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Editorial

Friction Stir Welding Prospective on Light-Alloys Joints

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1. Introduction and Scope

The demand for stronger, lighter, and cost-effective materials for engineering applications is a key technological challenge. In particular, manufacturing industrial sectors, such as the automotive and aerospace industries, are in continuous demand for materials able to guarantee high strength to weight ratio, good ductility, excellent corrosion resistance, and low cost. In this context, friction stir welding (FSW) is a valuable, cost-effective, and sound welding technique that has the primary advantage of non-fusion, solid-state welding across the welded joints. FSW guarantees easy control of tool design, rotation speed, and translation speed. It is, for these reasons, a potentially widely available welding technique.

This special issue intends to present the state of the art of the FSW applied to the most effective metallic material class of light alloys such as, especially, aluminum alloys.

2. Contributions

This special issue on FSW includes contributions on different aluminum alloy series, such Al-Zn 7000 thin sheets [1], Al-Mg 5000 [2], and Al-Mg-Si 6000 plates [3,4], Al-Cu extruded components [5]. Other contributions deal with magnesium alloys (Mg-9Al-1Zn) [6], and titanium alloys (Ti-6Al-4V) [7]. Different research features are also presented; these include dissimilar aluminum alloy joints [8], stationary [2] and multiple FSW pass processes [8], Taguchi studies [3], surface topography studies [9], and the role of dispersoids such as Sc in aluminum alloys [5]. A review paper is also part of the special issue, which deals with technologically interesting new approaches to the FSW [10]. In particular, on the one hand, a double side FSW was applied to an AA6082, and, on the other hand, a non-age-hardening AA5754 sheet was FSW by an innovative approach in which the welding pin was forced to slightly deviate away from the joining centerline. Both new FSW approaches showed a noticeable, and in some cases, significant improvement of the mechanical response of the joined aluminum sheets [10].

3. Conclusions and Outlook

This special issue intends to promote the research on new, sound, and technologically viable solutions to improve the FSW joint strength, and possibly to further optimize the production costs of light alloys, such as aluminum, magnesium, and titanium.

Conflicts of Interest: The author declares no conflict of interest.

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