

Development of Multiple Cryocooler with Pulse-tubes for High-temperature Superconducting Magnets

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It is thought that the temperature range for operation of high-temperature superconducting (HTS) magnets is 20K to 50K, if superconducting (HTS) magnets are made from rare earth materials. Therefore we have examined by tests the practicability of applying a pulse tube cryocooler which has advantages of simple structure, high reliability and their excellent maintainability to cooling systems of onboard HTS magnet of Maglev. When the two pulse-tube cryocoolers (the multiple active buffer pulse-tubes) are operated in the reverse phase mode, the cooling power of over 100W was achieved at the temperature of 50K, and the coefficient of performance (COP) of the multiple active buffer pulse-tube cryocoolers increased by 1.6 times compared with that of the pulse-tubes operated in the same phase mode. Furthermore, as an attempt to improve the cooling power, the regenerator materials were changed for examination.