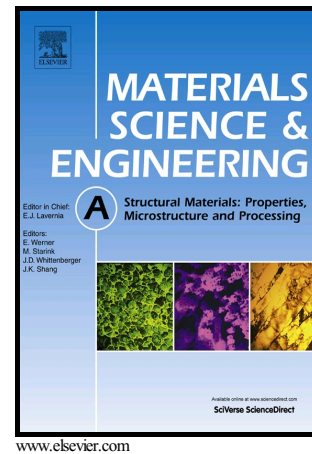


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# A comparative study of microstructure and mechanical properties between friction stir welded single and double phase brass alloys

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## Abstract

This study was done in order to compare the microstructure and mechanical properties of friction stir welded single and double phase brass alloys. The microstructure of the joints were examined using optical microscope, scanning electron microscope (SEM), scanning transmission electron microscope (STEM), and X-ray diffraction.

Furthermore, tensile test and fractography were applied to evaluate the mechanical properties of the joints. The results showed that the grain size of the stir zone in the double phase joint was smaller than that of the single phase alloy. In comparison with base metals, both of the joints contained high density of dislocations with a qualitatively similar texture. However, the dislocation density of the double phase joint was somewhat lower than that of the single phase one. Moreover, the joints had higher tensile strength, lower elongation and less ductile fracture compared to their base metals due to their finer grain size and higher dislocation density. The double phase joint had higher strength and lower elongation than single phase joint due to the effect of the second phase.

**Keywords:** Friction stir welding; Microstructure; Dislocation density; Mechanical properties; Brass.

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