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C1Po1A-08: Study on Zero Boil-Off of Liquid Hydrogen using a Single Stage GM cryocooler

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Hydrogen is expected to become a one of the major energy sources as an environment-friendly fuel because it emits no carbon dioxide when used. Rather than as a gas, hydrogen will be transported and stored as liquid hydrogen (LH2) owing to its higher density, which enables more efficient utilization of container capacity. However, LH2 has a very low boiling point of 20 K, so a small amount of heat produces boil-off gas. For long-term storage of LH2, a system for cooling and recondensation the boil-off is required. Therefore, we demonstrated zero boil-off of LH2 by cooling and recondensing boil-off gas using a single stage Gifford-McMahon (GM) cryocooler and a heat exchanger. In this paper, we report on the results of the demonstration experiment for zero boil-off gas.

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