CHAPTER I
INTRODUCTION

Water pollution becomes a major concern in many countries including Thailand. The petroleum and petrochemical industries are identified to be a significant source of water pollutants which are organic and inorganic compounds such as aromatics and their derivatives in both soluble and insoluble forms. It has been known that small amounts of them are harmful to human's health. Therefore, it is imperative to treat wastewater to meet the effluent standards.

Ethylbenzene is a colorless organic liquid with sweet taste and gasoline-like odor. The major use over 99 percent of ethylbenzene is to produce styrene. Moreover, it is also found in a number of products including gasoline and paints. It is also found in industrial discharge. From the EPA list of organic priority pollutants, only 0.7 parts per million (ppm) of ethylbenzene has potentially to damage the human's health. It can damage liver, kidneys, central nervous system and eyes. Hence, it is necessary to remove ethylbenzene from wastewater before discharged them into public water or reuse in industrial processes. Therefore, a cheap and high efficiency separation method is needed to solve this problem.

Froth flotation is one of interesting separation methods, which is a surfactant-based separation method. It is very interesting to point out that it requires relatively low energy as well as a simple operation. It has been also widely used in mineral processing. In addition, it is now being developed to solve environmental problems and it has been recently applied for wastewater treatment such as the removal of dispersed oil from oily wastewater (Phoochinda,1997).

In 1998, Pondstabodee studied the removal of ortho-dichlorobenzene (ODCB) by using froth flotation under microemulsion conditions. It was found that the highest performance of froth flotation corresponded to middle phase microemulsion (Winsor's type III microemulsion). Rajanarojanatam (1995) and Phoochinda (1999) showed the similar result that the maximum of ODCB removal occurred when middle phase microemulsion was formed. From the pervious works, it can be concluded that the formation of microemulsion can enhance the froth flotation efficiency. Since microemulsion has special characteristics such as ultra-

low interfacial tension, relatively large interfacial area and ultra-high solubilization capacity for both water –soluble and oil-soluble compounds as compared to other colloidal systems. It is believed that the ultra-low interfacial tension relates to higher froth flotation efficiency. In the present work, the formation of ethylbenzene, water and surfactant in form of microemulsion was investigated in order to understand the relationship between phase diagram of ethylbenzene and froth flotation. In this work, ethylbenzene was selected as a light oil contaminant, which was different from the previous work (heavy oil contaminant). In addition, the formation of stable bubble-particle aggregate is required for the effective flotation process. It means that the surfactants, which are selected, should be considered not only in terms of the formation of middle phase microemulsion, but also their foam stability.