

SYNTHESIS OF $Tl_{0.85}Cr_{0.15}Sr_2CaCu_2O_{7-\delta}$ SUPERCONDUCTOR FROM COPRECIPITATION Tl-FREE PRECURSOR

N. Ibrahim, M. I. Mohd Yusof and F. Md. Salleh

Faculty of Applied Sciences, Universiti Teknologi MARA,
40450 Shah Alam, Selangor, Malaysia

ABSTRACT

In this study, high purity $Tl_{12}12$ superconductor samples were successfully synthesized from $Tl_{0.85}Cr_{0.15}Sr_2CaCu_2O_{7-\delta}$ nominal starting composition by a two-step solid-state reaction method using Tl-free precursor powder prepared from coprecipitation method. The effect of using two different excess amount of precipitating agent (case I and case II) to react with metal oxalates in precursor preparation by coprecipitation method was investigated. XRD pattern of all samples sintered at $1000^\circ C$ for 4 minutes essentially showed formation of high purity 1212 phase. The results of samples' zero resistance critical temperature, $T_{c\ zero}$ were between 98-99 K and bulk critical current density, J_c measured at 40 K in zero magnetic fields were around $5-9 A/cm^2$. SEM investigation on the sample derived from case I and II revealed distinctly different sample morphology. The synthesized high purity sample can be useful as starting material for high temperature superconductor tapes fabrication.

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