

SUPERCONDUCTOR APPLICATION FOR FAULT CURRENT LIMITER

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ABSTRACT

Superconducting fault current limiters (SFCL) offers an attractive mean to limit short-circuit currents in power systems. A prototype of Resistive Fault Current Limiter using Bi-2212 based superconductor was developed and tested in order to study their fault current limitation characteristics. The most important physical property dominating the current limiting behavior of the SFCL is the electric field-current density (E-J) characteristics of High Temperature Superconductors (HTS) which is dependent on temperature. In this article we present the experimental results for a static impedance test and for a dynamic short circuit test. The static and dynamic tests are used to define the device operating conditions and to characterize the limiter's performance respectively. With the superconducting limiter in the test circuit, short circuit fault currents are limited to a few times the nominal current. The device impedance shows an initial rapid response followed by a more gradual increase over the first few cycles of fault current. Using a simplified circuit model analysis the experimental results are used to deduce materials parameters such as the superconductor current density and resistivity. The development prospects for high- T_c superconducting fault current limiters are discussed.