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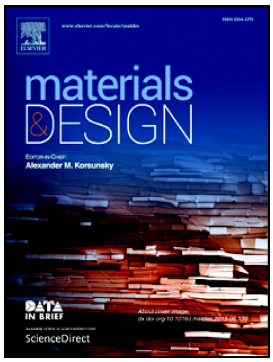

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A new strategy to design eutectic high-entropy alloys using simple mixture method

Hui Jiang[a], Kaiming Han[a], Xiaoxia Gao[a], Yiping Lu[a,*], Zhiqiang Cao[a], Michael C. Gao[b,c*], Jeffrey A. Hawk[b], Tingju Li[a]

[a]Key Laboratory of Solidification Control and Digital Preparation Technology (Liaoning Province), School of Materials Science and Engineering, Dalian University of Technology, Dalian 116024, P.R. China

[b]National Energy Technology Laboratory, 1450 Queen Ave SW, Albany, OR 97321, USA

[c] AECOM, P.O. Box 1959, Albany, OR 97321, USA

* Author to whom correspondence should be addressed; E-mail: luyiping@dlut.edu.cn; Tel.: +86 411 84708940. Email: michael.gao@netl.doe.gov; Tel.: +1 541 967 5869.

Abstract

Eutectic high entropy alloys (EHEAs) hold promising industrial application potential, but how to design EHEA compositions remains challenging. In the present work, a simple and effective strategy by combining mixing enthalpy and constituent binary eutectic compositions was proposed to design EHEA compositions. This strategy was then applied to a series of (CoCrFeNi)M_x (M = Nb, Ta, Zr, Hf) HEAs, leading to the discovery of new EHEAs, namely, CoCrFeNi$Nb_{0.45}$, CoCrFeNi$Ta_{0.4}$, CoCrFeNi$Zr_{0.55}$ and CoCrFeNi$Hf_{0.4}$. The microstructure of these new EHEAs comprised of FCC and Laves phases in the as-cast state. The experimental result shows that this new alloy design strategy can be used to locate new EHEAs effectively.