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CaC_2对电磁-悬浮铸造AZ61合金组织和力学性能的影响

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摘 要：利用电磁搅拌技术，结合悬浮铸造方法，在浇铸AZ61镁合金的过程中加入微纳米颗粒CaC_2，使CaC_2弥散分布于母相金属液中，促进合金形核，改善合金铸造组织形态和分布，提高合金的力学性能。结果表明：利用电磁-悬浮铸造制备的镁合金，其显微组织细化，晶间β相细小并且网状结构减少，当CaC_2悬浮剂加入量(质量分数)为0.36%时，镁合金的细化效果最佳，其晶粒最小尺寸为75 μm，抗拉强度为211.4 Pa，伸长率为8.5%，与普通金属型铸造制备的镁合金相比，晶粒尺寸减小64.3%；抗拉强度提高约24.2%；伸长率提高46.6%。

关键字：AZ61镁合金；CaC_2；电磁-悬浮；显微组织；力学性能

Effects of CaC_2 on microstructure and tensile properties of AZ61 magnesium alloys by electromagnetic-suspension casting

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Abstract: The electromagnetic suspension casting of AZ61 wrought magnesium alloy was studied using electromagnetic stirring technique and the suspension casting during the casting process. The electromagnetic suspension casting not only can diffuse CaC_2 powders distribution into the melt evenly, but also can refine the development of dendrite. The results show that electromagnetic suspension casting is found to be effective on refining the microstructure of magnesium materials, thinning the β-$Mg_{17}Al_{12}$ and improving the distribution uniformity of β-$Mg_{17}Al_{12}$ phase. The 0.36% CaC_2 addition refines the grains most effectively, and the size is 75 μm. The ultimate tensile strength of alloys is 211.4 MPa, and the elongation is 8.5%. The grain

size decreases by 64.3%, and the ultimate tensile strength and the elongation of alloys increase by 24.2% and 46.6% respectively compared with those of the die-casting Mg alloys.

Key words: AZ61 magnesium alloy; CaC_2; electromagnetic suspension; microstructure; tensile properties