



Contribution ID: 47

Type: **Poster Presentation**

Development of 1 kW Stirling cryocooler with using linear compressor

Tuesday 30 June 2015 09:00 (2 hours)

Cryogenic cooling systems for HTS electric power devices require a reliable and efficient high-capacity cryocooler. A Stirling cryocooler with a linear compressor can be a good candidate. It has advantages of low vibration and long maintenance cycle compared with a kinematic-driven Stirling cryocooler. In this study, we developed dual-opposed linear compressor of 12 kW electric input power with two 6 kW linear motors. It is experimentally measured the electromagnetic parameters of fabricated linear motor such as thrust constant, effective resistance and inductance. The developed Stirling cryocooler has gamma-type configuration. Moving components of piston and displacer is supported with flexure spring. A slit-type heat exchange is used for cold and warm-end, and the generated heat is rejected by cooling water. In cooling performance test, electric heat is loaded to measure cooling capacity and spatial temperature distribution in cold-end heat exchanger surface. In addition, displacement of moving parts, dynamic pressure, input voltage and current are also measured during operation. With the measured experimental data, the dynamic behavior of linear compressor is discussed.

Primary author: Dr KO, Junseok (Korea Institute of Machinery & Materials)

Co-authors: Dr YEOM, Hankil (Korea Institute of Machinery & Materials); Dr KIM, Hyobong (Korea Institute of Machinery & Materials); Dr IN, Sehwan (Korea Institute of Machinery & Materials); Dr PARK, Seong-Je (Korea Institute of Machinery & Materials); Dr HONG, Yong-Ju (Korea Institute of Machinery & Materials)

Presenter: Dr KO, Junseok (Korea Institute of Machinery & Materials)

Session Classification: C2PoB - Stirling and Pulse Tube Cryocoolers

Track Classification: CEC-03 - Cryocoolers (Non-Aerospace)