T4 treated Mg-Gd-Zn	40	0.76	56.81	30.4	
As-cast Mg-Gd-Zn	40	0.79	53.92	31.6	1
Extruded Mg-Sn-Zn-Ca	40	0.438	57.72	17.52	2
As-cast Mg-10Zn-Y	40	0.98	47.5	39.2	
As-cast Mg-6Zn-Y	40	1.01	55.14	40.4	3
Mg-2Zn-0.1Ca	50	0.75	49.1	37.5	4
Hot-rolled MAT61 (Mg-6Al-Sn)	60	0.74	54	44.4	5
As-rolled AZ31	40	0.78	60.9	31.2	
As-rolled LAZ831 (Mg-8Li-3Al-1Zn-0.2Y)	40	0.85	60.8	34.0	
As-rolled LAZ1131 (Mg-11Li-3Al-1Zn-0.2Y)	40	0.91	62.1	36.4	6
As-extruded Mg-1.5Ca	40	0.908	----	36.32	7
As-extruded Mg-2Zn-La	40	0.98	55.0	39.2	8

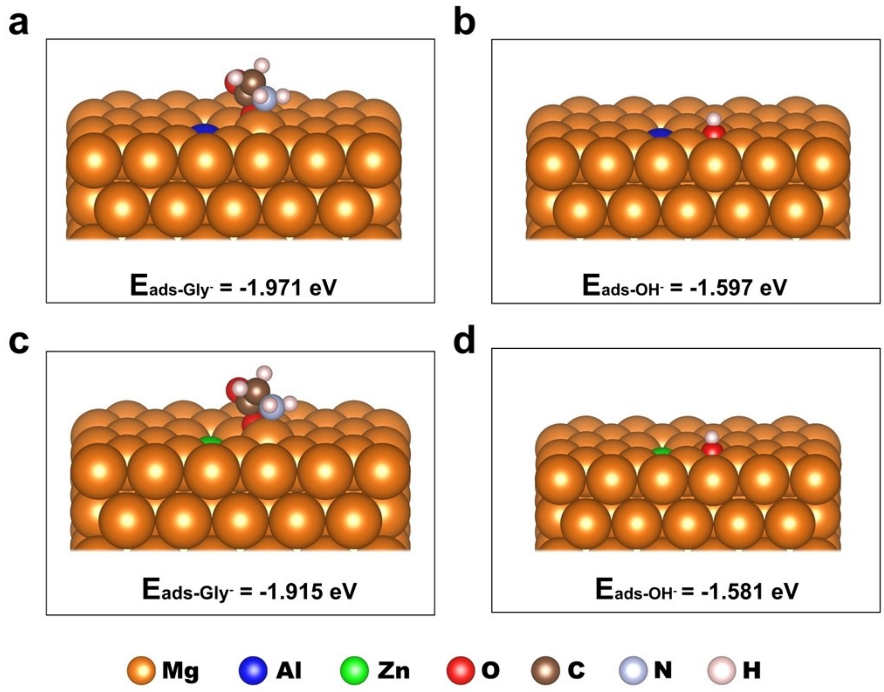

Fig. S2. (a-d) Adsorption energy of OH^- and Gly^- molecules on Al-dopant Mg and Zn-dopant Mg surfaces as well as corresponding adsorption modes.

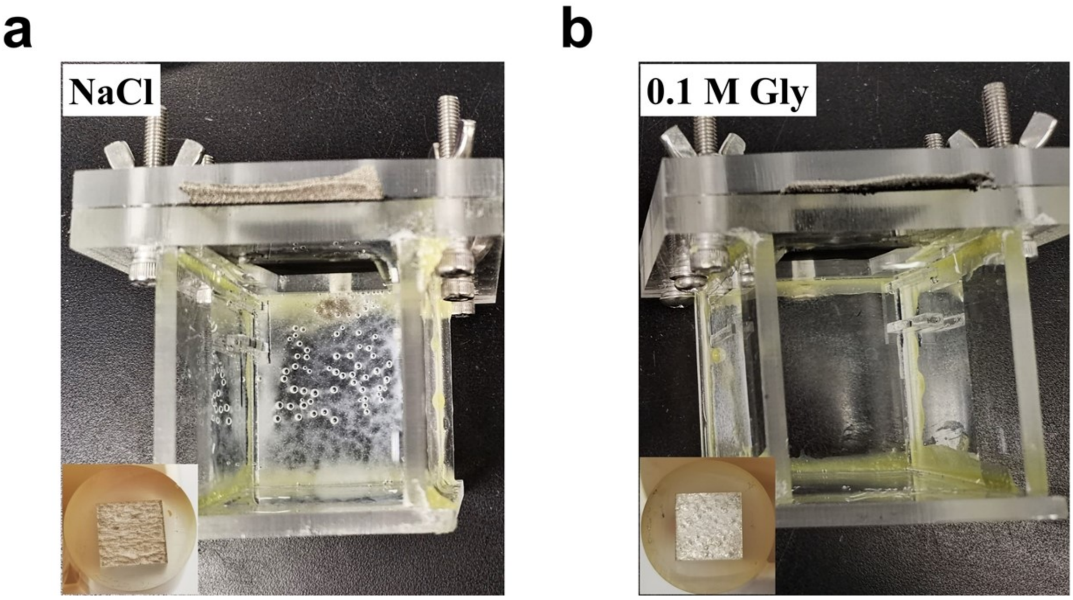

Fig. S3. (a-b) the corrosion products in the electrolytic cell after 5 mA cm^{-2} discharged for 10h using different electrolytes.

Table S2. The changes of pH value after discharge at high current densities.

pH	40 mA cm^{-2}	60 mA cm^{-2}
NaCl	10.5 (±0.1)	10.9 (±0.1)
0.1 M	9.5 (±0.1)	10.0 (±0.1)

References

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