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A new class of non-crystalline materials: nanogranular metallic glasses

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Abstract

Nanogranular metallic glasses (NGMGs) or metallic nanoglasses are assembly of metallic glass (MG) granules with a size typically ranging from a few to 100 nm interconnected by glass/glass interfaces. These materials can be synthesized by different techniques including inert gas condensation and physical vapor deposition. In comparison with conventional MGs produced by cooling of liquids, NGMGs show enhanced thermal stability, ferromagnetism with higher Curie temperature, better biocompatiblity and superior mechanical properties. This review aims to introduce such a new class of non-crystalline solids: NGMGs, emphasizing on the preparation methods and the unique properties of these materials. Meanwhile, an outlook on this subject is proposed for the possible future research topics in the field of nanoglasses.

Keywords: Nanogranular metallic glasses; Nanoglass; Nanostructured materials; Vapor deposition