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**FABRICATION AND CHARACTERISATION OF
 $\text{Bi}_{1.6}\text{Pb}_{0.4}\text{Sr}_2\text{Ca}_2\text{Cu}_3\text{O}_y$ SUPERCONDUCTORS PREPARED BY
SOLID STATE REACTION TECHNIQUE**

THE THESIS SUBMITTED BY

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to the Board of Study in Physics of the
POSTGRADUATE INSTITUTE OF SCIENCE

in partial fulfillment of the requirement

for the award of the degree of

MASTER OF SCIENCE IN PHYSICS OF MATERIALS

Of the

**UNIVERSITY OF PERADENIYA
SRILANKA**

2006.

608727



**FABRICATION AND CHARACTERISATION OF
Bi_{1.6}Pb_{0.4}Sr₂Ca₂Cu₃O_y SUPERCONDUCTORS PREPARED BY
SOLID STATE REACTION TECHNIQUE**

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ABSTRACT

Three Bismuth based superconducting samples with the composition Bi_{1.6}Pb_{0.4}Sr₂Ca₂Cu₃O_y were prepared using solid state technique. The Bi₂O₃, PbO, SrCO₃ and CuO powders of 99.99% purity were used as starting raw materials. The powders were mixed with the nominal cation ratio Bi:Pb:Sr:Ca:Cu = 0.8:0.2:1:1:1.5 and the mixed well using dry grinding. Then the powder was divided into three sets and with the labels Sample1, Sample2 and Sample3. Then the samples were calcinated at constant temperature of 820⁰C and the pallets of diameter 14 mm and of thickness 1-2 mm were prepared under the pressure of 200 kg/cm², 300 kg/cm² and 250 kg/cm². After that the pallets were subjected to preliminary sintering at constant temperature in the furnace and allowed to furnace cooling to room temperature in air.

The resistance measurements at low temperatures were performed on these samples using a resistivity probe. The sample1 shows the onset superconducting transition temperature T_{onset} at 103 K and 101 K, when cooling and heating respectively. The sample2 shows the onset superconducting transition temperature T_{onset} at 111 K and 112 K, when cooling and heating respectively. The sample3 shows the onset superconducting transition temperature T_{onset} at 110 K and 110 K, when cooling and heating respectively. The XRD measurements were also performed and conclude that the samples consists Bi2223 phases.