Research Title Preparation of $Bi_xPb_ySr_2Ca_2Cu_3O_z$ Superconductors

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Abstract

The effect of Pb addition on superconductivity of the high Tc superconductor $Bi_2Sr_2Ca_2Cu_3O_z$ was studied by preparing $Bi_xPb_ySr_2Ca_2Cu_3O_z$ using solid reaction method. The starting compounds were Bi_2O_3 , PbO_2 , $SrCO_3$, $CaCO_3$ and CuO with atomic composition ratio of Bi + Pb : Sr : Ca : Cu = 2 : 2 : 2 : 3 . The well - mixed powder was calcined at temperatures in the range of 830 - 840 °C and then pressed into pellets. These pellet samples were consequently sintered at temperatures between 830 - 960 °C . It was found that these samples showed Meissner effect at temperatures above the boiling point of liquid nitrogen. Also , the critical temperature(Tc) was observed to be dependent on Pb quantity in the sample. However , the maximum Tc was 107.1 K when x = 1.4 and y = 0.6 . The crystal structure of this sample was identified by means of X - ray diffration to be tetragonal , with lattice parameters a = b = 5.41 Å and c = 37.42 Å.