

Theme: Semiconductor Equipment

- Sub Theme: Stirling Cryogenics Cooler for Semiconductor

Demand for large-capacity ultra-low temperature cooling technology is increasing for semiconductor ultra-high integration and high-precision manufacturing processes. In order to obtain a high aspect ratio in semiconductor etching equipment, ultra-low temperature cooling technology is required to quickly remove heat generated during the etching process.

Now we are looking for cryogenic cooling systems that have large capacity for semiconductor equipment and are environmentally friendly, energy and space efficient. Among the various cryogenic cooling systems, the advantages of the stirling cooler include 1) the use of eco-friendly natural refrigerants such as helium, hydrogen, and nitrogen, 2) a wide operating range due to the generation of cold heat by the sensible heat change of the refrigerant, 3) a high coefficient of performance and a coefficient of performance that gradually decreases even when the range of temperature rise increases, 4) low number of mechanical parts and high space efficiency, 5) low noise and low vibration due to gentle pressure change during cycle.

The topics we are through this GRO are as follows (but not limited to):

1. System analysis technologies for stirling cryogenic cooling
2. Design of the core parts of stirling cryogenic cooler
3. Design and manufacture of stirling cryogenic cooler that have large capacity
4. Establishment of stirling cryogenic cooler performance test method
5. Stirling cryogenic cooler performance test
6. Proposal for practical use of stirling cryogenic cooler

※ *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*