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研究报告

酸性盐雾下2024铝合金搅拌摩擦焊接头的腐蚀行为

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**摘要:** 在详细分析2024铝合金搅拌摩擦焊焊缝表面微结构的基础上,采用酸性连续盐雾试验研究焊缝表面的腐蚀行为。组织分析表明,焊缝表层因受搅拌头轴肩水平挤压作用而呈现弧形条纹特征,并导致晶粒和第二相粒子得到显著细化;合金中的第二相粒子主要为棒状的 $Al_2CuMg$ (S相)和颗粒状的 $CuAl_2$ ( $\theta$ 相)。盐雾试验表明,搅拌摩擦焊焊缝区耐蚀性因包铝层遭到破坏而呈现下降趋势,腐蚀程度因焊缝表面残留的纯铝而呈现不均匀性。腐蚀首先从局部点蚀开始,最终演变为剥落腐蚀。

**关键词:** 2024铝合金 搅拌摩擦焊 组织 盐雾试验 腐蚀

CORROSION BEHAVIOR OF FRICTION STIR WELDED JOINT OF 2024 ALUMINUM ALLOYS UNDER ACID SALT SPRAYING

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**Abstract:** The microstructures of friction stir welded (FSW) joint of 2024 aluminum alloy were examined by using optical microscope and transmission electron microscope. The corrosion behaviors of the joint were investigated by method of acid salt spray. The analysis results of microstructure show that the arc stripe is the main feature on the surface of the weld seam due to the extrusion action of the shoulder of the stir tool. The grain and second phase particles are also refined. The second phase particles are mainly composed of  $Al_2CuMg$ (S phase) and  $CuAl_2$ ( $\theta$  phase). The corrosion test shows that the resistance to corrosion of FSW seam is lower than that of base metal pure aluminum layer. There exists an unevenness for the corrosion of the FSW seam. The corrosion initially results from pitting corrosion and finally develops to exfoliation.

**Keywords:** 2024 aluminum alloy friction stir welding microstructure salt spray test corrosion

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