Anti-cavitation corrosion of CoCrFeNiAlx coating on TC4 through laser cladding

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Abstract The influence of different aluminium contents on the cavitation corrosion resistance of CoCrFeNiAlx high-entropy alloy (HEA) coatings deposited on TC4 through laser cladding in different media was investigated. The results showed that the cavitation corrosion resistance of the coatings firstly increased and then gradually decreased with the increase of Al content both in distilled water and simulated seawater, and the weight loss rate was much larger in simulated seawater than in distilled water. The increase of Al content led to a transfer of the coating's internal phase from a single FCC phase to FCC+BCC binary phases, which led to an increase of the corrosion resistance of the coating. As the BCC phase content increased, the plasticity of the coating decreased and the strength increased, which reduced the ability of the coating to absorb cavitation energy, leading to serious cavitation damage.

Keywords High-entropy alloy coating, Corrosion, Cavitation erosion, Marine environment, corrosion mechanism

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