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Formation of self-lubricating PEO coating via in-situ incorporation of PTFE particles

Yan Chen^{1,2,3}, Xiaopeng Lu^{1,2*}, Carsten Blawert², Mikhail L. Zheludkevich^{2,4}, Tao Zhang^{1,3*}, Fuhui Wang^{1,3}

¹ Corrosion and Protection Division, Shenyang National Laboratory for Materials Science, Northeastern University, 3-11 Wenhua Road, Shenyang 110819, China

² Institute of Materials Research, Helmholtz-Zentrum Geesthacht, Max-Planck-Str. 1, Geesthacht, 21502, Germany

³ Corrosion and Protection Division, Shenyang National Laboratory for Materials Science, Institute of Metal Research, Chinese Academy of Sciences, Wencui Road 62, Shenyang, 110016, China

⁴ Faculty of Engineering, University of Kiel, Kaiserstrasse 2, 24143 Kiel, Germany

Abstract

Self-lubricating plasma electrolytic oxidation (PEO) coatings have been fabricated on AZ91 magnesium alloy via in-situ incorporation of PTFE particles. Surfactants are used to improve dispersion stability of the particles in aqueous solution and relatively low energy input is applied to ensure the particles are inertly incorporated into the coating. It was found that the porous layer has been sealed significantly and PTFE-enriched ridge-like protrusions can be obtained on the coating surface after sufficient treatment time. 3D surface micro-topography was reconstructed to disclose the uptake of the particles and wear mechanisms of the coatings. The particle-containing protrusions can act as lubricant reservoirs, leading to ultra-low and stable friction coefficient between the coating and its counterpart during entire dry

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