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AM60变形镁合金薄板激光焊接 接头的组织与性能

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摘要:以AM60变形镁合金薄板为研究对象,分析CO₂激光焊后接头的组织和性能,探讨镁合金激光焊接的工艺特点。结果表明:在合适的工艺参数下,能获得表面成型良好、变形小的焊接接头。金相观察分析发现接头中热影响区不明显,焊缝区组织致密,晶粒细小,晶界上均匀分布着脆性相(Mg₁₇Al₁₂),但内部易产生气孔、裂纹等微观缺陷。硬度测试结果显示,焊缝硬度略高,母材和热影响区硬度相当。在本实验条件下采用CO₂激光焊能实现AM60镁合金的焊接,抗拉强度可达母材的94%,断口表现为混合断裂。

关键字: 变形镁合金AM60; 激光焊接; 微观组织; 力学性能

Microstructure and properties of joints of wrought magnesium alloy AM60 plates welded by laser beam welding

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Abstract:The CO₂ laser beam was used to weld the wrought magnesium alloy AM60 plates, the microstructure and mechanical properties of the joints were studied, and the technical characteristics of magnesium alloy laser welding were discussed. The results show that a favorable weld without obvious distortion can be obtained under the suitable parameters. By metallurgical analysis it is found that the heat affected zone is not distinct, and the microstructure in fusion zone presents compact fine grains with brittle intergranular precipitates (Mg₁₇Al₁₂), which often accompanies with micro defects such as porosity and cracking. The result of hardness test shows that the hardness of the weld is slightly high, while the hardness of the base metal is equivalent to that of the HAZ. Under this experimental condition, the wrought magnesium alloy AM60 can be welded by CO₂ laser beam welding, and the joint strength is up to 94% of the base metal. The fracture surface is

characterized by mixture fracture.

Key words: wrought magnesium alloy AM60; laser beam welding; microstructure; mechanical property

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