

4136431 SCPC/M : MAJOR: PHYSICAL CHEMISTRY;  
M.Sc.(PHYSICAL CHEMISTRY)

KEY WORDS : HTSC / Orthorhombic distortion /  $T_c$  / (d+s) wave theory

Lt.Jg. NIPAPHAT CHAROENTHAI : RESPONSE OF RARE EARTH-123 HIGH  $T_c$  SUPERCONDUCTORS TO ZINC(II) ION DOPING : POSSIBLE DEPENDENCE ON RARE EARTH ION SIZE. THESIS ADVISORS: PONGTIP WINOTAI, Ph.D., I MING TANG, Ph.D., SAUVAROP LIMCHAROEN; Dr.rer.nat, 70 p. ISBN 974-664-322-3

The effects of Zn doping in the  $REBa_2Cu_{3-x}Zn_xO_{7-y}$  HTSC (RE = Er, Y, Ho, Dy, Gd and Sm) were studied experimentally. X-ray diffraction patterns were taken to determine the effect of Zn doping on the different RE-123 superconductors. Iodometric titration was used to determine the copper valency of all fabricated specimens.

Since one of the aims of the research was to examine the effect of changes in the orthorhombic distortion on the transition temperatures, only specimens having nearly identical copper valency were subjected to detailed measurements. The valencies of specimens studied were in the range between 2.190-2.195. The  $T_c$ 's were measured and their values were 91.37, 91.82, 92.04, 92.47, 93.10 and 93.26 K respectively. The suppression of  $T_c$ 's of the different RE-123 due to Zn doping was explained within the framework of a newly developed (d+s)- wave theory for HTSC.