SUPPLEMENTARY INFORMATION
for

Development of Zn-Mg-Ca Biodegradable Dual-Phase Alloys

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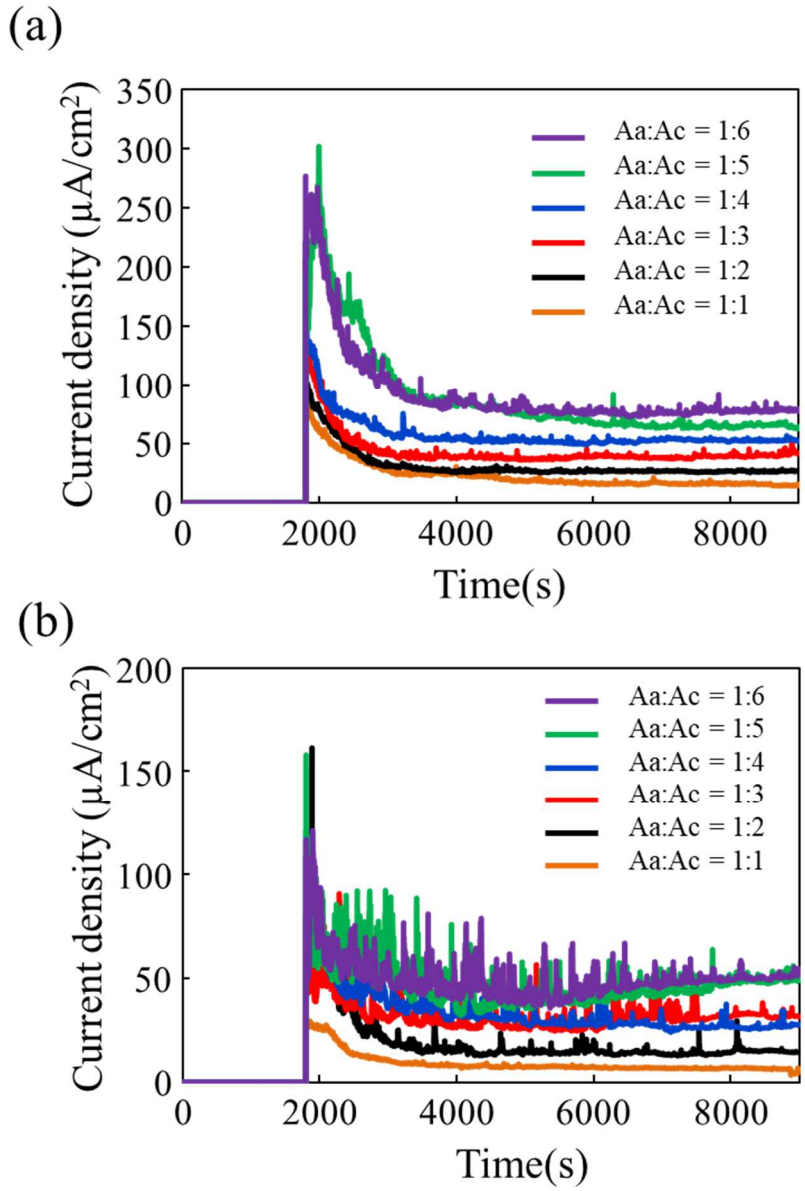
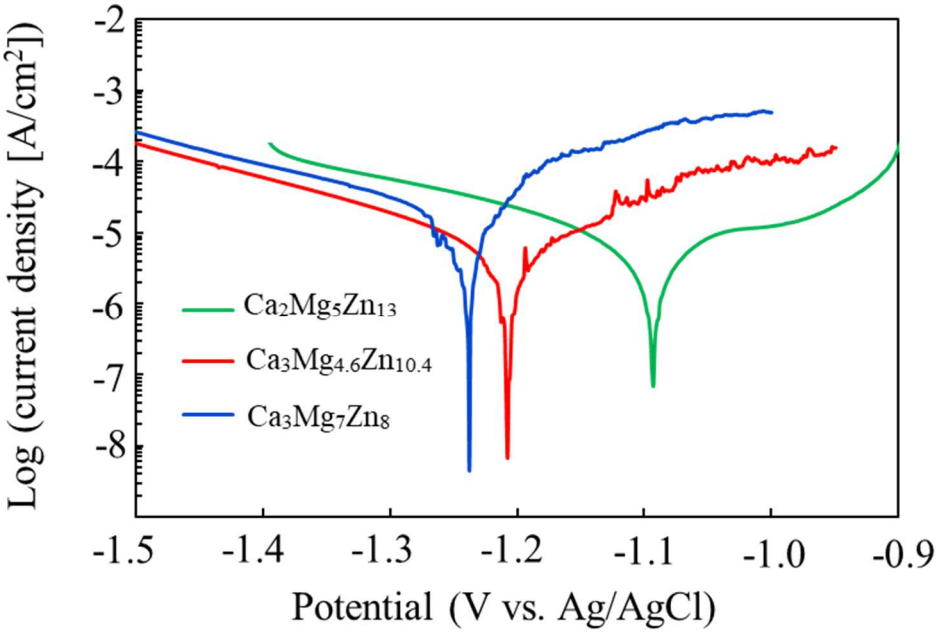


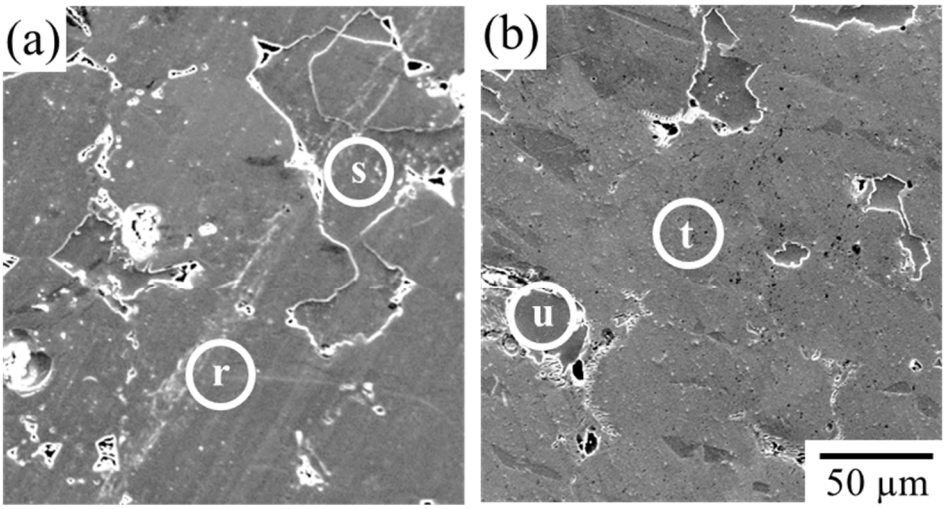
Supplementary Figure S1

Typical variations in current densities measured between the anodic IM3-$Ca_2Mg_5Zn_{13}$ phase and cathodic IM1 phase with composition of $Ca_3Mg_7Zn_8$ and (b) $Ca_3Mg_{4.6}Zn_{10.4}$, depending on the area fraction of cathodic IM1 phase electrode with respect to anodic IM3 phase.



Supplementary Figure S2

The polarization curves of the IM3-$Ca_2Mg_5Zn_{13}$, IM1-$Ca_3Mg_7Zn_8$ and IM1-$Ca_3Mg_{4.6}Zn_{10.4}$ phases, used for the evaluation of the galvanic current density shown in Supplementary Figure S1.



(c)

	Sample I		Sample J	
	r	s	t	u
Ca	9.5	13.8	9.6	13.4
Mg	19.2	24.5	17.5	19.9
Zn	71.3	61.7	72.9	66.7
phase	IM3	IM1	IM3	IM1

Supplementary Figure S3

(a, b) SEM images showing the microstructures in the prepared alloys: (a) Sample I and (b) Sample J. (c) Compositions in at.% examined by SEM-EDS at the points indicated in Figure S3(a, b) and the expected constituent phases in the alloys.

Supplementary Table S1

Composition of the Hanks' balanced salt solution used in this study (Gibco, US, No.14025).

Reagents	mg/L	mM
$CaCl_2$ (anhydrous)	140	1.261
$MgCl_2$-$6H_2O$	100	0.4926
$MgSO_4$-$7H_2O$	100	0.4065
KCl	400	5.333
KH_2PO_4	60	0.4412
$NaHCO_3$	350	4.167
NaCl	8000	137.93
Na_2HPO_4 (anhydrous)	48	0.3380
D-Glucose	1000	5.556