

## Press Release

## Driving E-Mobility with Copper Sinter Innovations: Heraeus Electronics Partner of Public Funded Joint Project “KuSIn”

Heraeus Electronics, an expert in materials and matched material solutions for the electronics packaging, is one of five partners in the three-year joint project "KuSIn - Copper sinter processes using induction heating for electromobility applications", funded by the German Federal Ministry of Economic Affairs and Climate Action (BMWK).

The joint project began in July 2023. Heraeus Electronics met with all partners at the headquarters of the sinter equipment manufacturer Budatec in Berlin for the project launch on July 12-13, 2023. Other partners and participants in this project are: Vitesco Technologies as well as the Chemnitz University of Technology and the Fraunhofer Institutes ENAS and IMWS.



### Kupfer-Sinterprozesse mittels Induktionserwärmung zur Anwendung im Bereich Elektromobilität

In the KuSIn project, pastes, tools, machines, and processes for inductive sintering of copper particles for (multi-)die and substrate attach<sup>1</sup> in electromobility, and related power electronics applications will be developed. Silver will be substituted by copper as a joining material in a resource-efficient way. The required higher sinter temperatures and the higher oxidation tendency of copper compared to silver are addressed by fast, selective, and energy-efficient inductive heating. The use of copper as a joining material in combination with induction heating is expected to enable significant improvements in process costs and energy efficiency while maintaining reliability compared to conventional silver sinter processes. Especially the increased use of sintering metal-ceramic substrates on heat sinks or other large-area structures, this could further support the spread of low-temperature sinter technology in power electronics.

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<sup>1</sup> Die and substrate attach are the technical terms for chip and substrate assembly on the circuit carrier.

Heraeus Electronics will develop copper pastes and processes for inductive sintering of copper particles for die and substrate attach for power electronic assemblies. Both material cost reduction and high-cost process parameters such as sinter temperature, time and pressure will be addressed.

In addition to coordinating the joint project, Vitesco Technologies will apply the new sinter process in the construction of a power module, which will be tested through extensive testing and analysis and compared with the state of the art.

In its subproject, Budatec is designing and implementing a sinter equipment with inductive heating and defined atmospheres. This will enable the inductive copper sinter process to be researched and later industrialized.

Chemnitz University of Technology will design and simulate the core components and the inductive sinter process. In addition, the sub-project includes the realization of an inductive sinter module for integration into the sinter equipment.

The Fraunhofer Institutes ENAS and IMWS will develop the induction coil and the copper sinter process as well as perform material diagnostics and reliability assessments in their subproject. For this purpose, Fraunhofer ENAS will conceptualize miniaturized induction coils for the inductive sinter module, realize them by means of microtechnological processes, and research the application of copper sinter paste in the inductive copper sinter process. The Fraunhofer IMWS is dedicated to microstructure-based research of copper sinter pastes during development and processing as well as to material interactions (joint formation, aging, degradation) in the inductively sintered contact interface based on non-destructive investigation methods, high precision target preparations, highest resolution analysis techniques as well as micromechanical, thermographic, electrical, and chemical characterization methods.

### About Heraeus

The Heraeus Group is a broadly diversified and globally leading family-owned technology company, headquartered in Hanau, Germany. The company's roots go back to a family pharmacy started in 1660. Today, Heraeus bundles diverse activities in the Business Platforms Metals and Recycling, Healthcare, Semiconductor and Electronics as well as Industrials. Customers benefit from innovative technologies and solutions based on broad materials expertise and technological leadership.

In the 2022 financial year, the group generated revenues of €29.1 billion (US\$30.6 billion\*) with approximately 17,200 employees in 40 countries. Heraeus is one of the top 10 family-owned companies in Germany and holds a leading position in its global markets.

(\* calculated with 2022 average exchange rate, 1€ = 1.0530 US\$)

### Über Heraeus Electronics

Heraeus Electronics is a leading manufacturer of materials for the assembly and packaging of devices in the electronics industry. The company develops material solutions for the automotive, power electronics and advanced semiconductor packaging market and offers its customers a broad product portfolio - from materials and material systems to services.

### Medienkontakt

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