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**Formation of soft magnetic high entropy amorphous alloys composites
containing *in situ* solid solution phase**

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Abstract Fe-Co-Ni-Si-B high entropy amorphous alloys composites (HEAACs), which containing high entropy solid solution phase in amorphous matrix, show good soft magnetic properties and bending ductility even in optimal annealed state, were successfully developed by melt spinning method. The crystallization phase of the HEAACs is solid solution phase with body centered cubic (BCC) structure instead of brittle intermetallic phase. In addition, the BCC phase can transformed into face centered cubic (FCC) phase with temperature rise. Accordingly, Fe-Co-Ni-Si-B high entropy alloys (HEAs) with FCC structure and a small amount of BCC phase was prepared by copper mold casting method. The HEAs exhibit high yield strength (about 1200MPa) and good plastic strain (about 18%). Meanwhile, soft magnetic characteristics of the HEAs are largely reserved from HEAACs. This work provides a new strategy to overcome the annealing induced brittleness of amorphous alloys and design new advanced materials with excellent comprehensive properties.

Keywords: High entropy alloys; Amorphous metals; Magnetic property; Phase transformation, Mechanical properties

1. Introduction

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