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P4.208 Mechanical alloying strategies for fabrication of new types of oxide dispersion strengthened low-activation one-phase high entropy alloys

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The CoCrFeNiMn high entropy alloy (HEA) and its low-activation variants strengthened by dispersion of nano-oxides prepared via mechanical alloying were investigated. The two ways of oxide dispersion creation were verified: direct adding of oxides and internal oxidation of oxidizable elements by adding the gaseous oxygen to the alloyed powder. The grain refinement of the one phase FCC alloy by presence of oxides was determined by microstructural analyses to be 50%. The positive effect of oxide dispersion on the strength properties was found to be between 30% and 70% for room and elevated temperatures, respectively. It was proven that the internal oxidation method can be used for a preparation of the ODS HEA alloy. This is especially applicable in the case of hard and abrasive oxides which do not erode during mechanical alloying and do not create fine dispersion.

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