SUPERCONDUCTIVITY AND NORMAL-STATE BEHAVIOR OF CO-DOPED $(\mathbf{Y_{1-x}Gd_x})\mathbf{Ba_2}(\mathbf{Cu_{0.98}Zn_{0.02}})_3\mathbf{O_{7-\delta}}$

E. Burzo, I.Gr. Deac, V. Pop, R. Tetean

Babes-Bolyai University, Faculty of Physics, RO 3400 Cluj-Napoca, Romania

Polycrystalline samples of composition $(Y_{1-x}Gd_x)Ba_2(Cu_{0.98}Zn_{0.02})_3O_{7-\delta}$ were investigated, for their superconducting and normal-state properties, by using resistivity, ac and dc susceptibility measurements. X-ray powder diffraction has been used to find the lattice parameters of the samples. The doped Zn acts as scatterer and induces a local spin magnetic moment. The interaction of this induced moment with the Gd^{3+} magnetic moment could change the normal behavior of those compounds and magnetic anomalies were shown in dc magnetic susceptibility measurements. Electrical resistance and ac susceptibility data indicated that T_c value decreases as the level of Gd doping increases. The conduction mechanism of electrons as revealed by (T) behaviour seems follow a crossover from purely metallic regime to the localization regime due to weak localization or electron-electron interaction. The electrical and magnetic anomalies above T_c are also analyzed taking account the presence of a pseudogap (spin-gap) that opens in the density of states above a characteristic temperature T^* $(T^* > T_c)$.

9.7 cm

13.4 cm

Subject category :

1. Correlated Electrons and High Temperature Superconductors

Presentation mode :
poster

Corresponding author :
R.Tetean

Address for correspondence :
Babes-Bolyai University, Faculty of Physics,
RO-3400 Cluj-Napoca,
Romania
Tel: ++4064194315 ext:196, Fax: ++4064191906

Email address :
rote@phys.ubbcluj.ro