

Ceramic superconductor

YSrCaCuO

UGC sponsored minor project in Physics

Submitted to

the University Grants Commission

(UGC Ref. No.: MRP(S)-1407/11-12/KLMG002/UGC-SWRO, Dated 10.07.2012)

By

SAM RAJAN



**DEPARTMENT OF PHYSICS
CMS COLLEGE
KOTTAYAM
KERALA**

Brief Report of the Study

In the present work new nano crystalline ceramics YSrCaCuO was prepared and analyzed. The perovskite phase structured ceramic materials were prepared by the conventional solid state reaction technique using initially by mechanical assist through grinder and pestle for 24 hours later by ball milling process for 48 hours. The prepared samples were allowed for calcinations at different treating temperatures to acquire the desired homogeneity and phase formation. In order to show the viability of the proposed method, these powder were prepared in a special furnace.

The samples were analyzed by X-ray Diffraction (XRD), Debye-Scherrer formula, FTIR, SEM. The analysis of XRD files by mathematical methods and by software's confirmed the cubic structure of the samples with $a = 7.543 \text{ \AA}$. Scanning electron microscopy (SEM) studies revealed that the particle sizes are in the nano meter range. It also confirmed the calculated value of particle size using the Debye Scherrer's formula. In FTIR the band at 1434.11, 1749.55, 3646.75 cm^{-1} confirmed the presence of O octahedral. This confirms that the sample would be superconducting