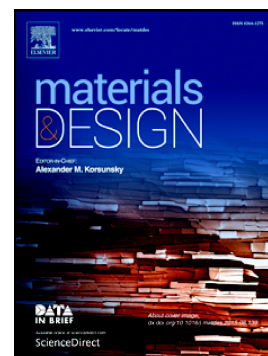


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Enhanced strength and ductility of bulk CoCrFeMnNi high entropy alloy having fully recrystallized ultrafine-grained structure

S.J. Sun ^{a, b}, Y.Z. Tian ^{a *}, H.R. Lin ^{a, b}, X.G. Dong ^c, Y.H. Wang ^d,

Z.J. Zhang ^a and Z.F. Zhang ^{a, b *}

^a *Shenyang National Laboratory for Materials Science, Institute of Metal Research, Chinese Academy of Sciences, Shenyang 110016, China*

^b *School of Materials Science and Engineering, University of Science and Technology of China, Hefei 230026, China*

^c *School of Materials Science and Engineering, Shenyang Ligong University, Shenyang 110159, China*

^d *National Engineering Research Center for Equipment and Technology of Cold Strip Rolling, Yanshan University, Qinhuangdao 066004, China*

Abstract

A high efficient magnetic levitation melting technique was reported for fabricating bulk equiatomic CoCrFeMnNi high-entropy alloy (HEA) ingot with a diameter of 110 mm. The bulk ingot can be either forged or rolled. In particular, fully recrystallized ultrafine-grained (UFG) HEA with a minimum grain size of 503 ± 181 nm was successfully obtained through a simple cold rolling and annealing process. The tensile properties of the HEA were studied by changing the grain size from the UFG regime to the coarse-grained regime. The UFG HEA exhibited a good balance of strength and ductility due to the low stacking fault energy. The linear Hall-Petch relationship was well fitted when the grain sizes range from 503 nm to 88.9 μm .

Keywords: High-entropy alloy (HEA); Ultrafine grain; Hall-Petch relationship; Strength; Ductility

* Corresponding author. Shenyang National Laboratory for Materials Science, Institute of Metal Research, Chinese Academy of Sciences, Shenyang 110016, PR. China.

E-mail address: yztian@imr.ac.cn (Y.Z. Tian), zhfzhang@imr.ac.cn (Z.F. Zhang).

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