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Development of Hydrogen Supply and Exhaust System for Liquid Hydrogen Cooled Superconducting Rotating Machine

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Superconducting generator has been developed with NbTi superconducting field winding cooled by liquid helium, but not yet commercialized.Superconducting motor and wind generator has been recently developed using BSCCO or REBCO wires which are mainly cooled by liquid nitrogen or refrigerator.

On the other hand, hydrogen based energy infrastructure is now promoted and liquid hydrogen is becoming an important energy carrier.We proposed to utilize liquid hydrogen as a coolant for superconducting generator.The superconducting generator can improve the power system stability and hence promote the introduction of renewable energies to the power system.Liquid hydrogen immersed cooling is preferable for rotor field winding of middle or large capacity commercial generator.

Experimental facility for the development of hydrogen supply and exhaust system for the hydrogen cooled rotor was introduced as one of the important component technology.

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