EFFECTS OF Y-DOPING ON THE $Hg_{0.82}Re_{0.18}Ba_2Ca_{1-x}Y_xCu_2O_{6+x}$ SUPERCONDUCTING PROPERTIES

C. A. C. Passos, P. C. M. Cruz, R. A. Cotta, M. G. Virgens, M. T. D. Orlando
UFES
L. G. Martinez
IPEN/USP

The $Hg_{0.82}Re_{0.18}Ba_2Ca_{1-x}Y_xCu_2O_{6+d}$ superconductors samples, (Hg-12(n-1)(n), with n=2), were prepared to investigate the dependence of T_c with different itrium (Y) content. It was chose $0.05 \leq x \leq 0.55$ as the investigated range. The synthesis of the samples involves as the first step the preparation of precursor. It were prepared the following precursor; $Y_2Cu_2O_5$, $Y_2Ba_2Cu_3O_{8+d}$, $YCaCuO_{6+d}$, $YBaCuO_4$, $Ba_4CaCu_3O_{8.25}$, $Ba_2Cu_3O_{5+d}$, $CaCu_2O_3$, $Y_{1.4}BaCu_{1.6}O_5$ e $BaCuO_{1.97}$. The samples were produced by the solid-vapor reaction between HgO and a stoichiometric ratio among several precursor, and take place in vaccum sealed quartz tube. In order to avoid the explosion of the quartz tube (mercury vapor pressure inside the tube) it was used a hydrostatic pressure furnace ($P = 30$bar) to make the thermal treatment. Taken into account that the reaction occours in a sealed quartz tube, the stoichiometry chose for the precursor define the sample oxygen content. The X-ray powder diffraction reveals that there is not any Y-precursor precipitation, however for $x < 0.15$ the n=3 phase start to apears. The magnetic AC susceptibility ($H_a = 5$ Oe and ν=430 Hz) measurements of the samples have shown T_c reduction as an increment of the Y content. Moreover, it was notice that there is a secound transition signals. The behaviour indicated to be T_c(Y content) linear dependent and could be fited by $T_c(Y\%)$= 128(4)K - 0.7(1)*($Y\%$). This linear decreament of T_c was observed in Hg,Re-1223 doped with Y in the site of Ca. It was suggested to be this behaviour related with the PICT (Pressure Induced Charge Transfer). The Y dopping change the carrier in the inner layer and induced a "overdoped" which reduce the T_c value.