

عنوان مقاله:

Processing-structure-property Investigation on the Friction Stir Welding of 5052 Aluminum Alloy beside applying Cr₂O₃ nano-particles

محل انتشار:

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خلاصه مقاله:

FSW has received a great deal of attention as a new solid-state welding technique. In the current study, a square-pin-profiled tool was used to perform FSW on AA5052 plates. The main aim of this article was to find out the appropriate rotational and traverse speeds to gain better microstructural and mechanical properties. In an attempt to study the microstructural and mechanical properties of the joints, optical microscopy (OM) and scanning electron microscopy (SEM) were employed. Three different rotational speeds of 500, 800 and 1000 rpm and three different traverse speeds of 32, 80 and 125 mm/min. An increase in the rotational speed increased the ultimate tensile strength and microhardness of the specimens. At the best welding condition, by employing the rotational and traverse speeds of 1000 rpm and 80 mm/min, respectively, 66 % enhancement in the elongation and 8.5 % increase in the microhardness of the welded samples were obtained. Moreover, the ultimate tensile strength of this welded joint reached to 80 % of the base metal. To investigate the effects of reinforcements' application on FSW, Cr₂O₃ nano-particles were induced at the optimized conditions. It was revealed that performing FSW with the presence of reinforcements reduces the UTS due to the intensive agglomeration of the reinforcements.

کلمات کلیدی:

FSW, Rotational speed, Traverse speed, SEM, 5052 aluminum alloy, Cr₂O₃ nano-particles

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