

AMORPHOUS METALS ARE CHANGING OUR FUTURE

Amorphous metals are metallic glasses and structured like quenched liquids. Bulk metallic glasses are quenched rapidly from the molten state retaining a disordered, non-crystalline structure. Or in other words, they are amorphous, which means “without shape”. This innovative class of materials possesses a wide variety of previously incompatible characteristics, making them suitable for many high-tech applications. Heraeus has made it possible to employ amorphous metals on an industrial scale, by using additive manufacturing and other technologies.



CONSUMER ELECTRONICS

Shock-absorbent, scratch- and wear-resistant – Shatterproof and lighter casings for smartphones



AUTOMOTIVE INDUSTRY

Extremely strong, thermoplastic – Stable suspension systems, wear-resistant gears and drive components



MEDICAL TECHNOLOGY

Harder and more corrosion-resistant than conventional metals – Sharp, durable scalpels and minimally invasive instruments



WATCHMAKING AND JEWELRY INDUSTRY

High surface quality – Jewelry and abrasion-resistant clockwork components



SPORTS AND LEISURE

High storage capacity of elastic energy – Golf clubs, skis and snowboards

Amorphous metals ...

PAST	TODAY
... were first produced in about 1960 at the California Institute of Technology and have been used in industrial niches (such as energy-efficient transformer cores).	... have been manufactured since 2015 by technology companies such as Heraeus, opening new markets and applications.
... required cooling rates of 10⁶ K/s from the molten state.	... solidify at cooling rates of 10-100 K/s and can be processed e. g. with 3D printing.
... consisted of relatively simple alloys, often with only two or three elements.	... consist of a wide variety of complex alloy systems with a range of custom-tailored properties .
... until now, production has been limited to thin one-dimensional strips.	... make it possible to manufacture high-strength components and complex three-dimensional structures.