Influence of pH During Modified Sol-Gel Process to Synthesized Pure Phased YBCO

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Among numerous studies of high-Tc superconductor compound, the YBCO system is the most studied system. During 3 last decades synthesized of high quality pure homogeneous powder were done. One of these methods was modified citrate gel that was widely used to obtain nanosized single phase YBCO. One of the most important factors to yield pure product is adjustment of the pH during the gelation. Then in this work, we adjusted different pH for gelatin and compare phase purity and elemental composition by using XRD and EDS. To synthesize the YBCO, we used Nitrate of metal (Y, Ba, Cu) as precursor. stochiometric (1:2:3) amount of metal nitrate were solved in distilled water and mixed with constant stirring ,(for each equivalent gram of metal nitrate add one equivalent gram of citric acid) and stirred up to have unclear light blue solution and the ethylendiamine was added drop wise to adjust pH from 4.56 to 7.45. Then the solution was heated up 80 C to achieve viscous gel. The color changed from dark blue to purple according to pH. The gel was heated on furnace up to 520 C and kept for 2 hours. During heating the gel swell and filled the baker then special attention is needed to use over sized baker.

Obtained powder was calcined for 22h at 900 C to yield homogeneous pure phase and then pellets with 1cm diameter in 10 ton pressure were produced and sintered for 19h at 930 C and annealed to room temperature in oxygen.

Resistivity measurement using standard four probe technique exhibit Tc (zero) from 90 K to 94 K. The samples were discussed by XRD, SEM and EDS.

Monte Carlo Glauber dynamics of structural T/O transition in YBCOx

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We have chosen an Ising ASYNNNI model under grand canonical ensemble consideration to investigate structural phase transition from high symmetric paraelastic Tetragonal (T) to lower symmetric ferroelastic Orthorhombic (OI) in YBa2Cu3O6+x ($0<x<1$). The ordering process of absorbed oxygen from an external bath into basal planes of layered superconductor YBCOx is studied by Monte Carlo Glauber dynamics, which involves effect of chemical potential on oxygen diffusion. Our simulation predicted short range superlattice orthorhombic II and III (OII, OIII) orderings corresponds to the oxygen stoichiometry (x) and environmental temperature that it is confirmed by our ND studies (ILL, France) and other authors.