

# Investigation of Quench Behavior in Superconducting Fault Current Limiter Using Acoustic Emission Sensor

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The vibration signal from a quench generated in a resistive type superconducting fault current limiter (SFCL) was measured and analyzed using acoustic emission (AE) sensor. When a SFCL limits a fault current, the quench, which means fast phase transition from super- to normal state, happens with vibration due to high-energy explosion. We measured the vibration signal using AE sensor in order to identify the physical variation in SFCL during the quench. The tested SFCL sample was a Bi-2212 bulk tube with shunt coil connected in parallel. A special AE sensor fabricated to be used in cryogenic temperature was installed at the terminal of the SFCL tube. For introducing fault currents, the input voltage was set to 200V<sub>rms</sub>, and 12~25kA<sub>rms</sub> of 5 cycles was applied to the test circuit. The AE sensor made uniform magnitude of signals when the SFCL operates stably. However, in case that unexpected problem happened in SFCL, the detected signal was varied irregularly. From the results, it was expected that we could diagnose the quench behavior of SFCL in LN<sub>2</sub> indirectly.

Keywords : superconducting fault current limiter, acoustic emission sensor, quenches

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