



Manufacturing Transformation Era: Process Solutions for Wafer and Panel- Level Packaging Driven by Semiconductor Process Technology

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Abstract:

To realize a smart society, AI-driven information and communication technology has become a crucial infrastructure. It enhances data processing efficiency and real-time capabilities through the integration of cloud, fog, and edge computing. These technologies bring innovation to every aspect of our lives and businesses.

The AI module, which is one of the components for realizing advanced AI, requires advanced semiconductor manufacturing technologies to achieve low latency (less than 1ms) and low power consumption. To meet these demands, in addition to the performance enhancement of semiconductor chips through traditional miniaturization technology based on Moore's Law, advanced packaging technologies that enable efficient performance improvement of AI modules through high-density integration are essential. On the other hand, the advancement of AI modules presents challenges such as reduced yield due to the complexity of three-dimensional structures, rising costs, and increased power consumption.

ULVAC has been continuously developing manufacturing solutions to achieve heterogeneous integration through substrate packaging, 2.5D interposers, and 3D-IC technologies, including through-silicon vias (TSV) and hybrid bonding. Furthermore, to contribute to the cost reduction of AI modules, ULVAC is continuing its efforts to achieve manufacturing technology in panel-level packaging (PLP) as a mid-process while maintaining the quality based on wafer-level packaging (WLP). In this presentation, ULVAC will outline its efforts in heterogeneous chiplet integration, which involve plasma etching/ashing and PVD (Physical Vapor Deposition) sputtering techniques to achieve high-density interconnections.

Speaker's Biography:

Taku Hanna joined ULVAC in 2017. He earned a Ph.D. in Engineering with a focus on inorganic material development from the Tokyo Institute of Technology. He has been involved in the development of highly-sensitive hydrogen detectors, alloys, and oxide semiconductor materials,

as well as oxide semiconductor TFT devices. Currently, he is working as a Senior Manager in the fields of advanced packaging technology and power semiconductors at the Institute of Advanced Technology at ULVAC. In this role, he is engaged in the research and development of semiconductor manufacturing equipment, including sputtering and etching equipment.