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# Plasma Electrolytic Oxidation of the Magnesium Alloy MA8 in Electrolytes Containing TiN Nanoparticles

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The formation of protective multifunctional coatings on magnesium alloy MA8 using plasma electrolytic oxidation (PEO) in an electrolytic system containing nanosized particles of titanium nitride was investigated. Electrochemical and mechanical properties of the obtained layers were examined. It was established that microhardness of the coating with the nanoparticle concentration of 3 g l<sup>-1</sup> increased twofold ( $4.2 \pm 0.5$  GPa), while wear resistance decreased ( $4.97 \times 10^{-6}$  mm<sup>3</sup> N<sup>-1</sup> m<sup>-1</sup>), as compared to respective values for the PEO-coating formed in the electrolyte without nanoparticles ( $2.1 \pm 0.3$  GPa,  $1.12 \times 10^{-5}$  mm<sup>3</sup> N<sup>-1</sup> m<sup>-1</sup>).

*Key words:* Magnesium alloys; Protective coatings; Plasma electrolytic oxidation; Corrosion; titanium nitride; Nanoparticles

## 1. Introduction

Recently, the fields of industrial application of magnesium (Mg) alloys have been significantly extended<sup>[1-4]</sup>. Aerospace industry has been the main consumer of Mg alloys for quite a long time. However, during the last decades, a serious competition for the fuel consumption reduction has

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