PREPARATION OF HIGH DENSITY SUPERCONDUCTING CERAMIC BY HOT-PRESSING TECHNIQUE

B.S.B. Karunaratne
Dept. of Physics, University of Peradeniya.

$YBa_2 Cu_3O_{7-x}$ ceramic has recently generated great interest because of the observation of superconductivity above liquid nitrogen temperature. For various physical measurements the superconducting powder is normally formed into pellets by cold pressing and the firing. However, the density of such pallets are considerably lower than the theoretical density (T.D.) and mechanically weak. The pores in the material will also reduce the attainable critical current in the superconductor. Therefore it is important to study the densification methods of this ceramic material.

In this investigation, high density (97% T.D.) samples were prepared by hot-pressing superconducting powder at 950°C for 1½ hours under 45 MN m^{-2} pressure. As hot-pressed samples were mainly tetragonal and superconducting orthorhombic form was obtained by subsequent oxygen annealing at 900°C. Microstructure and X-ray diffraction studies showed that there was a considerable texturing in these samples.