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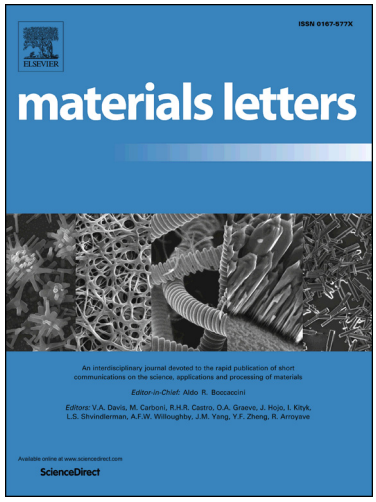

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A novel $Fe_{20}Co_{20}Ni_{41}Al_{19}$ eutectic high entropy alloy with excellent tensile properties

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Abstract

Eutectic high entropy alloys (EHEAs) are recently of great interest due to their excellent mechanical properties. However, only a few EHEAs have so far been designed because of the lack of multi-component phase diagrams. Here, a new $Fe_{20}Co_{20}Ni_{41}Al_{19}$ EHEA was successfully designed and studied. The alloy exhibited a nano-lamellar eutectic microstructure composed of ordered BCC (B2) phase and ordered FCC ($L1_2$) phase. The room-temperature tensile strength and total elongation of the alloy were as high as 1103MPa and 18.7%, respectively, which were better than those of a majority of as-cast high entropy alloys. The new alloy has a potential application in industry and will promote the further study of EHEAs.

Keywords: Metals and alloys; Microstructure; Mechanical properties; Eutectic high entropy alloys.

1. Introduction

Recently, a new multi-component alloy design concept, namely, high-entropy alloys (HEAs), was