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Co-Chairs: Jun Qu, Oak Ridge National Laboratory; Yongping Lei, China Nuclear Power Design Company; Peng He, Harbin Institute of Technology; Yunlong Chang, Shenyang University of Technology

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Investigation of microstructure and mechanical properties of CP–Ti/Q345 filled with Cu-based wires

Min Zhang; Qiaoling Chu; Jihong Li; Qingyang Fan; Weiwei Xie, Xi'an University of Technology

ABSTRACT

Fusion welding of CP–Ti to Q345 with Cu-based filler metals was performed by TIG welding method. The microstructures of the welded joint were analyzed by means of scanning electron microscopy (SEM), energy dispersive spectroscopy (EDS), and X-ray diffraction (XRD). Mechanical properties were evaluated by microhardness, tensile tests, and three-point bend tests. The effect of V ratio was detailed investigated. The results indicated that enhancing V ratio led to the extension of the reaction zones and increase ultimate tensile strength of joints. Fractured surface of the tensile specimen was dominated by brittle morphology. Enhancing the V ratio in the filler metals allowed diluting but not suppressing the formation of Ti–Cu intermetallics.

KEYWORDS: intermetallics, welding, microstructure, mechanical