# THE EFFECT OF VARYING IN SINTERING DURATION ON CHARACTERIZATION OF $Tl_{0.8}Cr_{0.2}Sr_2Ca_{0.8}Cu_2O_7$ SUPERCONDUCTOR SYNTHESIZED BY CO-PRECIPITATED METHOD

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## ABSTRACT

### THE EFFECT OF VARYING IN SINTERING DURATION ON CHARACTERIZATION OF $Tl_{0.8}Cr_{0.2}Sr_2Ca_{0.8}Cu_2O_7$ SUPERCONDUCTOR SYNTHESIZED BY CO-PRECIPITATED METHOD

The effect of varying in sintering duration on superconductivity properties and microstructure of Tl 1212 were systematically studied. The main purposes of this study are to produce a sample of thallium-based system with nominal composition $Tl_{0.8}Cr_{0.2}Sr_2Ca_{0.8}Cu_2O_7$ and to study the effect of varying in time duration at sintering on superconductivity properties and microstructure of Tl-1212. The procedure of methodology has two parts which are preparation of Tl-1212 using COP method and characterizations process such as $T_c$ and SEM. The results are discussed in relation between critical temperature and microstructure. $T_c$ for samples heated at 4, 6 and 8 minute is 92K, 81K and 83K respectively. The microstructures for sample heated for 4 minutes have a smooth surface than the samples that heated for 6 and 8 minutes which has a rough and not homogenous grains size. The appropriate sintering time is 4 minutes in order to achieve a homogenous structure.

# CHAPTER 1

## 1.1 Introduction

Superconductor has physical properties that vary from material to material, such as the heat capacity and the critical temperature. Superconductors are materials that have no resistance to the current flow. Furthermore, superconductor is an extraordinary electrical and magnetic characteristic material. They will exhibit perfect conductivity where has a zero resistance. The properties of superconductor only exist at very lower temperature.

Thallium is a chemical element that mostly is use in electronics industry and also pharmaceutical industry.

Nowadays, Tl-based system had been studied to synthesize it in order to get the exactly critical temperature of high purity superconductor. Besides, to get the phase characterization and the microstructure are also the aim of the studied.

Since the sintering process gives affect to the properties and microstructure of Tl-based system, so, in this study, the effect of varying in sintering duration on superconductivity properties and microstructure of Tl 1212 will be observed.

It is well known that the synthesis method play an important role in order to produce sample with good quality and high pure-phase. One of the methods is co-precipitated