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Investigation of the Mechanical and Microstructural Properties of TIG Welded Ti6Al4V Alloy

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Abstract

The joint integrity of 1 mm thick sheets of Ti6Al4V alloy welded autogenously using TIG welding was investigated in this article. The current and gas flow rate were varied and their effects on the mechanical properties and microstructure of the weld were analyzed. Results show that the microstructure within the weld zone consists of α'martensitic phase and are coarse, which results in higher microhardness within the weld zone compared to the base metal. The samples with a higher gas flow rate were observed to also improve the tensile strength, while samples with a lower gas flow rate resulted in tensile strength below that of the base metal.