

## CHAPTER I

### INTRODUCTION

In Thailand, there are many sources of sand as we know that koh-samed is the famous place in Thailand for tourism. The interesting thing of koh-samed is nearly-perfect ecosystem. Koh-samed's sand is very interesting because its structure is calcium carbonate sand which is different from others. Normally, sand's structure is mainly contained with silica while koh-samed's sand is different (Soontaree, 1997).

Koh-samed's sand was chosen for this project as a raw material in preparation of hybrid composite material. Koh-samed's sand is a raw material which is abundant natural resource. Its particle is a grain, then the pulverize process, which is wasting time and costing too much, is not necessary. Lastly, since koh-samed's sand mainly contains with calcium carbonate, then it's a good choice to bring this sand to form a hybrid porous material; which has high surface area with highly porous, lightweight, hydrophilicity and good mechanical properties (Bai *et al.*, 2010).

In this project, the preparation of hybrid composite of Koh-samed's sand increases value of originally sand. Moreover it is the way to use a new natural resource for future. The preparation calcium carbonate is combined with poly vinyl alcohol (PVA) by process. Then, final product which is  $\text{CaCO}_3$ -PVA hybrid composite will be studied on its porous properties and mainly focused on their physical property which is porous structure, light weight and high strength and its application as a heavy metal detector. Morphology and physical properties of calcium carbonate ( $\text{CaCO}_3$ ) based aerogel are, thus, focused.

The purpose of this work is the preparation of the hybrid composite material by using  $\text{CaCO}_3$  as a filler, PVA as a binder and boric acid as a crosslink agent. Dimethylglyoxime (DMG) was added as a supplement to form complex with nickel. Finally, its properties will be used as heavy metal (Nickel) detector. These proposed

DMG and  $\text{CaCO}_3$ -PVA hybrid composite material could be used as naked-eye sensor for nickel in waste water from batteries or nickel alloy manufactures.