materials

Article

Supplementary Materials: Metal Ions Supported Porous Coatings by Using AC Plasma Electrolytic Oxidation Processing

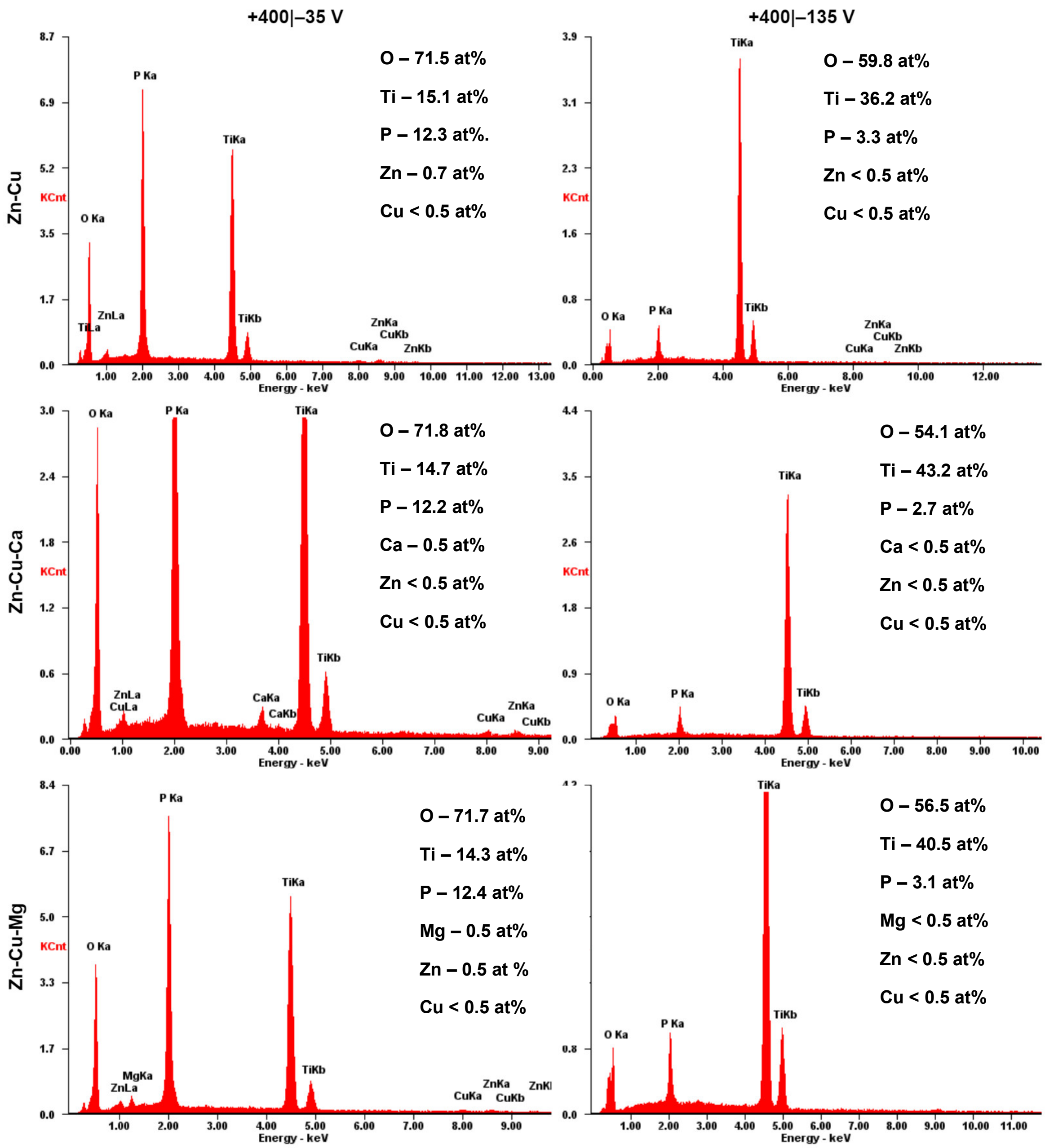

Figure S1. EDS spectra of coatings obtained at applied voltage of +400|–35 V and +400|–135 V.

Table S1. Results of XPS analysis of PEO coatings in atomic percentage.

Sample	Ca	Mg	Zn	Cu	Ti	P	O	N

TiZnCu-35	–	–	0.4	0.4	3.6	27.5	65.2	2.9
TiZnCu-135	–	–	0.4	0.4	4.9	27.8	64.4	2.1
TiZnCuCa-35	5.0	–	0.6	0.6	4.7	25.5	62.5	1.1
TiZnCuCa-135	5.4	–	0.5	0.4	4.5	23.7	63.8	1.7
TiZnCuMg-35	–	5.6	0.4	0.3	4.7	26.3	60.7	2.0
TiZnCuMg-135	–	6.5	0.4	0.4	6.1	25.0	59.9	1.7

Table S2. Maxima of binding energies (eV) of PEO coatings.

Sample	Ca $2p_{3/2}$	Mg 2s	Zn $2p_{3/2}$	Cu $2p_{3/2}$	Ti $2p_{3/2}$	P 2p	O 1s	N 1s
TiZnCu-35	–	–	1021.6	932,6	460.0	134.0	531.6	402.0
TiZnCu-135	–	–	1021.6	932.4	459.8	133.8	531.4	399.8
TiZnCuCa-35	347.6	–	1021.8	932.2	459.8	133.8	531.6	400.6
TiZnCuCa-135	346.8	–	1021.4	932.0	458.6	133.0	530.6	401.0
TiZnCuMg-35	–	89.2	1021.2	931.8	559.8	133.6	531.4	400.4
TiZnCuMg-135	–	89.0	1021.4	932.0	459.6	133.8	531.4	401.6

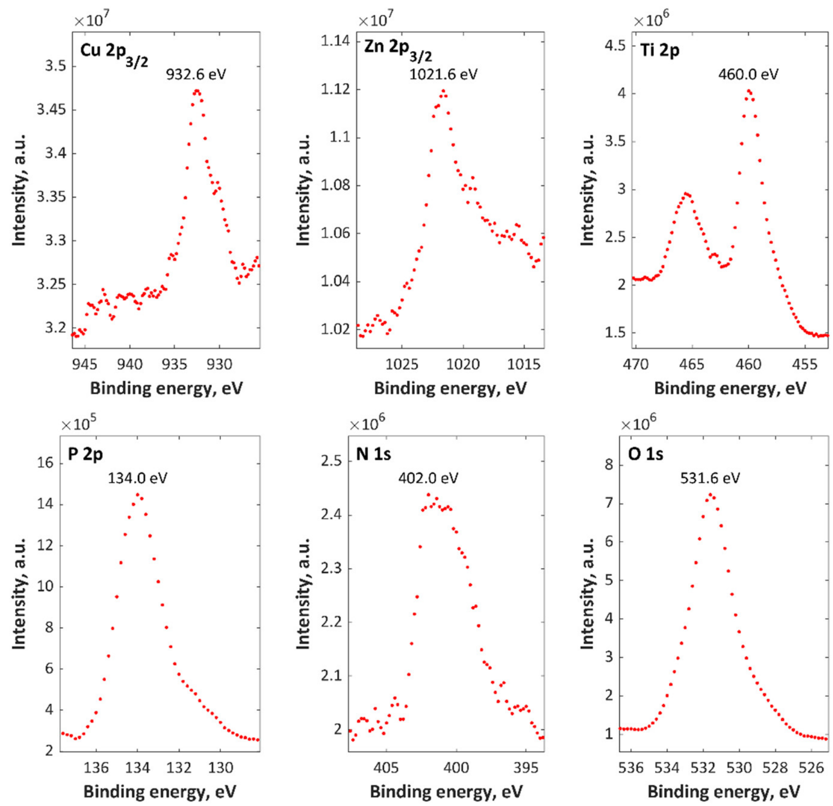

Figure S2. XPS spectra of coatings enriched in zinc and copper, obtained at applied voltage of +400|−35 V.

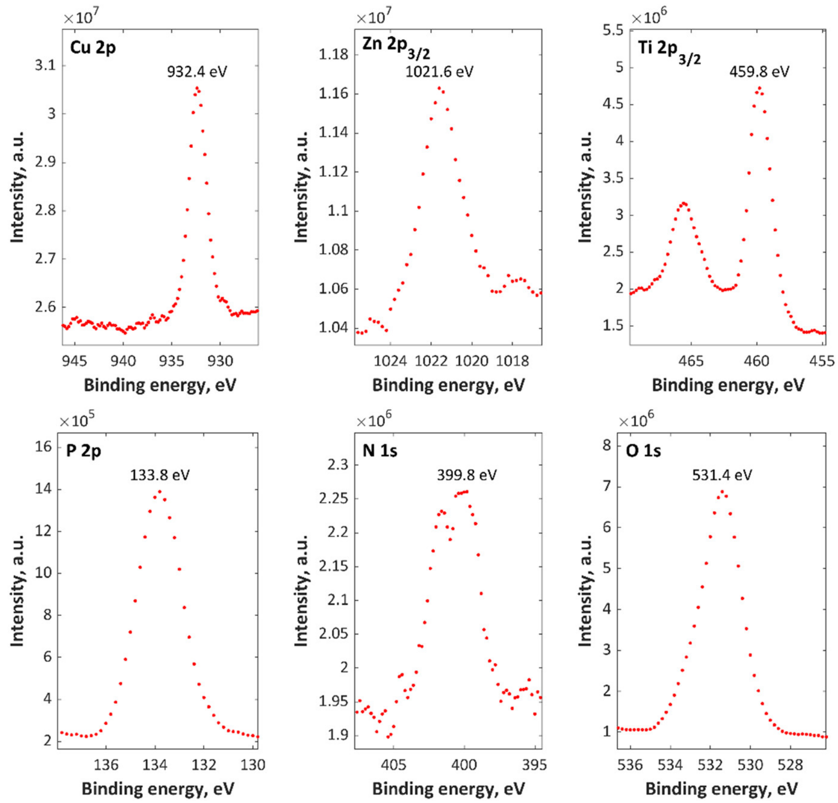

Figure S3. XPS spectra of coatings enriched in zinc and copper, obtained at applied voltage of +400|−135 V.

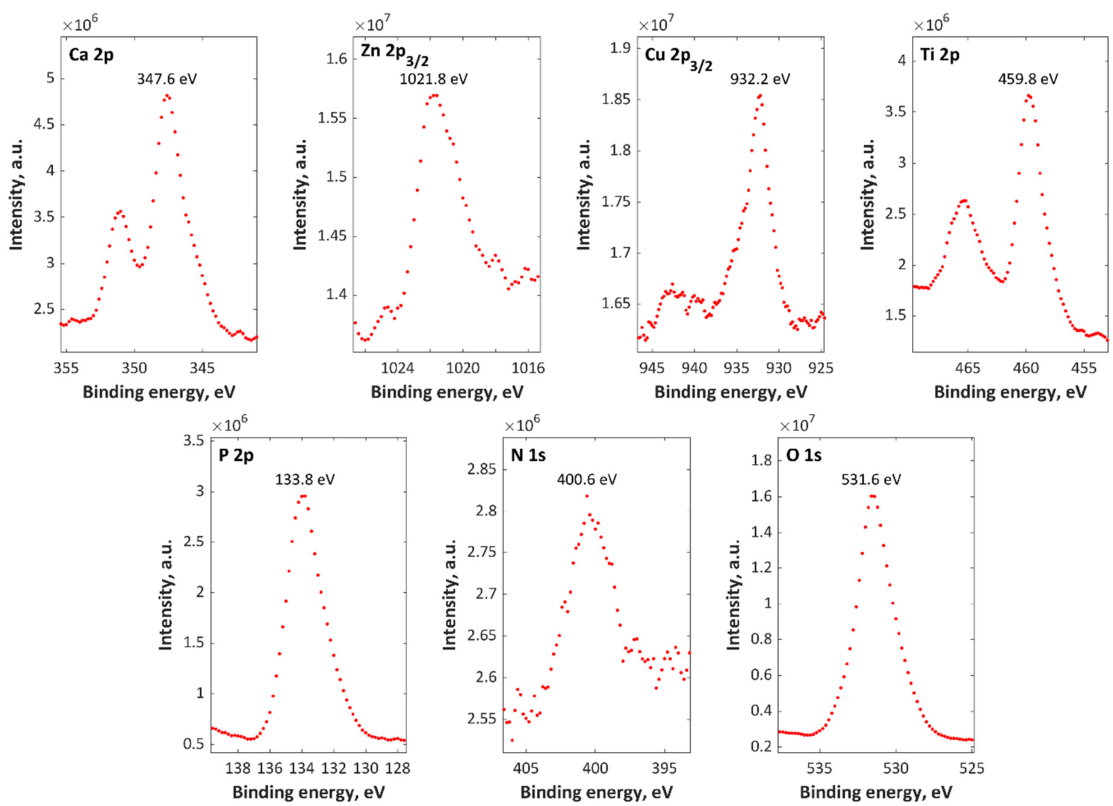

Figure S4. XPS spectra of coatings enriched in zinc, copper, and calcium, obtained at voltage of +400|−35 V.

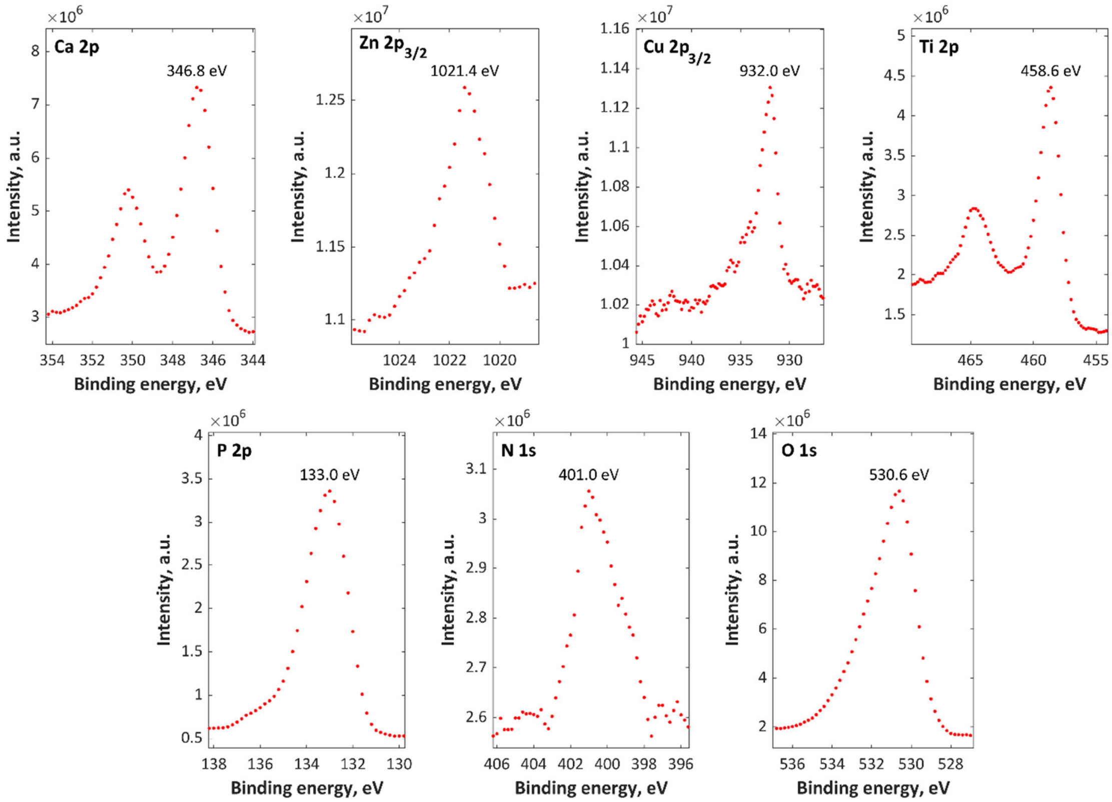

Figure S5. XPS spectra of coatings enriched in zinc, copper, and calcium, obtained at voltage of +400|−135 V.

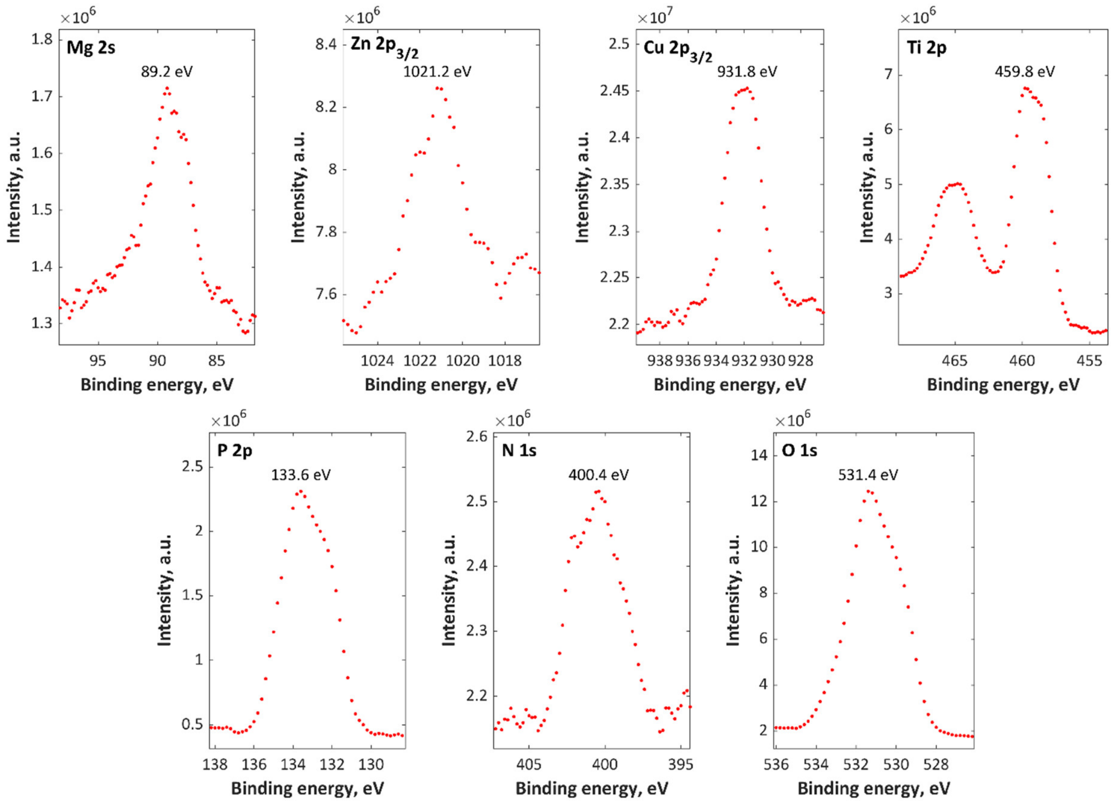

Figure S6. XPS spectra of coatings enriched in zinc, copper, and magnesium, obtained at voltage of +400|–35 V.

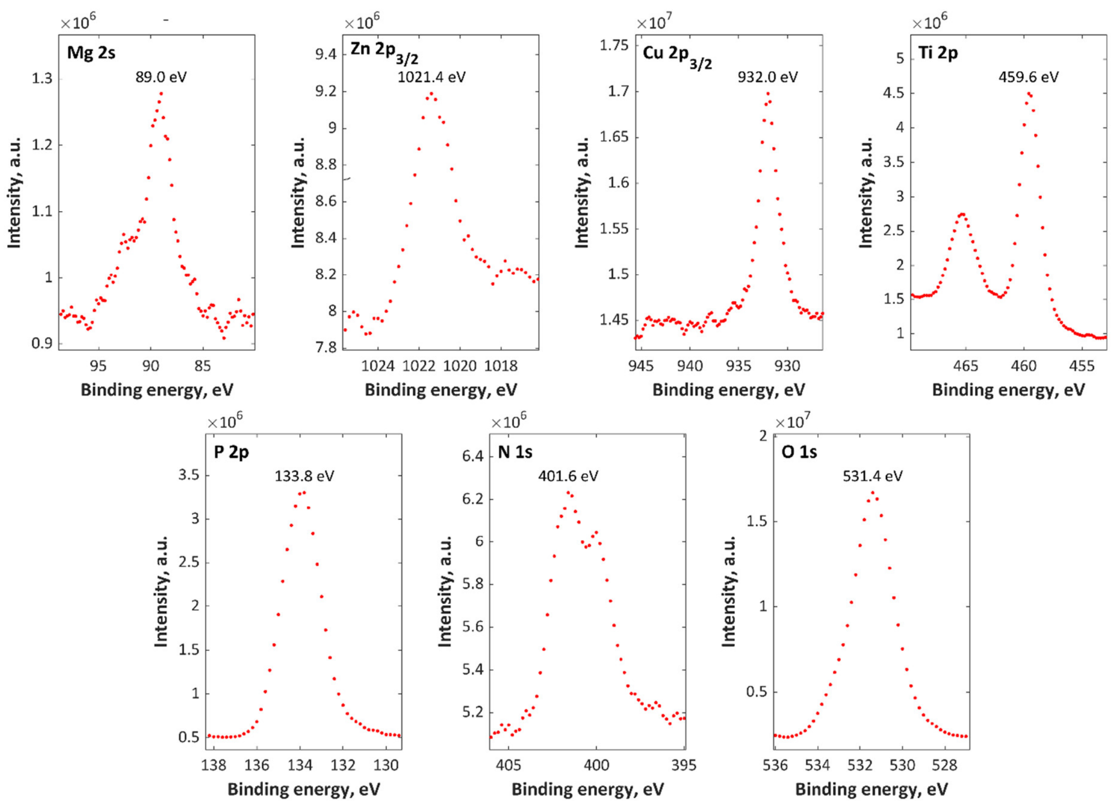

Figure S7. XPS spectra of coatings enriched in zinc, copper, and magnesium, obtained at voltage of +400|–135 V.

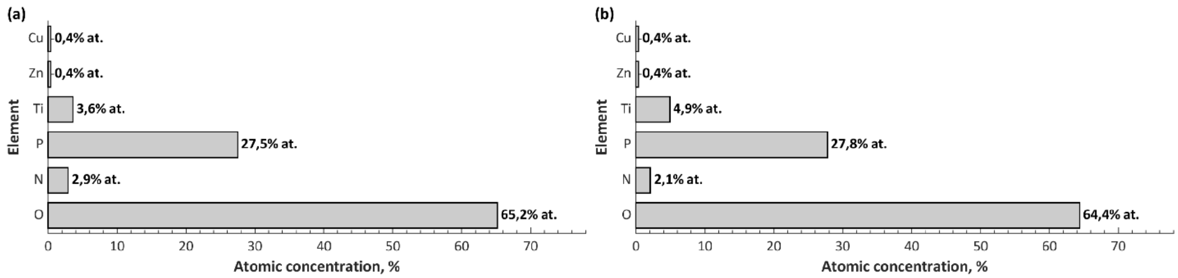

Figure S8. Elemental composition by XPS of top 10 nm of coatings enriched in copper and zinc, obtained at voltage of: (**a**) +400|–35 V, (**b**) +400|–135 V.

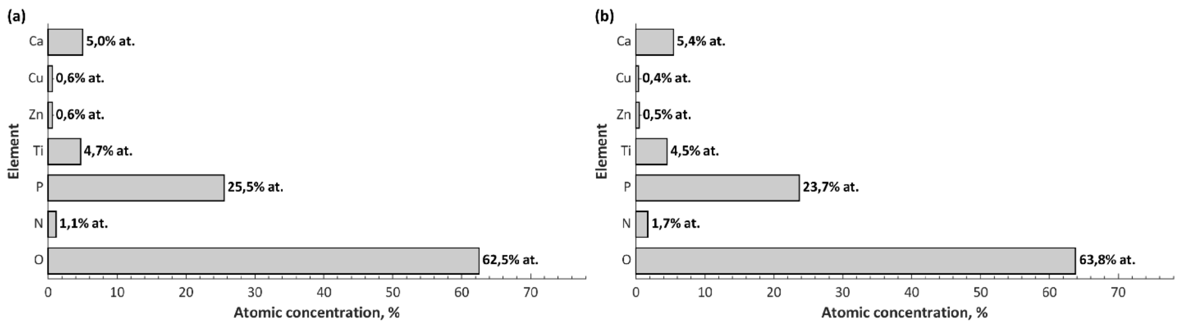

Figure S9. Elemental compositions by XPS of top 10 nm of coatings enriched in copper, zinc, and calcium, obtained at voltages of: (**a**) +400|–35 V, (**b**) +400 | –135 V.

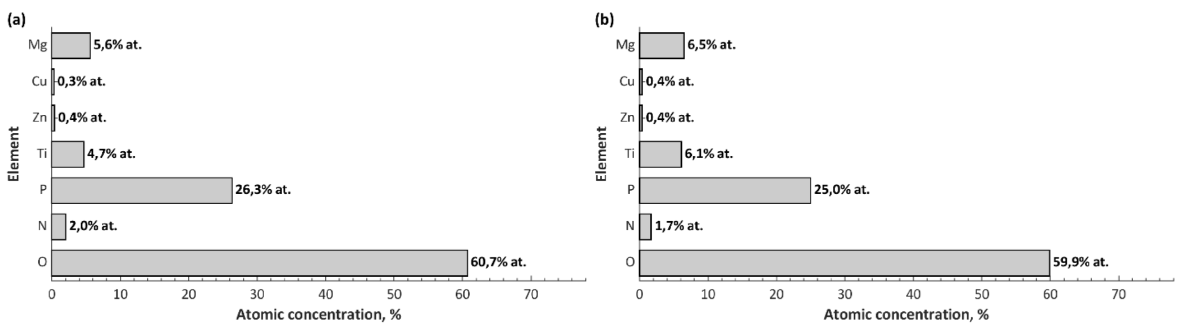

Figure S10. Elemental composition by XPS of top 10 nm of coatings enriched in copper, zinc, and magnesium, obtained at voltages of: (**a**) +400|–35 V, (**b**) +400|–135 V.

Table S3. Binding energies (BE, eV) of selected chemical compounds from available literature.

Compounds	BE, eV	Peak	Ref.
CaO	529.4–531.3	O 1s	[1]
Cu_2O	530.3	O 1s	[1]
CuO	529.6	O 1s	[1]
CuO	529.5	O1s	[3]
TiO_2	529.9	O1s	[1]
MgO	530.0–532.1	O 1s	[1]
Mn_3O_4	529.6	O 1s	[1]
$Cu_3(PO_4)_2$	531.8	O1s	[5]
$Cu(NO_3)_2$	533.4	O1s	[5]

$Mg(OH)_2$	**530.9**	**O1s**	**[1]**
$Ca(NO_3)_2$	**533.6**	**O 1s**	**[1]**
$CaHPO_4$	**531.7**	**O 1s**	**[6]**
$Ca_5(PO_4)_3OH$	**531.1**	**O1s**	**[7]**
$Mg_3(PO_4)_2$	**532,1**	**O 1s**	**[8]**
$Zn_3(PO_4)_2$	**532.3**	**O 1s**	**[9]**
P_2O_5	**532.2–534.3**	**O 1s**	**[1]**
Ti_2O_3	**457.8**	**$Ti2p_{3/2}$**	**[2]**
TiO	**455.1–455.9**	**$Ti2p_{3/2}$**	**[2]**
$TiO_{1.5}$	**455.2–456.8**	**$Ti2p_{3/2}$**	**[2]**
$TiO_{0.73}$	**454.5**	**$Ti2p_{3/2}$**	**[2]**
$TiO_{0.9}$	**454.7**	**$Ti2p_{3/2}$**	**[2]**
TiP	**454.8**	**$Ti2p_{3/2}$**	**[2]**
$CaTiO_3$	**458.9**	**$Ti2p_{3/2}$**	**[2]**
$Ti_3(PO_4)_4$	**458.8**	**$Ti2p_{3/2}$**	**[2]**
TiO_2	**458.6**	**$Ti2p_{3/2}$**	**[2]**
CaO	**346.1–347.3**	**Ca $2p_{3/2}$**	**[1]**
$Ca_3(PO_4)_2$	**347.7**	**Ca $2p_{3/2}$**	**[2]**
$Ca(H_2PO_4)_2$	**347.6–347.8**	**Ca $2p_{3/2}$**	**[2]**
$CaHPO_4$	**347.5–347.8**	**Ca $2p_{3/2}$**	**[2]**
$CaHPO_4$	**347.4**	**Ca $2p_{3/2}$**	**[6]**
$Ca_2P_2O_7$	**347.6**	**Ca $2p_{3/2}$**	**[2]**
$Ca(HCOO)_2$	**347.4**	**Ca $2p_{3/2}$**	**[2]**
$Ca(NO_3)_2$	**348.7**	**Ca $2p_{3/2}$**	**[1]**
$Ca_5(PO_4)_3OH$	**347.1**	**Ca $2p_{3/2}$**	**[7]**
MgO	**87.9–88.1**	**Mg 2s**	**[1]**
$Mg_3(PO_4)_2$	**90.21**	**Mg 2s**	**[8]**
ZnO	**1021.40–1021.80**	**Zn $2p_{3/2}$**	**[2]**
$Zn(OH)_2$	**1021.80**	**Zn $2p_{3/2}$**	**[2]**
$Zn_3(PO_4)_2$	**1023.3**	**$Zn3p_{3/2}$**	**[9]**
Zn_3P_2	**1020.6**	**Zn $2p_{3/2}$**	**[1]**
ZnP_2	**1020.9**	**Zn $2p_{3/2}$**	**[1]**
Cu_3P	**129.6**	**P 2p**	**[1]**
CuP_2	**129.7**	**P 2p**	**[1]**
Zn_3P_2	**128.3**	**P 2p**	**[1]**
ZnP_2	**129.8**	**P 2p**	**[1]**
$Mg_3(PO_4)_2$	**134.4**	**P 2p**	**[8]**
$CaHPO_4$	**133.6**	**P 2p**	**[6]**
P_4O_{10}	**135.3**	**P 2p**	**[1]**
P_2O_5	**135.2**	**P 2p**	**[10]**
Cu_2O	**932.7**	**$Cu2p_{3/2}$**	**[5]**
CuO	**933.6**	**$Cu2p_{3/2}$**	**[5]**
$Cu(OH)_2$	**934.0**	**$Cu2p_{3/2}$**	**[5]**
$Cu_3(PO_4)_2$	**935.9**	**$Cu2p_{3/2}$**	**[5]**
$Cu(NO_3)_2$	**935.5**	**$Cu2p_{3/2}$**	**[5]**
$Zn_3(PO_4)_2$	**133.4**	**P 2p**	**[9]**
$Ca_{10}(PO_4)_6(OH)_2$	**133.8**	**P 2p**	**[2]**
$CaHPO_4$	**133.8**	**P 2p**	**[2]**
$Ca_2P_2O_7$	**133.8**	**P 2p**	**[2]**
$Ca(H_2PO_4)_2$	**134.0**	**P 2p**	**[2]**

$(P_2O_5)_{33}(ZnO)_{67}$	**134.0**	**P 2p**	**[2]**
$Ca(H_2PO_4)_2$	**134.0**	**P 2p**	**[2]**
$Ca_5(PO_4)_3OH$	**133.7**	**P $2p_{3/2}$**	**[7]**
$Cu_3(PO_4)_2$	**133.9**	**P $2p_{3/2}$**	**[5]**

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