



CHAPTER I

INTRODUCTION

1.1 Introduction

The most common process to extract zinc from zinc ore is a hydrometallurgical process. This process produces large amount of waste, containing of various heavy metals such as lead, cadmium and cobalt, which are toxic [1,2,3]. Generally, the great volume of waste generated from the hydrometallurgical process is stored in different types of close containers or in sealed reservoirs or landfill near the plant [4,5]. Since landfill of the waste requires a large space or soil occupation and specific close container, the expansive cost resulted from making the container and more area becomes a problem for industries.

Recycle zinc waste by transformation to valuable form that is friendly with environment is an alternative way to solve this problem. Nowadays, literatures have reported on the use of zinc waste as raw material for producing some products such as building materials, pigments, refractories and glass-ceramics.

Considering the chemical composition of waste, its main composition is SiO_2 , CaO , Fe_2O_3 and Al_2O_3 , which are the basic oxides in ceramics. Therefore, it is possible to use it as a raw material to incorporate with the typical ceramics such as tiles and glazes. The advantage of using waste in ceramic body is not only useful for the waste disposal, but it also reduce the production cost of tiles and glazes as well.

The aim of this research is to study the possibility of utilize zinc waste as raw materials for producing unglazed tile and glaze for ceramic tiles. The effects of compositions on properties of unglazed tile and glaze were also considered. Since Fe_2O_3 is important source of tan, red-brown and brown colors in glaze and bodies [6]. The effect of Fe_2O_3 on color of unglazed tile and glaze was also studied in this research.

1.2 The objectives of this research are;

1. To study the properties of hydrometallurgical zinc waste and possibility to use this waste in the production of unglazed tiles and glazes for ceramic tile.
2. To study the properties of the ceramic tiles and glazes.
3. To study the effect of compositions on properties of tiles and glazes.