Nanocrystal Dispersed Amorphous Alloys with Improved Properties

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a method for producing amorphous alloys with a high density of nanocrystals dispersed throughout the alloy.

OVERVIEW

Aluminum glasses (a type of amorphous alloy) possess exceptional strength, good ductility, and corrosion resistance. Additionally, iron glasses (another type of amorphous alloy) possess good magnetic properties for electrical applications. However, an approach to precisely and accurately control the crystallization of these alloys has not previously been developed.

THE INVENTION

UW-Madison researchers have developed a method for adding an insoluble element like lead to the amorphous precursor. The element then creates small crystals in the amorphous matrix. The addition of the element up to approximately one atomic percent does not appreciably affect the mass density, and the resulting amorphous alloys have increased strength.

APPLICATIONS

• Production of aluminum- and iron-based amorphous alloys with improved properties

KEY BENEFITS

• Allows greater control over the initial size, density and dispersion of nanocrystals in amorphous alloys
• Provides aluminum-based amorphous alloys of greater strength and iron-based amorphous alloys with better magnetic properties than those produced with prior methods
• Elements such as lead, bismuth, indium and cadmium, as well as any material that is insoluble in the corresponding amorphous precursor matrix, can be added to the
amorphous precursor as seeds for nanocrystals.

- Inexpensive and reproducible.

ADDITIONAL INFORMATION

Tech Fields
Materials & Chemicals - Metals

CONTACT INFORMATION

For current licensing status, please contact Emily Bauer at emily@warf.org or 608-960-9842.