Keynote speaker:

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Title of the Presentation: ***Enabling Advanced Chiplet and SiP Architectures: Materials, Interconnects, and Thermal Solutions.***

Martin Metzler is Senior Manager for Technical Business Development. In this role, he leads a Europe-wide team and is responsible for technical business development across the region. He manages a diverse product portfolio within the Circuit Board Assembly and Semiconductor Assembly business areas, focusing on engaging with customers early on and integrating advanced materials and processes into future electronic applications.

Prior to joining MacDermid Alpha, Martin spent over twelve years in various engineering, senior engineering and expert roles at Continental AG and its spin-off, Vitesco Technologies. His responsibilities included developing and industrialising power electronics, particularly focusing on material and process innovation, as well as specifying, procuring and qualifying complex manufacturing equipment.

Over the years, his focus gradually shifted towards technology and project management.

Most recently, he was Technology Manager for the development of SiC-based power modules. As an expert, he also took a leading role in setting up a global network of sintering technology experts, thereby making a significant contribution to international knowledge exchange and competence development.

Martin holds a Dipl.-Ing. degree in engineering from the University of Applied Sciences in Nuremberg, specialising in manufacturing technology.

Abstract

Integrating advanced semiconductor components into 2.5D and 3D-stacked architectures, as well as System-in-Package (SiP) solutions, requires highly specialised materials to meet the growing demands for electrical performance, thermal management and mechanical reliability. This presentation will address the technological challenges and material-based solutions across the entire structure of an advanced package, from the active silicon die to the complete system level.

Adopting an 'inside-out' approach, the presentation begins with materials at die level, such as die attach and underfills, before progressing to critical interconnect technologies, including microbumps, TSVs (Through-Silicon Vias) and RDLs (Redistribution Layers). Particular focus is given to the importance of high-performance interconnect materials in ensuring signal and power integrity. Subsequent sections then cover the material requirements for interposers, substrates and encapsulation. A particular focus is placed on thermal management, including the use of TIMs, heat spreaders and innovative materials for efficient heat dissipation, which is crucial for system reliability.

Through industrial examples and current trends, the presentation provides practical insights into the direct impact of intelligent material selection on the performance, efficiency and longevity of advanced packaging solutions.

The session is targeted at students, academic representatives and technical experts from industry and offers both a foundational understanding and a forward-looking perspective on materials in next-generation electronics packaging.