

Low-iron-loss amorphous soft magnetic materials for high-frequency

Lower loss, better processability, and broader material applicability than conventional nanocrystalline materials

Overview

Inductors and transformers, which consist of a magnetic core made of soft magnetic materials with wound coils, are widely used in applications such as electronic circuit boards in data centers. Particularly, amorphous soft magnetic materials are beginning to be applied to EV motors and other systems to improve energy efficiency. In these applications, reducing iron loss—comprising hysteresis loss, classical eddy current loss, and excess loss—is essential for achieving higher efficiency and miniaturization of power devices. At high frequencies, excess loss becomes dominant, and therefore material designs that effectively reduce this loss are required.

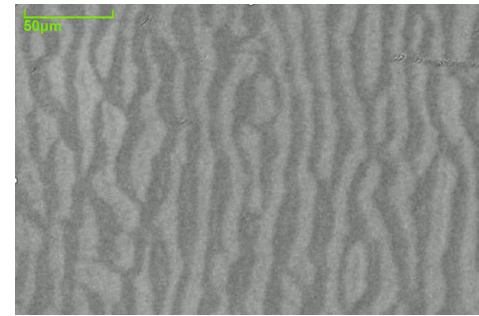
This invention relates to a simple processing method for amorphous soft magnetic materials to reduce excess loss. Compared with conventional approaches such as nanocrystallization, this method provides greater loss reduction at high frequencies, while also offering superior processability and applicability to a wide range of material systems.

Product Application

- Applications include high-frequency operation and miniaturization of electromagnetic components such as motors, transformers, and reactors.
- Examples include stator cores for EV drive motors, magnetic components such as toroidal cores used in data center power circuits, stator cores for drone brushless motors, compact motors and drive circuits in electric dental handpieces, and power converters for electric aircraft.

IP Data

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MOKE microscopy image: Formation of fine magnetic domains achieved by this method

Features • Outstandings

As the patent application has not yet been published, technical details—including the application specification—will be disclosed after the conclusion of a technology transfer agreement. Please feel free to contact us for further information.

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