Patent Search

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Abstract:

The invention pertains to a method for the synthesis and characterization of novel lightweight metallic glass composites. The synthesis involves a controlled cooling p specifically designed metal alloy to form a composite that includes an amorphous phase and secondary crystalline phases. The characterization employs advanced te assess the structural and mechanical attributes of the material. These composites offer high strength, hardness, toughness, wear resistance, and corrosion resistance them suitable for a variety of industrial applications. The invention also provides for the production of application-specific composites and outlines a methodology fo scale, economically viable production.

Complete Specification

Description:The present invention pertains generally to the field of materials science and, more specifically, to the design, synthesis, and characterization of novel lightweight metallic glass composites. This innovative technique involves the synthesis of new classes of lightweight metallic glasses and their composites that exhib superior strength, hardness, and toughness. It also includes the use of advanced characterization techniques to evaluate the microstructure and mechanical proper these materials.

The invention further pertains to applications of these novel lightweight metallic glass composites in various industrial and technological sectors, including but not l to, aerospace, automotive, structural, and electronics applications, where high strength, light weight, and excellent wear resistance are critical.

Background of the invention:

The present invention provides a method for the synthesis and characterization of novel lightweight metallic glass composites. These composites demonstrate supe properties, such as high strength, high hardness, high toughness, and excellent wear resistance, making them ideal for a variety of industrial applications.

Metallic glasses, also known as amorphous metals, are a class of materials that exhibit a disordered atomic structure, unlike the regular, periodic structure found in traditional crystalline metals. This unique atomic arrangement provides metallic glasses with a variety of exceptional properties. However, conventional metallic glas often suffer from brittleness under high-stress conditions. The proposed invention addresses this problem by introducing a composite structure, which includes the dispersion of ductile crystalline phases within the amorphous matrix, enhancing the toughness and ductility of the overall material without compromising on streng hardness.

The method of synthesis involves controlled cooling processes of a heated metal alloy, a technique commonly referred to as rapid solidification. The alloy's compos

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