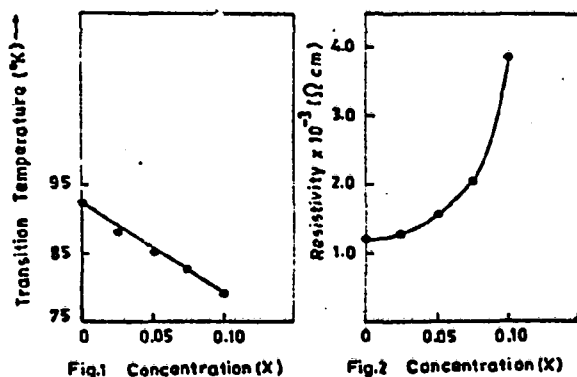


YBa₂Cu₃O_{7-x} DOPED WITH V₂O₅ : SYNTHESIS AND SUPERCONDUCTIVITY

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Since CuO₂ planes in RBa₂Cu₃O_{7-x} play an important role in high T_c superconductivity, the substitution of transition elements at Cu sites in these superconductors on their superconducting behaviour has been investigated extensively. To our best of knowledge, substitution of Vanadium has not been so far reported in YBa₂Cu₃O_{7-x}. Since V ion can exist in V⁺⁴ or V⁺⁵, it is interesting to see the effect of V substitution at Cu sites. Samples YBa₂(Cu_{1-x}V_x)₃O_y with x = 0.00, 0.025, 0.05, 0.075 and 0.1 were prepared using conventional technique. The samples reannealed in flowing O₂ at ~ 600 C for approximately 24 hours showed metallic resistivity behaviour except for x = 0.1, which showed a semiconducting resistive behaviour. Further annealing of this sample for 120 hours, changed this behaviour to that of metallic. X-ray diffractograms showed that the main Bragg peaks essentially remained the same indicating that the samples were single phase and the native orthorhombic structure of 123 compound remained essentially undisturbed. Resistivity of these samples at room temperature as a function of x increases rapidly



as shown in Fig.1. It was observed that the hardness of the samples also increased with x. All samples showed magnetic levitation at LN₂ temperature, and were superconducting as observed by four terminal resistance measurements. As shown in Fig. 2., the superconducting transition temperature T_c (T when R = 0) of YBa₂(Cu_{1-x}V_x)₃O_y is found to decrease linearly as a

function of x. The transition width increased slightly with x. The ΔT_c as a function of x is not as much as one may have expected due to the mixed valence of V ion.

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