

The Microstructure, Texture and Mechanical Properties of Friction Stir Welded Aluminum Alloy

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Abstract: The microstructure and texture of 7075-T6 FSW weld with optimal parameters are investigated using optical microscopy, electron back scatter diffraction and neutron diffraction. The mechanical properties are characterized through microhardness, nanoindentation and ultrasonic tests. The friction stir welding is performed at a nominal rotational speed of 1400 rpm and a traverse speed of 60 mm/min. The nugget zone contained fine, equiaxed and fully recrystallized grains. The texture of the base material mainly consisted of Cube and rotated Goss components. However, in the nugget zone, the dominant texture components were Band among common shear orientations. Elastic modulus was measured by ultrasonic and nanoindentation methods. The ultrasonic method being nondestructive, easy, inexpensive and fast. It is found that a little increase of Young modulus is observed in nugget zone compared to base metal.

Keywords : Aluminum alloy, FSW, microstructure, texture, Microhardness, Young modulus