Intermetallic Phases in the Fusion Weld of CP Ti to Stainless Steel

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Abstract : In this paper, dissimilar welding of titanium to stainless steels is reported. Laser Beam Welding (LBW) and Gas Tungsten Arc Welding (GTAW) were employed to join CPTi to SS304. The welds were examined using scanning electron microscopy (SEM) and energy dispersive X-ray spectroscopy (EDS). FeTi, Ti2Cr and Fe2Ti dendrites are formed along with beta phase titanium matrix. The hardness values of these phases are high which makes them brittle and leading to cracking along the weld pool. However, it is believed that cracking, hence, fracturing of this weld joint is largely due to the difference in thermal properties of the two alloys.

Keywords : dissimilar metals, fusion welding, intermetallics, brittle

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