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# Development of high efficiency Stirling cryocooler for high temperature superconducting motor

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For the wide spread of high-temperature superconductor (HTS) devices, a cryocooler having COP of >0.1, compact size, light-weight, high efficiency and high reliability is required. For practical use of superconductive devices, especially HTS motor used for electric vehicle. We developed a high efficiency Stirling pulse-tube cryocooler (STP). STP has high reliability and low vibration. However its efficiency was not enough to meet the demands of HTS motor. To further improve the efficiency, we reconsidered the expander of cryocooler and developed a Stirling cryocooler. A cooling capacity of 151W at 70K and a minimum temperature of 33K have been achieved with compressor input power of 2.15kW. Accordingly, the COP was about 0.07. The detail of cryocooler and the experimental results will be reported in this paper.

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