Fabrication and Fault Test of BSCCO/Cu-Ni SFCL Elements

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For the development of superconducting fault current limiters (SFCLs) having large current capacity, we fabricated an SFCL element that consists of Bi-2212 superconductor and Cu-Ni alloy tubes. First, Ag was plated on the surface of the Bi-2212 for the enhancement of soldering process. On the Ag-plated Bi-2212 tube, a Cu-Ni alloy tube was soldered using optimized solders and soldering conditions. The BSCCO/Cu-Ni composite was processed mechanically to have a helical shape for the improvement of the SFCL characteristics. The total current path of the SFCL element was 1330 mm long with 12 turns, and had critical current of 340 A at 77 K. Finally, we carried out the fault test using the fabricated SFCL element. It showed successful current limiting performance under the fault condition of 50 V_{rms} and 5.5 kA. From the results, the rated voltage of the SFCL element was decided to be 0.4 V/cm, and the power capacity was 12 kVA at 77 K. The fabrication process of the SFCL and the fault test results will be presented.

keywords : Bi-2212, Cu-Ni alloy, SFCL, Soldering process.

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