

Recovery Process in Au/YBCO Meander Lines

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We investigated recovery process in Au/YBa₂Cu₃O₇ (YBCO) meander lines on sapphire substrates. The meander lines were fabricated by patterning YBCO films coated with gold layers. The lines were subjected to simulated AC fault current. Small current was applied right after the fault for recovery measurements. The samples were immersed in liquid nitrogen during the experiment. After the fault was removed, the quench resistance decreased first slowly and then fast. The initial slow decrease was due to the decrease of the meander line temperature, and the fast decrease due to the N-S transition. The recovery speed depended on the size of samples. Data were analyzed quantitatively with the concept of heat transfer within the sample and to the surrounding liquid nitrogen. A heat balance equation was solved for the initial phase of recovery, and the solution was compared with data. It agreed with data well. The result of this work will be applied to the design of superconducting fault current limiter elements with short recovery time.

Keywords : recovery, quench, YBCO thin film, heat transfer

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