

Investigation of Liquid Nitrogen/Fluorocarbon Mixture for HTS Apparatus

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Liquid Nitrogen/Fluorocarbon mixture would be an effective coolant and insulating medium of high-temperature superconducting (HTS) magnets and power devices, which may provide a cryogenic environment in the wide temperature range of 50 to 100K and serve as a liquid dielectric. In this paper, the gas-liquid-solid phase equilibrium, boiling heat transfer and insulation characteristics of the LN₂/CF₄ mixture were discussed firstly, and then its applications in the fields of superconducting electrical technology, such as superconducting energy pipeline, superconducting fault current limiter, superconducting reactor/magnetic energy storage, and superconducting magnetic resonance instrument are presented with an emphasis focused on their electromagnetic characteristics and thermal stability compared with those devices cooled by other means.

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