



## Chapter I

### Introduction

#### 1.1 Hydroxyapatite

Hydroxyapatite (HAp) is an inorganic or mineral phase of bone matrix, bone is composed of living cells and matrix. The cells in bone control the remodelling process that regulates the bioavailability of the minerals within the skeleton whereas the matrix controls the structure properties of the skeleton and is the framework with cell live ( Lavernia and Schoenung, 1991 ).

HAp has extensively attracted to be used as a substitute material because of its structural likewise to main inorganic of matrix bone. In addition, it has been proved as a biocompatibility with surrounding tissues and is the bioactive implant material. However, the limitation of HAp in its use in some mechanical properties is not sufficient for more demanding load bearing application. At present, a strengthening of HAp has been performed in several ways such as incorporation with composite materials and surface coating system. The application of HAp using as biomaterial has been continuously studied.

## 1.2 Objective and Scope

The aim of this research was to increase the strength of HAp prepared from cattle bone ash by inducing compressive surface stress. The method was commonly done by coating with material having lower thermal expansion coefficient in order to induce the compressive stress at the surface of substrate. In this study, calcium phosphate glass was used as a coating material. The glass composition was selected in such a way that it had the appropriate coefficient of thermal expansion by adding  $\text{Na}_2\text{O}$ . In this experiment, HAp specimens were prepared by extruding the paste into rod shape specimens, sintering and then characterizing. Coating process was carried out by dipping the sintered specimens in to the molten glass under a controlled temperature and time. The mechanical strength of the coated specimens was measured and compared to that of the uncoated one.

### Flow Chart of the Experiment

