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Method of Making Nanocrystalline Metal Flakes via Ultrasonic Shot Peening

A highly efficient and environmentally friendly method uses ultrasonic shot peening to generate nanocrystalline metal flakes for application in polymer composites and surface coating.

Due to its peculiar and interesting mechanical, physical, and chemical properties, such as increased mechanical strength, enhanced diffusivity, and higher specific heat, nanocrystalline (NC) materials are experiencing rapid development. As opposed to conventional coarse-grained metal flakes, NC materials have a wide variety of technical applications such as electronics, catalyses, batteries, ceramics, magnetic data storage, structural components, etc. The industry needs a method to more rapidly and efficiently produce NC materials.

Researchers at Purdue University have developed a method to generate NC metal flakes by ultrasonic shot peening (USP). This technology leads to the formation of nanosized grains in the metal flakes, which has the potential for application in the field of polymer composites and surface coating. This method is highly efficient and environmentally friendly because the mechanism of this method is the severe plastic deformation and fatigue behavior of the materials.

Advantages:

-Highly efficient

-Environmentally friendly

Potential Applications:

-Nanocrystalline metal flakes

-Polymer composites

-Surface coating

TRL: 9

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Category
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Materials Science & Nanotechnology/Nanomaterials & Nanostructures
Chemicals & Advanced Materials/Materials Processing & Manufacturing Technologies

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