

Development of Turbo-Brayton Refrigeration System

J. Ko, J. Kim, S. Choo, Jiho Park, H. Lim, J.Y. Park, J. Seo, Y. Lim, H. Yeom, Korea Inst. of Mach. & Mat'ls, Daejeon, Korea

This paper describes the development of a turbo-Brayton refrigeration system. The refrigeration cycle is designed to produce 10 kW of cooling at 77 K, with neon as a working fluid. The system consists of a 2-stage centrifugal compressor, compander, and plate heat exchangers. The turbo machines have static gas bearing and operate around 40 ~ 50 krpm. Four segments of a commercial plate heat exchanger are used for the main heat exchanger. The system has an additional gas management system for supplying bearing gas and cooling gas to the turbo machines. Cooling capacity is measured via the heat load generated by an electric heater. The developed refrigeration system shows 8 kW at 80 K and 10 kW at 90 K of cold-end temperature.