

Press release

Bochum, 8/2/2022

innoelectric and CBMM test innovative magnetic materials in electromobility

The aim of the cooperation project is to reduce charging losses thanks to soft magnetic cores

In an international research project between innoelectric AG, based in Bochum, Germany, and the Brazilian company CBMM, the cooperation partners are investigating whether nanocrystalline magnetic materials can significantly increase efficiency in electromobility.

As part of the joint research work, the innovative soft magnetic core material with niobium is being tested in direct application in the innoelectric On-Board Charger. To achieve the best possible results, the functional properties, thermal behavior and electromagnetic interference behavior are tested directly in an existing system architecture. In addition, the innoelectric research team is adapting the system architecture of the innoelectric On-Board Charger to the special properties of the magnetic material in order to be able to present its advantages even more specifically. Felix Burmeister, systems engineer and project manager at innoelectric, is optimistic: "Whether on land or water - our customers today already cover a very broad spectrum of different vehicles and fields of application. We want to offer them a product that provides great added value across its many features. We are very pleased to have won a partner with a large network in CBMM, with whom we can take our technology another decisive step forward. We are excited to see what new ways of optimization the new magnetic materials will enable, first in our lab and later in the field!"

Since soft magnetic cores allow significantly higher saturation points of induced magnetic fields, the use of the material can lead to a significant improvement in power density. Particularly high permeability simplifies wiring and allows greater flexibility in the design of cooling systems. At the same time, there is the potential to reduce the weight as well as the size of the On-Board Charger and to achieve higher efficiencies. Bharadwaj Reddy, CBMM-Technical market development specialist, describes the numerous reasons for the beneficial use of the material: "Nanocrystalline soft magnetic materials enable the minimization and highly efficient operation of magnetic components for EV charging applications. This is because nanocrystalline material has very high permeability, low coercivity, low magnetostriction, high Curie temperature up to 570 degrees Celsius and high saturation flux density."

The collaboration aims to publish a study that compares soft magnetic nanocrystalline and ferrite-based magnets in terms of thermal behavior, size, cost and efficiency. This will provide groundbreaking insights into the effects of using niobium in terms of volume savings and optimized heat conduction.

innoelectric is a developer and manufacturer of innovative components for electromobility. The innoelectric On-Board Charger (OBC) offers both AC and DC charging for electrified vehicles, commercial vehicles and machines. Thanks to integrated charging communication in accordance with all common international standards, the innoelectric On-Board Charger can be used safely and flexibly worldwide, even in 50 Hz and 60 Hz network topologies. The On-Board Charger provides 22 kW charging power in AC mode and, as a "one-device-solution", handles 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. Available as a 400 V and as an 800 V variant, the OBC is a highly efficient charging system. Currently, the maximum efficiency is 96 %.

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

Photos

- (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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Keywords

Niobium, magnetic technology, On-Board Charger, research project, collaborative project, international, charging technology, inductors, power electronics, magnet technology, nanocrystalline materials, electromobility, power efficiency, AC and DC charging, infrastructure, research, Soft magnetic cores

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About innoelectric

innoelectric develops and produces components for electromobility. Power electronics and charging communication are the focal points of the portfolio. In addition, innoelectric offers engineering services for issues related 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 has its corporate headquarters in Bochum, Germany.

About CBMM

CBMM is the world leader in the production and commercialization of Niobium products and has been in the market for over 60 years. CBMM is headquartered in Brazil, with subsidiaries in the United States, the Netherlands, Singapore and Switzerland and representative offices in China. CBMM manufactures and supplies niobium products and develops technology related to niobium product applications for the infrastructure, mobility, aerospace, health and energy sectors. CBMM historically has production capacity which exceeds the global demand for Niobium products. The company counts on robust logistics infrastructure in all continents, serving more than 400 clients in 50 countries. Its business model is guided by solid corporate governance and is based on guaranteed supply, innovation and development of new technologies in partnership with the most renowned research centers worldwide.