عنوان مقاله:

Effect of Tool Pin Shape on Defect-Free FSP and Particles Distribution in SiC/Al۶۰۶۱ Composites

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خلاصه مقاله:

In this research, Al-SiC composites were produced using FSP tools with different pin shapes to investigate the distribution of reinforcing particles in the base metal. First, to obtain the optimal rotational and traverse speed and tilt angle, several tests were performed on different parameters. The results showed that the rotational speed of ۱۲۵۰ rpm and the traverse speed of ۱۰۰ mm/min in all tools produced flawless samples. Then, tools with different tool pin profiles of triflate, cylindrical, threaded, triangular, square, and hexagonal were utilized in this study. The distribution of reinforcing particles in the base metal was studied using a light microscope. The results showed that the cylindrical tool was not able to distribute particles in the base metal even after four passes of the process and was not a suitable tool for composite production. Tools with flat surfaces, such as square and triangular tools, have performed better in distributing reinforcing particles in the base metal. The results showed that the presence of a kind of eccentricity and pulse production in these tools had improved the distribution of particles. Threaded and hexagonal tools have the best performance in the distribution of reinforcing particles in the base metal and can be introduced as a suitable tool for composite products in the FSP process. The results of this study also showed that the change in the direction of tool rotation improved the distribution of reinforcing particles in all tools.

کلمات کلیدی:

FSP, Pin Shape, Material Flow, Defect formation, Reinforcing particles distribution