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Effect of nitrogen incorporated into oxide layer, formed on the magnesium alloys by using r.f. PECVD process, on their corrosion resistance.

Małgorzata Kalisz[1], Marcin Grobelny[1]

[1]Motor Transport Institute, Warsaw, Poland

malgorzata.kalisz@its.waw.pl

The low density of magnesium alloys makes them especially attractive in order to reach the lowest weigh targets, without losing strength, required by the automotive, electronic and aeronautical industries. Unfortunately, magnesium alloys have a strong susceptibility to atmospheric and galvanic corrosion and need to be protected with anticorrosive coatings. Traditionally magnesium and magnesium alloys have been protected with anodizing treatments or with chromium-based coatings with the consequent problem of pollution by Cr(IV) ions. The development of new corrosion resistant coatings for protection of magnesium parts, by using clean and environmentally friendly processes is very important and strategic for the European industry due to environmental, health and economic considerations: nowadays there is a strong need to replace the presently used hazardous coating technologies and to improve the usage of light weight materials.
In this context plasma technology, including: plasma enhanced chemical vapor deposition (PECVD) are becoming increasingly popular.
The paper presents influence of nitrogen introduced into the SiO_2 layer (prepared by PECVD) on the corrosion resistance of the magnesium alloys AZ32 and AZ91. On both magnesium alloys a two types of coatings: SiO_2 with a thickness of 1.1 µm and SiO_xN_y with a thickness of 64 nm and 0.56 µm was performed. Then, the corrosion resistance of these coatings with comparison to clean, nothing coated alloys was made. Corrosion properties of investigated coatings was based on analysis of the voltammetric curves. The obtained results show that the introduction of nitrogen to a volume of a thin layer of SiO_2 produced plasma, which is creating a layer SiO_xN_y, improves the corrosion resistance of magnesium alloys AZ32 and AZ91 type.

Keywords
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