**Speech subject：** Maximize the performance of SiC device with advanced sinter technology.

***Speech leader:*** Jing Zhang, Head of Shanghai Innovation Center, Heraeus Electronics China, Heraeus Materials Technology Shanghai Ltd

**Speech Description/Objective:**

Silicon Carbide (SiC) technology is revolutionizing power electronics with its superior properties, such as high thermal conductivity, high breakdown voltage, and high switching frequency. However, the packaging of SiC devices poses significant challenges in terms of thermal management, mechanical stability, electrical performance, and reliability under high stress. To address these challenges, advanced sinter technology has emerged as a critical solution, particularly in the forms of highly large area sintering and copper (Cu) sintering, both in pressure and non-pressure sintering processes.

Highly large area sintering involves the uniform distribution of heat across extensive surfaces, which is essential for high-power SiC devices. This technique ensures effective thermal management, enhances mechanical robustness, and improves reliability under high-stress conditions. The ability to manage heat efficiently is crucial for maintaining the performance and longevity of SiC devices, especially in demanding applications such as power modules, inverters, and high-frequency converters.

Copper sintering, on the other hand, leverages copper ’ s excellent thermal and electrical conductivity and cost-effectiveness. Pressure sintering of copper requires the application of pressure, resulting in higher density and improved bonding, making it suitable for high-power applications. Conversely, non-pressure sintering does not require pressure application, simplifying the process and making it more cost-effective for less demanding applications. The choice between pressure and non-pressure sintering depends on the specific performance requirements and cost considerations.

The integration of advanced sinter technology in SiC device packaging not only enhances thermal and electrical performance but also extends the lifespan and reliability of the devices. Future trends in sinter technology point towards innovations such as hybrid sintering techniques, advanced materials, and integration with other packaging technologies. These advancements promise to further optimize the performance of SiC devices, solidifying sinter technology as a pivotal component in the evolution of power electronics.

In conclusion, highly large area sintering and copper sintering, both pressure and non-pressure, represent significant advancements in the packaging of SiC devices, addressing critical challenges and paving the way for future innovations in power electronics.

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In this presentation, the progress of sinter technology development of Heraeus Electronics will be presented and discussed.

**Speech Outline:**

**Who Should Attend:**

**Introduction of Speaker:**
Dr. Jing Zhang, head of Shanghai Innovation Center, Heraeus Electronics China, graduated from Delft University of Technology. His research of interests includes power electronic packaging material, process and reliability. In 2017, he joined Heraeus, focusing on advanced packaging and reliability evaluation for the WBG semiconductor devices. He has published 20 papers, authored 1 academic work. Dr. Zhang is the Founding Chairman of IEEE Electronics Packaging Society (EPS) Benelux Branch, the Executive Secretary of the International Technology Roadmap for Wide Bandgap Power Semiconductors (ITRW). He also serves as a member of the Technical Committee of the Center for Shanghai Silicon Carbide POWER Devices Engineering & Technology Research. He is an off-campus supervisor of master's students at Fudan University and Shanghai Jiaotong University.