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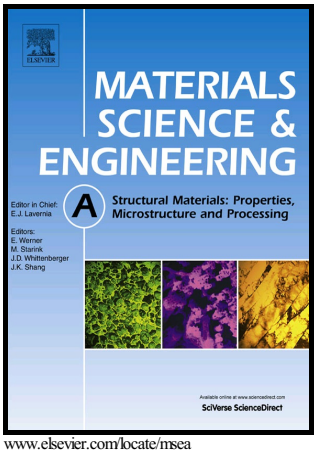

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Dissimilar friction stir lap welding of magnesium to aluminum using plasma electrolytic oxidation interlayer

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ABSTRACT

Joining the die-cast non-combustible magnesium alloy AMX602 to the die-cast aluminum alloy ADC12 via friction stir lap welding (FSLW) was investigated. The aluminum alloy on the top can more easily form a sound dissimilar joint than that on the bottom. Strong dissimilar joints were achieved after the magnesium alloy was subjected to a plasma electrolytic oxidation treatment. After the welding process, the plasma electrolytic oxidation interlayer was stirred and flowed into the aluminum alloy side. The growth of the intermetallic compound was restrained by the plasma electrolytic oxidation interlayer by reducing the reaction time of the magnesium alloy and aluminum alloy.

Key words: Mg/Al dissimilar joint; Friction stir lap welding; Plasma electrolytic oxidation; Intermetallic compounds; Microstructure

1. Introduction

For reducing product weight, aluminium (Al) and magnesium (Mg) alloys are increasingly investigated by the automotive industry, aircraft industry, tool industry and electron industry around the globe. The Al alloy is the most widely used light metal due

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