

Mg-Y4-Nd3合金的组织与摩擦磨损性能

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摘要 研究了Mg-Y4-Nd3合金铸态和T6处理(525 °C固溶处理8 h, 250 °C时效处理16 h)后的显微组织、力学性能和摩擦磨损性能。结果表明: 铸造Mg-Y4-Nd3合金共晶相分布在 α -Mg固溶体晶界上, 呈不连续网状分布。经过固溶时效处理后, 合金为等轴晶组织, 共晶相基本固溶到 α -Mg基体中, 时效析出沉淀相呈弥散分布。两种处理合金的抗拉强度都随温度的升高而降低, 伸长率均随温度的升高而升高, 同温度下, T6处理的合金抗拉强度高于铸态合金。T6处理的合金在干滑动摩擦条件下, 随着载荷的增加, 摩擦系数降低, 磨损量增加, 磨损机制由磨粒磨损伴有氧化磨损向剥层磨损过渡, 在高载荷下磨损表面出现塑性变形挤出现象。

关键词 [材料实验](#); [Mg-Y4-Nd3合金](#); [T6处理](#); [沉淀强化](#); [抗拉强度](#); [摩擦磨损](#)

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Microstructure and friction and wear properties of Mg-Y4-Nd3 alloy

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Abstract Microstructure, tensile properties and tribological properties of as cast and T6 treated Mg-Y4-Nd3 alloy (solution treatment for 8 h at 525 °C and aging treatment for 16 h at 250 °C) were investigated. The results show that the eutectic phase in Mg-Y4-Nd3 alloy was distributed at the grain boundary of α Mg solid solution in the form of discontinuous network. After solution and aging treatment, the microstructure of the alloy exhibited equiaxed grains and most of the eutectic phase dissolved into the α -Mg matrix. The precipitate phases dispersed uniformly after aging process. The tensile strength of the two alloys with different treatments decreased as the temperature was increased whereas the elongation increased. At the same temperature the alloy after T6 treatment shows higher tensile strength than the as cast alloy. As the applied load was increased, the friction coefficient of the T6 alloy decreased but the wear rate increased under the dry sliding condition. Moreover, the wear mechanism changed from abrasive wear and oxidation wear to delamination wear; at high load the worn surface shows plastic deformation and extrusion phenomenon.

Key words [Mg-Y4-Nd3 alloy](#); [T6 treat](#); [precipitation strengthening](#); [tensile strength](#); [friction and wear](#)

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