

Press release

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Amorphous metals now 3D-printed for the first time In partnership with Exmet, a Swedish startup, Heraeus has developed the 3D printing of amorphous components, thereby expanding its range for special materials

Through a new technology partnership with the Swedish company Exmet, the Heraeus technology group has now broadened its portfolio of 3D-printed metals to include the highly sought-after group of materials known as amorphous metals. “Amorphous metals will change our future. They possess a wide variety of previously incompatible characteristics: They are very strong and yet malleable, as well as harder and more corrosion-resistant than conventional metals. Together with Exmet, we intend to open up this new class of materials for industry and 3D printing,” says Tobias Caspari, head of 3D Printing at Heraeus New Businesses. Heraeus contributes its extensive materials expertise, while Exmet brings their proficiency in manufacturing with 3D printing. “Particularly in additive manufacturing, it is crucial for the material and the manufacturing process to be perfectly matched in order to ensure the utmost consistency and quality,” Tobias Caspari emphasizes.

Amorphous metals are suitable for an exceptional number of high-tech applications. They are energy-absorbing and scratch-proof while still having very good spring characteristics – interesting for injection nozzle diaphragms, casing for consumer electronics, or as dome tweeters for speakers. “For fifty years the commercial success of amorphous metals has been held back by inadequate manufacturing methods. Now that changes. Exmet looks forward to cooperating with Heraeus as a competent partner with a worldwide network to help bring this disruptive new technology to the market,” says Mattias Unosson, Exmet co-founder and CEO.

Expertise in materials and processes critical to success

Heraeus develops high-tech metal powders and the related processes for additive manufacturing – a market with great potential, but far from “plug & play.” Expertise in materials and processes is crucial here, because the metal powder and the printing process must be individually matched with the desired component. Based on its more than 165 years of experience with metals and metals processing, the Hanau-based technology group focuses on manufacturing high-quality metal powders suitable for 3D printing, on researching new special alloys, and on developing the parameters for processing the materials. In addition, their customers have access to experts for design and process simulation, several manufacturing facilities, and recycling options for used metal powder.

Info box: Additive manufacturing

Additive manufacturing is a technology that produces three-dimensional parts layer by layer from metals, polymers or special materials. The use of additive methods such as selective laser melting to produce components from amorphous metal alloys opens up new possibilities, not only for their long-sought use as a structural material, but equally for the near-net-shape manufacturing of high-strength components with complex geometries and sophisticated designs. In what are known as powder-bed systems, layers of a powder (typically 20–50 µm thick) are applied to the substrate plate, and the cross-section of the component to be produced is melted by laser or electron beam and fused to the underlying structural layers. In this way, extremely complex structures can be manufactured layer by layer from a wide variety of materials. The limitations inherent in traditional manufacturing methods no longer apply, because even overhangs, undercuts or hollows can be created without the use of tools.

About Exmet AB and Heraeus

Disruptive technology from Exmet AB removes the limits set by casting, melt spinning and thermoplastic forming in manufacturing of amorphous metals. With Exmet AB's additive manufacturing (also known as 3D printing or free form fabrication) technology, engineers and designers can fully exploit the excellent properties of amorphous metals, also known as bulk metallic glasses (BMG) and glassy alloys. The result is products of almost any alloy (such as iron, titanium, aluminium, magnesium or cobalt based alloys) and shape, virtually unaffected by corrosion, with low magnetization loss.

Heraeus, the technology group headquartered in Hanau, Germany, is a leading international family-owned company formed in 1851. With expertise, a focus on innovations, operational excellence and an entrepreneurial leadership, we strive to continuously improve our business performance. We create high-quality solutions for our clients and strengthen their competitiveness in the long term by combining material expertise with technological know-how. Our ideas are focused on themes such as the environment, energy, health, mobility and industrial applications. Our portfolio ranges from components to coordinated material systems which are used in a wide variety of industries, including the steel, electronics, chemical, automotive and telecommunications industries. In the 2015 financial year, Heraeus generated revenues without precious metals of €1.9 bn and a total revenue of €12.9 bn. With approximately 12,500 employees worldwide in more than 100 subsidiaries in 38 countries, Heraeus holds a leading position in its global markets.

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