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Liquid Metal Calls The Shots

From: Stig Agermose <Stig.Agermose@online.pol.dk>
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Stig

'Liquid Metal' Calls the Shots

Heavy metal's got a brand new bag, and it comes in liquid form.

A new metal alloy, called Vitreloy, is the first ever produced whose atoms remain in a liquid state -- called an amorphous structure -- which gives it unprecedented properties of strength, hardness and weight.

According to today's issue of the journal Materials World, most alloys crystallize into planes as they cool, which in turn makes them susceptible to fractures, defects and other wear. But the secret to Vitreloy is all in the cooling.

Researchers at Cal Tech and then at the Howmet Corporation in Greenwich, Conn., discovered a way to mix mostly zirconium with beryllium, titanium, copper and nickel, and then cool it slowly so that it doesn't turn into solid form: liquid metal.

As a result, Vitreloy is twice as hard as titanium, for example, with three-quarters the density of stainless steel and a chrome-like smoothness.

"It's actually a high-density liquid," says Mike Tenhover, an engineer for Amorphous Technology International, which purchased the license from Cal Tech and markets golf clubs made of the alloy under the name, Liquid Metal Golf. "It was actually designed specifically for golf. But there are a variety of other applications as well that we're exploring."

Tenhover says they are developing Vitreloy under a U.S. Army contract for anti-tank weapons. At the same time, they are looking into the production of watch cases that would replace nickel and other metals, which can cause allergic reactions.

To take advantage of Vitreloy's smoothness and hardness, they have successfully tested the medical use of the metal in hip-replacement joints.

Steve Hill, editor of Materials World, says, "The key is the process that allows this metal to form the way it does. I can see a whole host of uses, including aerospace applications, where you need incredible strength and a lightweight nature, like airplane frames, for example, although it remains to be seen what will be cost effective to market."

By Christopher Jones, Discovery Channel Online News

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