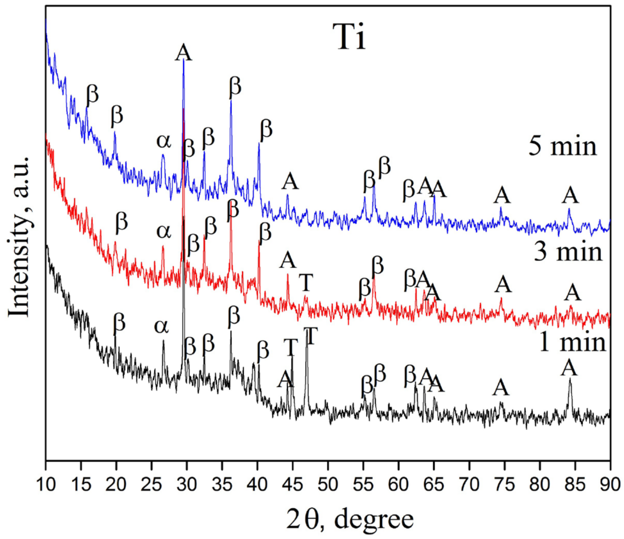
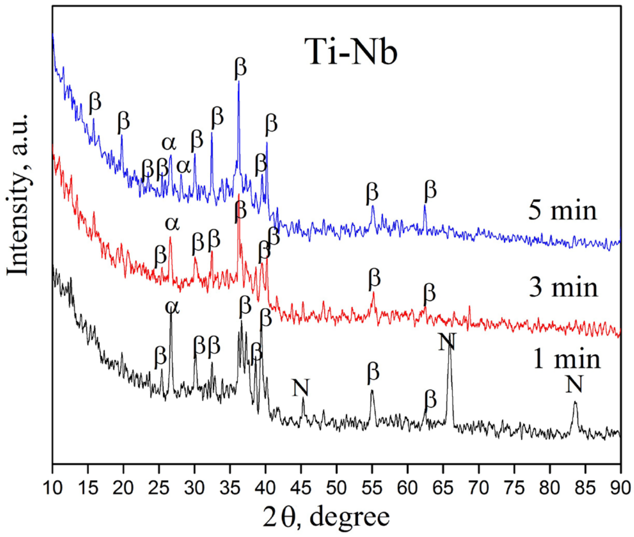
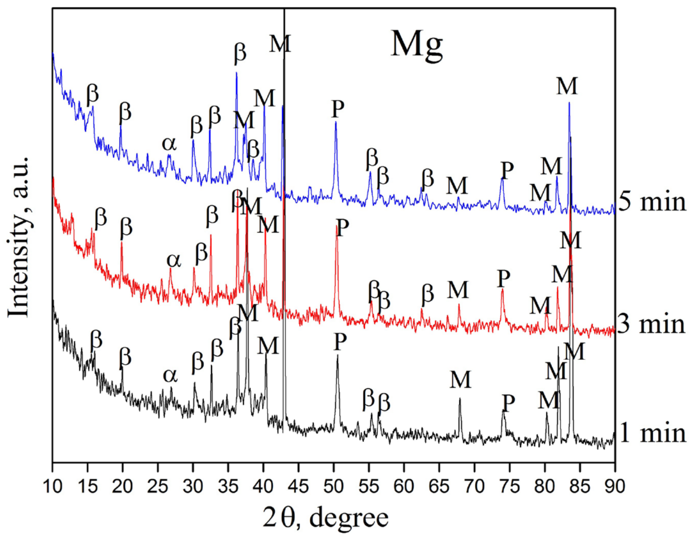
Supplementary material



a



b



c

Fig. S1. (Color online) X-ray images of coatings synthesized on Ti (a), Ti-Nb (b), and Mg (c) substrates at a MAO process voltage of 400 V and a process duration of 1, 3 and 5 min.

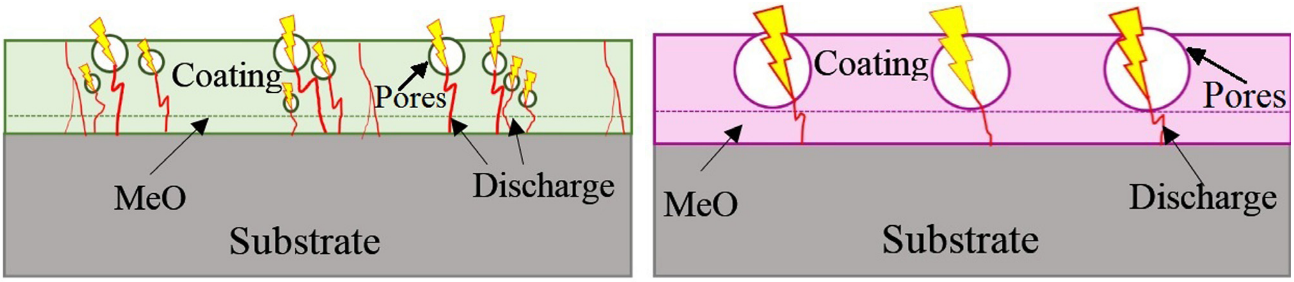
The following diffraction maxima were present in the CaP coating on a Ti substrate: α-TCP, β-TCP, and titanium oxide in the form of anatase (A). The X-ray images also showed the diffraction maxima of the α-Ti (T) substrate (ICDD #89-4893), and their intensity decreased significantly during the process.

On the Ti-Nb substrate, the α and β modifications of TCP are also present in the CaP coatings. At the beginning of the MAO process, peaks correlating to the substrate, specifically the β-Ti-Nb (N) alloy (ICDD #35-0789) can be observed in the first minute. These peaks disappear with increasing processing time.

β-TCP and α-TCP phases, as well as high-intensity peaks of the magnesium oxide phase, periclase (P) (ICDD #45-0946), and of the magnesium (ICDD #35-0821) were detected in the CaP coatings on the Mg substrate. Throughout the entire coating deposition process, their phase composition remained unchanged.

Table S1. Electrophysical properties of metals used as substrates and their oxides [23, 28, 29, 30].

Properties	Ti	Nb	Mg
Melting point, °C	1668	2500	651
Thermal conductivity at 300 K, W/(m·K)	15.5	54.5	125.0
Electrical resistance, μΩ·m	0.550	0.152	0.044
Properties	TiO_2	Nb_2O_5	MgO
Types of defects	Anionic vacancies	Anionic vacancies	Cationic vacancies
Type of conductivity	Electronic	Electronic	Ionic
Band gap, eV	3.2	3.4 – 3.7	8 – 11
Relative permittivity	30 – 100	11 – 40	8.0 – 10.5



a b

Fig. S2. (Color online) The scheme of discharge sparking during micro-arc oxidation on Ti, Ti-Nb (a) and Mg (b) substrates.