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STUDY OF THE SUPERCONDUCTING PROPERTIES OF THE Bi-Ca-Sr-Cu-O SYSTEM

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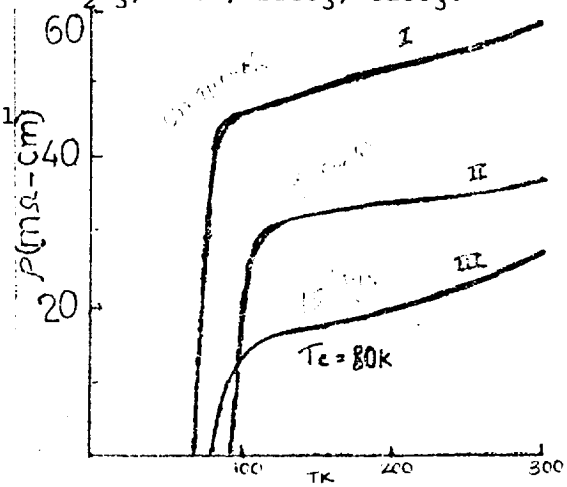
INTRODUCTION

High Temperature Superconductivity in the Bi-Ca-Sr-Cu-O System has been observed and has attracted considerable attention in the year 1988 (103). The 80 K superconductivity phase has been identified to have a composition of $Bi_2Ca\ Sr_2Cu_2O_x$ while 110 K phase as reported in the literature has a possible composition of $Bi_2Ca_2Sr_2Cu_3O_x$.

We present here a study of the electrical properties of bulk samples of slowly cooled and rapidly quenched 2:1:2:2 system. The samples used in this study were prepared from appropriate amounts of Bi_2O_3, CuO , $SrCO_3$, $CaCO_3$.

ADDITIONAL INFORMATION

Resistivity vs. temperature curves for typical unquenched and quenched specimens are shown in Fig. (a). The resistivity of the unquenched sample (curve I) shows metallic temperature behaviour down to the superconducting onset at Tc onset 90 K while zero resistance Tc is observed at 72 K. The resistivity of the rapidly quenched sample (curve II) showed a Tc onset around 105 K while zero resistance was found at 90.5 K. Neither sample shows any evidence of a second onset at 105-110 K. The electrical resistivity curve for a sample similar to curve II but exposed to atmosphere for 15 days is shown in curve III. This behaviour is in agreement with the work reported in Ref. (4). However, it has been suggested that the improved behaviour of quenched materials is caused by an oxygen deficiency (5) and this decay could then result from the uptake of atmospheric oxygen. The X-ray crystallographic studies showed that most of the samples were of single phase.



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