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Effect of V content on microstructure and properties of laser-solidified

$\text{Fe}_{60}(\text{NiCrCoTiV}_x)_{40}$ ($x = 0, 0.5, 1$) multicomponent alloy coatings on AISI 1045 steel

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Abstract: $\text{Fe}_{60}(\text{NiCrCoTiV}_x)_{40}$ ($x = 0, 0.5, 1$) multicomponent alloy coatings on low-cost AISI 1045 steel were successfully prepared by laser surface alloying. The effect of V content on microstructure, micro-hardness, wear resistance and corrosion resistance were studied in detail. The $\text{Fe}_{60}(\text{NiCrCoTiV}_x)_{40}$ ($x = 0, 0.5, 1$) multicomponent alloy coatings are all composed of a FCC solid solution phase and a BCC solid solution phase with a Fe_2Ti -type Laves phase. The lattice parameter of the BCC solid solution phase is not sensitive to V content, but the addition of V leads to the decrease of FCC content and the refinement of Fe_2Ti -type Laves phase. The addition of V significantly affects the properties of coatings, and the $\text{Fe}_{60}(\text{NiCrCoTiV}_{0.5})_{40}$ multicomponent alloy coating has higher micro-hardness and better wear resistance while the $\text{Fe}_{60}(\text{NiCrCoTiV}_1)_{40}$ multicomponent alloy coating has the best corrosion resistance. In addition, the corrosion resistance of $\text{Fe}_{60}(\text{NiCrCoTiV}_x)_{40}$ ($x = 0, 0.5, 1$) multicomponent alloy

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