**Global Research Outreach\_2025\_Call for Proposal**

**Theme: Semiconductor Materials**

**- Sub-Theme: New Heterogeneous Integration Materials**

With the development of heterogeneous integration architecture technology completed through connections between diverse chiplets, more and more new technologies are required. In particular, many new materials used during the integration process are required, such as ultra-high thermally conductive dielectric materials for HCB (hybrid copper bonding) or SOD materials used for gap-fill applications responsible for thermal management of SIP(system-in-package). Moreover, this demand for new materials will intensify with the introduction of glass core substrates, which are spotlighted as next-generation package substrates. In order to use these new materials for heterogeneous integration, not only the thermal conductivity must be satisfied, but various characteristics must be satisfied at the same time. These demanded characteristics of thermally conductive materials include low CTE (coefficient of thermal expansion), patternability, easiness of CMP, Low-temperature deposition processability etc.

To address these limitations, it is essential to pursue research on the discovery of new material structures suitable for heterogeneous integration, predictive simulation of material properties, and development of integration process-compatible thin-film fabrication techniques. We are mostly interested in fundamental research that solve problems arising in the above areas, such as but not limited to:

* Novel thermal conductive material capable of depositing at low temperature under which chip performance is not deteriorated.
* Simulation method predicting thermal conductivity and deposition temperature of materials
* Novel thermal conductive process material for integration capable of low temperature process

※ *The topics are not limited to the above examples and the participants are*

*encouraged to propose the original idea.*

※ *Funding: Up to USD 150,000 per year*