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Abstract

Magnesium alloys have been used in a wide range of lightweight applications in industries such as aerospace, automotive, and personal computing due to their high strength to weight ratio; however, high chemical reactivity, poor corrosion and wear resistance limit their widespread uses in many fields. The plasma electrolytic oxidation (PEO) process can produce a protective oxide layer on the magnesium alloy to improve the mechanical properties that limit more widespread application of magnesium alloys. In this work, molybdenum disulphide (MoS_2) nanoparticles in concentrations ranging from 0 to 10 g/L were added into the PEO electrolyte. The aim of this study is to investigate the influence of incorporating MoS_2 nanoparticles on the microstructure, phase, as well as short- and long-term corrosion resistance, and other mechanical properties of PEO grown oxides. While the $MgAl_2O_4$ phase was formed for all PEO grown oxide, the addition of MoS_2