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Cooling experiment analysis of a prototype thermal siphon system for single crystal ingot growth magnet

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Thermal siphon system is a cooling method for a large scale superconducting magnet system by circulating cryogen through cooling channel. In this paper, a small scale prototype thermal siphon system for single crystal ingot growth magnet is designed based on liquid and gas He circulation. The designed system is tested as a part of design method validation process. The cooling performance of the system is analyzed with experiment. The experiment is conducted in different heat input conditions to investigate different magnet heat input conditions such as AC losses. The system is also tested with two different helium levels to analyze the effect of the amount of cryogen. Finally, a revised topology of the prototype system, which is a candidate cooling system of the single crystal growth magnet product, is suggested based on the test results.

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