

STUDIES ON DIFFERENT SYNTHETIC ROUTES FOR THE PREPARATION  
OF  $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$  SUPERCONDUCTORS

O.A. ILEPERUMA <sup>a,b</sup>, M.A.K.L. DISSANAYAKE <sup>a,b</sup>,  
N. HATUHRUSINGHE <sup>a,b</sup>, AND S.H.S.P. SAMARAPPULI <sup>a</sup>

a - INSTITUTE OF FUNDAMENTAL STUDIES, KANDY, SRI LANKA.

b - FACULTY OF SCIENCE, UNIVERSITY OF PERADENIYA,  
PERADENIYA, SRI LANKA.

Several synthetic routes for the preparation of  $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$  superconducting materials have been reported in the literature. These include solid state reaction of oxides, carbonates and the calcination of initially precipitated carbonates, oxalates, citrates etc. We have also reported how a new superconducting phase can be obtained in a mixture of the  $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$  and  $\text{Bi}_2\text{Ca}_1\text{Sr}_2\text{Cu}_2\text{O}_y$  superconductors by varying the preparation method. In this case the method of preparation is shown to affect the structure and properties of the final product obtained via solid state reactions.

In the present study  $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$  was prepared via one of the following routes.

- (a) Sintering  $\text{Y}_2\text{O}_3$  and  $\text{BaCO}_3$  at  $950^\circ\text{C}$  followed by the addition of the third component,  $\text{CuO}$  and sintering again.
- (b) Sintering  $\text{Y}_2\text{O}_3$  and  $\text{CuO}$  at  $950^\circ$  followed by the addition of the third component,  $\text{BaCO}_3$  and sintering again.
- (3) Sintering  $\text{BaCO}_3$  and  $\text{CuO}$  to  $950^\circ$  followed by the addition of the third component,  $\text{Y}_2\text{O}_3$  and sintering again.

In all these cases the standard annealing procedures were carried out as in the preparation of the 123 superconductor. The samples were studied by XRD, electrical conductivity as well as the Meissner effect. It was found that only (a) and (b) above resulted in superconducting phases while (c) did not. These results may have implications in the preparation of monophasic superconducting materials.