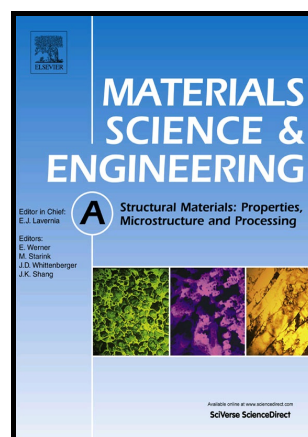


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The effects of phase transformation on the microstructure and mechanical behavior of FeNiMnCr_{0.75}Al_x high-entropy alloys

Rongbin Li^{b,a*}, Weiwei Zhang^a, Yong Zhang^c, Peter K Liaw^d

^a*School of Materials Science and Engineering, University of Shanghai for Science and Technology, Shanghai 200093, P. R. China.*

^b*Institute of Materials Science, Shanghai Dian Ji University, Shanghai 201306, P. R. China.*

^c*State Key Laboratory for Advanced Metals and Materials, University of Science and Technology Beijing, Beijing 100083, China.*

^d*Department of Materials Science and Engineering, the University of Tennessee, Knoxville, Tennessee 37996, USA.*

*Corresponding author: Tel.: 15116800186; 842363159@qq.com

Abstract

The effects of phase transformation on the microstructures and mechanical behavior of FeNiMnCr_{0.75}Al_x ($x = 0.25, 0.5$ and 0.75) high-entropy alloys (HEAs) were investigated. The crystal structures of the FeNiMnCr_{0.75}Al_x HEAs transitioned from the primary FCC1 and minor BCC ($x = 0.25$) to primary BCC and minor FCC2 ($x = 0.5$ and 0.75) phases. TEM images of the as-cast FeNiMnCr_{0.75}Al_x ($x = 0.25, 0.5$ and 0.75) alloys showed the BCC precipitates embedded in the FCC matrix phase. After annealing, two substantial phase transitions occurred for the $x = 0.25$ and 0.5 alloys from the BCC phase to the σ phase and between the FCC2 phase and the FCC1 phase, effectively increasing the yield strength and sharply reducing the strain. The

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