

## SYNTHESIS OF REBaCuO( RE = Y, Yb AND Pr ) FILMS BY CHEMICAL VAPOR DEPOSITION

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REBaCuO( RE = Y, Yb and Pr ) films, which have an wide possible application for microelectronics, have been successfully prepared by chemical vapor deposition method. The electrical properties and crystallographic structure of the deposited films were greatly influenced by substrate temperature, oxygen partial pressure, vapor concentration of source materials, temperature profile of heater etc.

Faster growth of YBaCuO film that accompanied the formation of a porous microstructure was observed as the total pressure was reduced. c-axis oriented structure was obtained by controlling the vapor concentration of source materials. The small change of vapor composition led to the texture changes of the films whereas the electrical properties(  $T_{c,0}$  and  $T_{c,onset}$  ) were hardly affected. Depending on the kinds of used substrate the development of minor texture component such as (110,103) and (h00) were mainly influenced whereas the electrical properties(  $T_{c,0}$  and  $T_{c,onset}$  ) were hardly affected. YBaCuO film, which was prepared at a relatively high temperature of 850°C, showed a high  $T_c$ (  $T_{c,0} > 90K$  ) and a high  $J_c$  above  $10^5 A/cm^2$  ( 77K,  $H = 0$  ).

REBaCuO films( Y, Yb and Pr ) were prepared at low substrate temperature of 650°C by controlling the temperature profile of heater as well as the oxygen partial pressure(  $PO_2 = 0.0126$  Torr ). The YBaCuO and YbBaCuO films showed a superconductivity above 77K( 81.5 - 87K ) with a relatively high  $J_c$  in the order of  $10^4 A/cm^2$ ( 77K,  $H = 0$  ). PrBaCuO films showed also an 123 structure and c-axis oriented structure was developed. The REBaCuO films( Y, Yb and Pr ) prepared at 650°C showed a large c-axis parameter of 11.7 ~ 11.8 Å. Two dimensionally well aligned microstructure was also observed for the films prepared at 650°C on SrTiO<sub>3</sub>(100) and LaAl<sub>3</sub>(100) substrates as well as the films prepared at 850°C.

211 and 132 phases were also deposited depending on the preparation conditions and CuO and Yb<sub>2</sub>O<sub>3</sub> were deposited when the vapor composition was Cu- and Yb- rich. It indicates that the texture and the amount of second phase such as CuO and Yb<sub>2</sub>O<sub>3</sub>, which are very beneficial for the flux pinning of REBaCuO superconductor, can be easily controlled.

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