European Innovation Council

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ADDITIVE MANUFACTURING OF AMORPHOUS METALS FOR SOFT MAGNETICS

AM²SoftMag is working toward the vision that 3D printing will one day become the de facto standard technology for manufacturing high-performance amorphous soft magnetic components for high-efficiency electrical machines and passive electrical components.

THE GOAL OF THE AM²SOFTMAG PROJECT

The project consortium combines the strengths of academic and industrial leaders in metallic glass design and processing, mechanical and magnetic testing, quality control and certification, and electrical machine design and testing. By developing powdered Fe-based amorphous soft magnetic alloys, optimizing SLM process parameters, and testing the resulting electromagnetic devices, the project members are targeting to achieve a significant breakthrough in the flexible and energy-efficient production of high-quality soft magnetic components.

Additive manufacturing enables customization of the design and in-situ fabrication of newly compositions of Fe-based soft magnetic materials. By adapting the design for the magnetic flux path, eddy current losses are limited. This results in higher efficient electric motors. By achieving high quenching rates, 3D printing enables the production of amorphous metallic components with very low coercivity, high resistivity, and high mechanical strength, whose microstructure can be further customized by post-annealing to improve magnetic properties. Furthermore, the near net shape production via 3D printing of amorphous soft magnets contributes to the circular economy by reducing waste and improving energy efficiency, thereby reducing the carbon footprint. Moreover, the use of non-environmentally critical elements plays an important role in the circular economy and make a significant contribution to the European Green Deal.

CONSORTIUM PARTNERS

AMAZEMET

Heraeus AMLOY

instituto IMdea materiales

INRiM Istituto Nazionale di Ricerca Metrologica

LAT Laboratory of Actuation Technology

LMW

Technische Universität Berlin

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