

Effect of Addition of Different Elements on Superconducting Properties of the Bi-Sr-Ca-Cu-O System

S.H.S.P. Samarappuli¹ and M.A.K.L. Dissanayake²

¹ *Institute of Fundamental Studies, Hantana Road, Kandy*

² *Department of Physics, University of Peradeniya, Peradeniya*

Effect of Sn addition on superconducting properties of $\text{Bi}_4\text{Sr}_3\text{Cu}_4\text{O}_y$ and Ni, P, and Ag addition on superconducting properties of $(\text{Bi}_{0.7}\text{Pb}_{0.3})\text{SrCaCu}_{1.5}\text{O}_y$ have been investigated using electrical resistivity, ac magnetic susceptibility and X-ray diffraction. Sn addition appears to favour the formation of the 85 K phase and reduce the $(\text{Bi}_{0.7}\text{Pb}_{0.3})\text{SrCaCu}_{1.5-x}\text{Ni}_x\text{O}_y$ material, Ni appears to replace Cu up to about $x=0.2$ composition resulting a drop in T_c . Future addition of Ni up to $x=0.95$ gives rise to a multiphase material but the superconductivity is retained with a lower T_c . For $x>1$, however, the material becomes semi-conducting.

Addition of P a drop in $(\text{Bi}_{0.7}\text{Pb}_{0.3})\text{SrCaCu}_{1.5}\text{O}_y$ using $\text{Ca}_3(\text{PO}_4)_2$ gives rise to a drop in T_c from 100 K to 70 K appears to favour the formation of the 85 k phase. Incorporation of a few atomic % of Ag in to this material appears to reduce the normal state resistivity significantly, without affecting the T_c .