Supporting Information (SI†)

Multipurpose surface functionalization on AZ31 magnesium alloy by atomic layer deposition: tailoring the corrosion resistant and electrical performance

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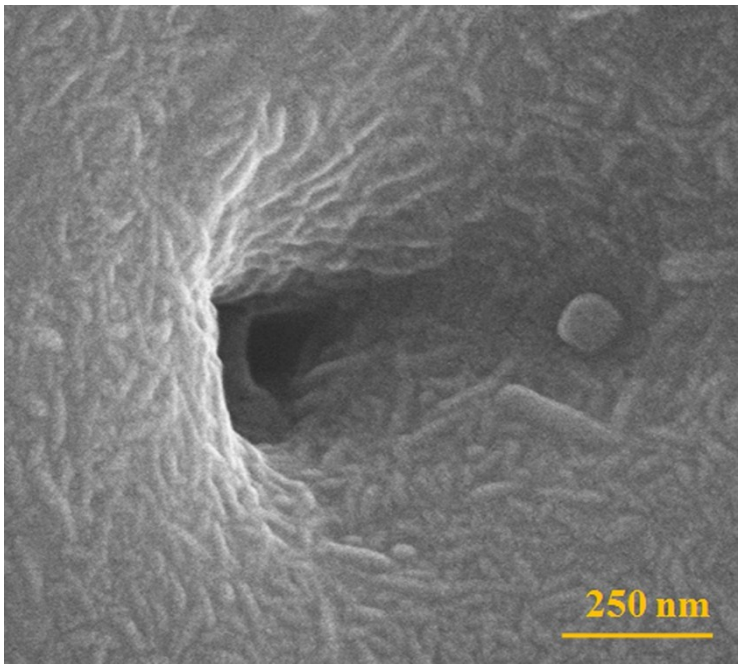

Figure S1. Surface morphologies of PEO/AZO coating on AZ31 magnesium alloy.

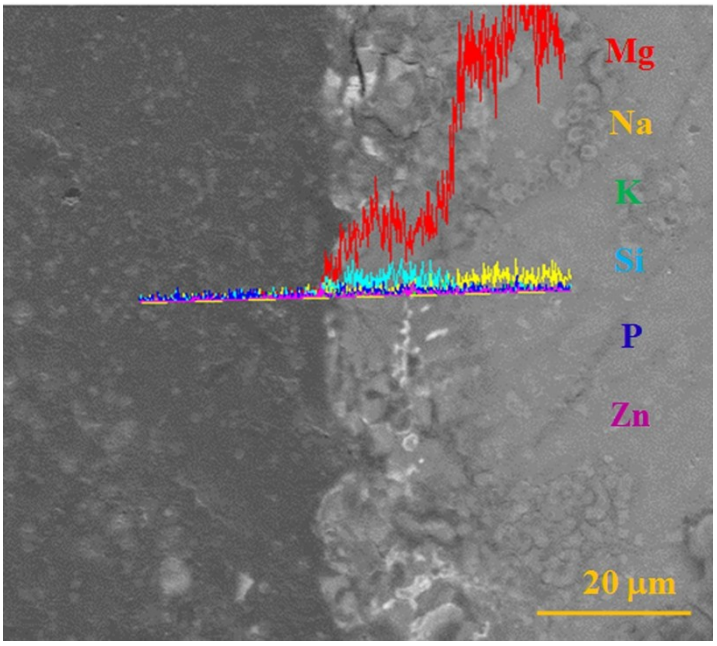

Figure S2. Cross-section morphologies of PEO/AZO coating on AZ31 magnesium alloy.

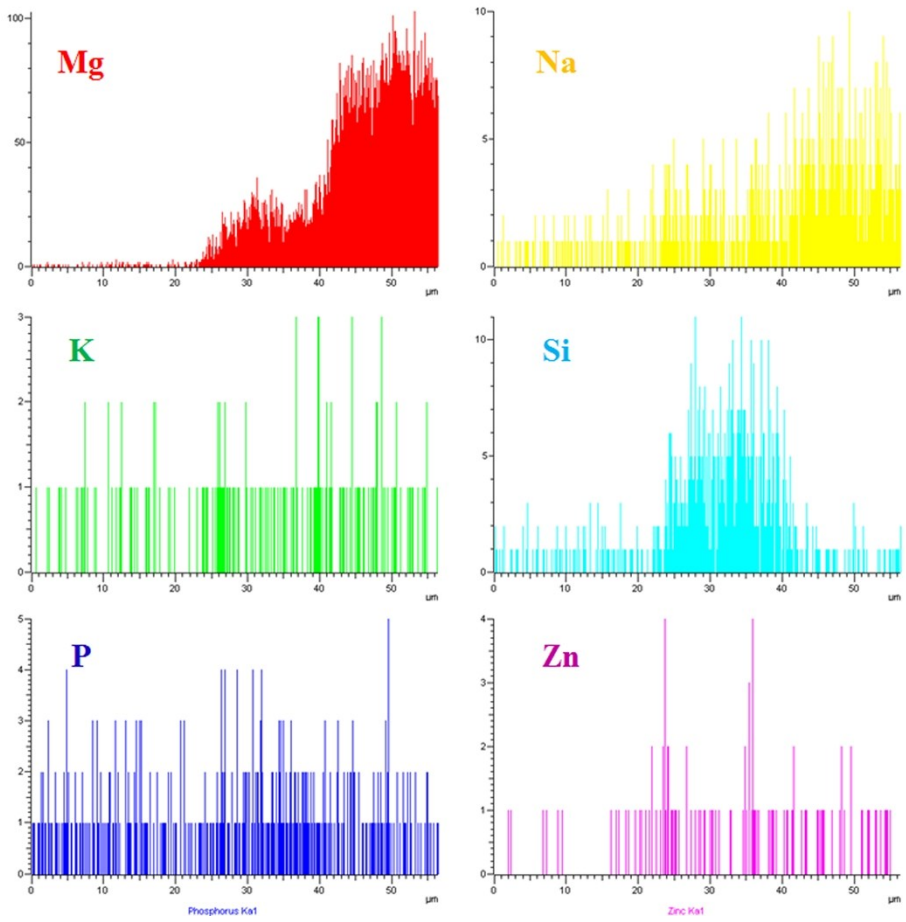

Figure S3. EDS line scanning analysis for corresponding elements of PEO/AZO coating on AZ31 magnesium alloy.

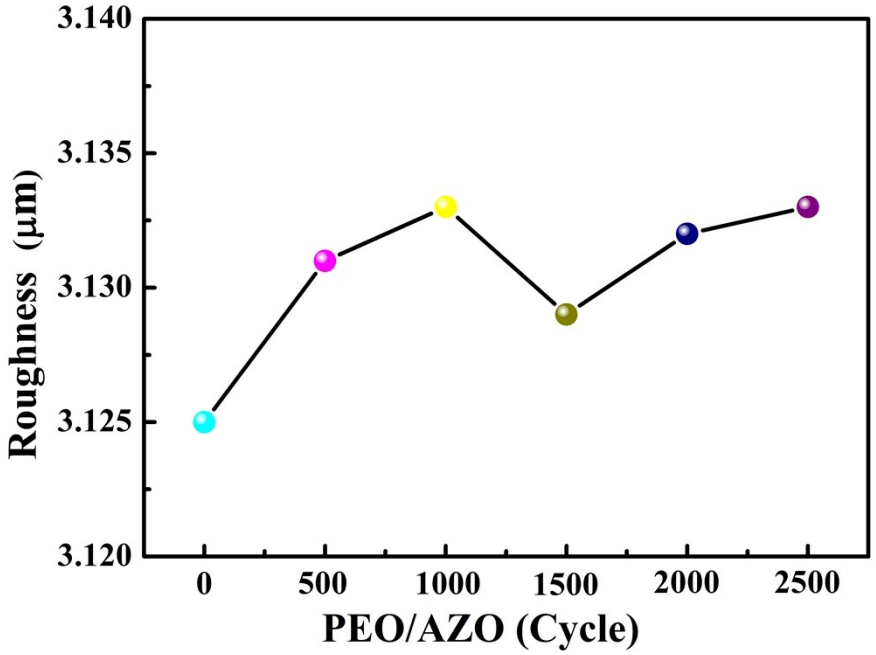

Figure S4. The roughness RMS values for PEO/AZO films with different ALD cycles.

Table S1. Results of potentiodynamic corrosion tests of different samples in 3.5% NaCl solution.

Sample	E_{corr}(V)	i_{corr} (A/cm^2)
Mg Alloy	-1.561	3.16×10^{-4}
PEO	-1.343	1.45×10^{-7}
PEO/AZO	-0.550	1.36×10^{-6}

Table S2. Comparison of additional component, corrosion resistant and electrical conductivity of surface functionalization method between literature and this work.

Work	Additional component	Corrosion resistant		Electrical conductivity
		E_{corr}(V)	i_{corr} (A/cm^2)	
L. White et al[25]	TiO_2	−1.418	2.64×10^{-6}	Insulator
X. Lu et al[26]	SiO_2	−1.55	1.9×10^{-7}	Insulator
S. Stojadinovic et al[27]	ZnO	----	-----	Insulator
Our Work	Al doped ZnO	-0.550	1.36×10^{-6}	25 S/m

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26. X. Lu, C. Blawert, Y. Huang, H. Ovri, M. L. Zheludkevich and K. U. Kainer, *Electrochimi. Acta,* 2016, 187, 20-33.

27. S. Stojadinovic, N. Tadic, N. Radic, B. Grbic and R. Vasilic, *Surf. Coat. Tech.,* 2017, 310, 98-105.