Short Communication

Effects of Graphite Particle Size on Microstructure and Properties of In-situ Ti-V Carbides Reinforced Fe-based Laser Cladding Layers

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The effects of graphite particle size on the microstructure, hardness and corrosion resistance of in-situ TiC-VC reinforced Fe-based laser cladding layers were studied. Results indicated that the corrosion resistance of the TiC-VC/Fe laser cladding layers could be improved by optimizing the graphite powder particle size. As the graphite particle size decreased from 180-270 μm to 1.3 μm , the average particle size of carbide decreased from 1.73 to 0.46 μm and the microstructure transformed from plate martensite into lath martensite, and finally into granular bainite. The hardness of the cladding layers decreased about 130 HV_{0.2}, but the corrosion resistance increased. The cladding layer prepared with a graphite particle size of 1.3 μm showed the best corrosion resistance, which was about 3.80 times greater than that of the cladding layer prepared with a graphite size of 180-270 μm .

Keywords: graphite particle size; corrosion resistance; laser cladding; TiC-VC

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