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化学转化膜上沉积镍对镁合金耐腐蚀性能的影响

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**摘要:** 将化学转化和化学镀镍结合在一起, 先对铸态AZ91D合金进行锡酸盐转化处理, 然后在转化膜上进行化学镀镍。研究了转化膜及化学镀镍涂层的成分、结构和耐腐蚀性能。结果表明: 锡酸盐转化处理后合金表面形成了以 $MgSnO_3 \cdot H_2O$ 为主要成分的转化膜, 可对合金起到一定的防护作用; 转化膜由细小的球形颗粒密积而成, 颗粒之间存在间隙, 它可以为化学镀镍的前处理过程提供良好的吸附条件; 转化膜上的化学镀镍层组织致密、无缺陷,  $MgSnO_3 \cdot H_2O$ 转化膜在镀镍层与基体之间起到过渡作用, 镀层的磷含量达到9%, 与基体结合良好; 在3.5% NaCl (pH=7)溶液中的动电位极化测试表明, 镀镍以后的合金在阳极极化过程中发生了明显的钝化, 耐腐蚀性能进一步提高, 对基体起到了较好的防护作用。

**关键字:** 镁合金; 化学转化处理; 化学镀镍; 耐腐蚀性能

**Effect of chemical conversion film plus electroless nickel plating  
on corrosion resistance of magnesium alloy**

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**Abstract:** In order to improve the corrosion resistance of as cast AZ91D alloy, electroless nickel plating combined with chemical conversion treatment was investigated in detail. Firstly, the alloy was treated by stannate conversion treatment, and then electroless nickel plating was carried out on the conversion film. The compositions, structure and corrosion resistance of the conversion film and the electroless nickel coating were studied. The results show that a  $MgSnO_3 \cdot H_2O$  conversion film is formed by treatment in the stannate solution at  $90^\circ C$ , and the immersion test and potentiodynamic polarization show that the corrosion resistance of the AZ91D alloy is improved to some extent. The porous conversion film provides an advantage for the adsorption during sensitisation treatment prior to electroless nickel plating. A Ni-P coating is successfully deposited on the conversion film. The presence of the stannate conversion film reduces the potential difference between the Ni-P coating and the substrate and enhances the corrosion resistance of the coating. The potentiodynamic polarization indicates that the Ni-P coating deposited on the conversion film provides a good protection for the magnesium alloy.

**Key words:** magnesium alloy; chemical conversion treatment; electroless nickel plating; corrosion resistance

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