

Contact Resistance Characteristics of High Temperature Superconducting Bulk- II

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Abstract—We have studied the contact characteristics of two resin-impregnated Y-Ba-Cu-O (a composite of $\text{YBa}_2\text{Cu}_3\text{O}_y$ and $\text{Y}_2\text{BaCuO}_5+10\text{wt}\%\text{Ag}_2\text{O}$) bulk superconductors in mechanical contact. In the previous work, fundamental characteristics of mechanical contact between two YBCO bulks were studied. A switching phenomenon between high and low resistance range could be observed at a threshold current or a transfer current value in the V-I curves. In this paper we found that the transfer current exceeded 30A and the contact resistance decreased to $40\ \mu\Omega$ at 77K for the mechanical contact when the sample surfaces were carefully polished. Moreover we succeeded in decreasing the contact resistance to $6\ \mu\Omega$ with depositing the metal on the contact surface. The present results suggest that a pair of YBCO blocks might be applicable to the mechanical persistent current switch for superconducting magnetic energy storage and other superconducting systems that are run in a persistent current mode.

Index terms— Persistent current switch, Contact resistance, Transfer current, High - Temperature superconductor, YBCO