

Laser-TIG Welding-Brazing for Dissimilar Metals between Aluminum Alloy and Steel

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Abstract : Experiments were conducted on 5A06 aluminum alloy and Q235 steel using the laser-TIG hybrid heat source welding-brazing method to realize the reliable connection of Al/Fe dissimilar metals and the welding characteristics were analyzed. It was found that the joints with uniform seam and high tensile strength could be obtained using such a method, while the welding process demanded special welding parameters. Spectrum measurements showed that the Al and Fe atoms diffused more thoroughly at the brazing interface and formed a 3 μ m-thick intermetallic compound layer at the Al/Fe joints brazed connection interface. Shearing tests indicated that the shearing strength of the Al/Fe welding-brazed joint was 165MPa. The fracture occurred near the melting zone of aluminum alloy, which belonged to the mixed mode with the ductile fracture as the base and the brittle fracture as the supplement.

Keywords : Al/Fe dissimilar metals, laser-TIG hybrid heat source, shearing strength, welding-brazing method

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