

Press release

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innoelectric concludes international research project on innovative magnetic materials with niobium

The study results show a direct comparison in the On-Board Charger application

In an international research project, innoelectric AG, based in Bochum, Germany, and the Brazilian company CBMM have investigated whether nanocrystalline magnetic materials can significantly increase efficiency in electromobility.

Functional properties tested directly in the system architecture of the OBC

As part of the joint research work, the innovative soft magnetic core material with niobium was tested in direct application in the innoelectric On-Board Charger. In order to achieve the best possible results, the functional properties, thermal behavior and electromagnetic interference behavior were tested directly in an existing system architecture. The particularly high permeability of the soft magnetic material simplifies wiring and allows greater flexibility in the design of the cooling systems. At the same time, there is the potential to reduce the weight and size of the On-Board Charger and achieve higher efficiencies.

Impressive results in direct comparison

With the successful completion of the research project, innoelectric and CBMM have now published a study in which the soft magnetic nanocrystalline material is compared in detail with ferrite-based cores in terms of thermal behavior, size, cost and efficiency. The results provide an insight into the effects of using niobium on volume savings and optimized heat conduction.

The use of nanocrystalline material compared to ferrite-based magnet materials enables the following savings without any loss in efficiency and electromagnetic compatibility:

- **Reduction of the core volume by more than 50 %**
- **Reduction of the weight by more than 60 %**

With the help of the knowledge gained, innoelectric is now in a position to make targeted use of the potential advantages of using nanocrystalline, soft magnetic materials in future designs and thus generate decisive added value for the products.

innoelectric is a developer and manufacturer of innovative components for electromobility. The innoelectric On-Board Charger (OBC) offers both AC and DC charging options for electrified vehicles, commercial vehicles and machines. Thanks to integrated charging communication in accordance with all current international standards, the innoelectric On-Board Charger can be used safely and flexibly worldwide, even in 50 Hz and 60 Hz grid topologies. The On-Board Charger provides 22 kW charging power in AC mode and, as a "one-device solution", takes over the entire charging management including the necessary communication with the charging infrastructure (EVSE) for AC and DC charging. The OBC is currently in use in various applications with a wide range of requirement profiles. The OBC is available in 400 V and 800 V versions. The maximum efficiency is currently 96%.

CBMM is a global leader in the production and marketing of niobium products. Headquartered in Brazil and with branches in Switzerland, China, Singapore and the USA, the company supplies products for the infrastructure, mobility, aerospace and energy sectors.

Images

- (1) innoelectric 22 kW On-Board Charger and soft magnetic nanocrystalline magnetic cores
- (2) Soft magnetic nanocrystalline magnetic cores with niobium in laminated and powder form.
- (3) Comparison between an inductive component with a conventional ferrite core and an alternative with a smaller, soft magnetic nanocrystalline core

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Infolinks

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About innoelectric

innoelectric develops and produces components for electromobility. The portfolio focuses on power electronics and charging communication. In addition, innoelectric offers engineering services for issues relating to electromobility. A deep understanding of electromobility, personal enthusiasm of the team and a high sense of responsibility are the basis on which we fill our projects with life. innoelectric AG is headquartered in Bochum, Germany.

About CBMM

CBMM is a global leader in the production and commercialization of niobium products and has been in the market for over 60 years. CBMM is headquartered in Brazil and has subsidiaries in the United States, the Netherlands, Singapore and Switzerland as well as representative offices in China. CBMM manufactures and supplies niobium products and develops technologies for applications of niobium products in the infrastructure, mobility, aerospace, healthcare and energy sectors. CBMM has a production capacity that exceeds the global demand for niobium products. The company has a robust logistics infrastructure on all continents and serves more than 400 customers in 50 countries. The company's business model is based on sound corporate governance and relies on security of supply, innovation and the development of new technologies in collaboration with the world's most renowned research centers.