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Zn对铸态Mg-Mn合金力学性能和腐蚀性能的影响

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摘 要：研究Zn对Mg-Mn合金微观组织、力学性能和在Hank ' s溶液中腐蚀性能的影响。结果表明：Zn可以明显细化Mg-Mn合金的铸态组织，当合金中Zn含量(质量分数)为3%时，合金的晶粒尺寸由700~900 μm减小到50~80 μm。合金的力学性能也随Zn含量的增加而显著提高；Zn含量为3%时，拉伸强度提高128.8 MPa，屈服强度提高42.6 MPa，伸长率提高1倍多。在Mg-Mn合金中加入 1%~2%的Zn，能够增强Mg-Mn合金钝化膜的稳定性，使Mg-Mn合金腐蚀速度显著降低。但是，当Zn含量增至3%时，钝化膜变得不稳定，腐蚀速度增加，耐蚀性能降低。

关键字： 镁合金；锌；微观组织；力学性能；腐蚀

Effect of Zn on mechanical properties and corrosion properties of

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Abstract: The effect of Zn on the microstructure, mechanical properties and corrosion properties in Hank's solute on of as-cast Mg-Mn alloy was studied. The results indicate that the addition of Zn element can significantly refine the grain size of cast Mg-Mn alloy. When Zn content is increased up to 3% (mass fraction), the grain size of the cast alloy decreases from 700−900 μm to 50−80 μm. Meanwhile, the mechanical properties of the alloy also increase with increasing Zn content. When Zn content is 3%, the ultimate tensile strength and the yield strength are increased by 128.8 and 42.6 MPa, respectively, while the elongation is increased twice. Addition of Zn element to Mg-Mn alloy can stabilize the passivation film, which mainly contributes to the low corrosion rate of Mn-Mn-Zn alloy. However, when the Zn content is over 3%, the passivation film becomes unstable, which results in a relatively high corrosion rate.

Key words: magnesium alloy; zinc; microstructure; mechanical property; corrosion

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