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HARDNESS AND MICROSTRUCTURE OF X12CrNiMo MARTENSITIC STAINLESS STEEL LASER ALLOYED WITH TITANIUM CARBIDE

X12CrNiMo martensitic stainless steel was laser alloyed with Titanium Carbide using a 4.4 kW CW Nd-YAG laser. The microstructure of the MMC was investigated using optical microscopy, X-ray diffraction (XRD) meter and scanning electron microscopy (SEM). A Vickers's hardness profile-indentations from the surface of the alloyed zone through to the substrate was measured at 100 μm interval using a load of 200 g. The alloyed Zone reveal a pores and cracks free MSS-TiC MMC. When the laser power and scanning speed were 2 kW and 0.014 m/min respectively, a Vickers's hardness value of two times that of the substrate was achieved in the MMC.

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