

E1-23: Preparation and characterization of the $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_x$ superconductor via citrate precursors by sol-gel technique

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In the Bi-Sr-Ca-Cu-O system, at least 2 separate crystalline phases which exhibit different critical temperatures have been identified; the so called 2212 phase with T_c about 85 K and 2223 phase with T_c about 110 K. In general Bi-Sr-Ca-Cu-O superconductors are prepared by solid state sintering. However, it is difficult to prepare single phase materials by this technique and the superconducting phase is very sensitive to annealing conditions. The sol-gel technique via citrate precursors may solve this problem.

In this work superconducting samples with nominal composition $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_x$ were prepared via citrate precursors by the sol-gel technique. Resistivity and ac magnetic susceptibility of the samples were measured down to 20 K. The resistivity vs temperature measurements exhibited a superconducting transition below 95 K with zero resistivity at ≈ 75 K. This behaviour was also confirmed by the ac magnetic susceptibility measurements. Powder X-ray diffraction measurements showed that the samples were mostly of the so called 85 K 2212 phase, with the presence of a small fraction of the 110 K phase. This was also evident in the resistivity vs temperature curve from the small drop at 125 K.