CHAPTER I
INTRODUCTION

Adsorption of surfactants at the solid-aqueous solution interface has been extensively studied to understand interactions between the surfactants and the solid surface since surfactant adsorption can play a critical role in many important industrial applications of surfactants such as wetting, adhesion, flotation, dispersion stability, detergency, and thin-film formation (Harwell and Scamehorn, 1993).

One of many substantial surfactant-based separation technologies, flotation or froth flotation is today considered one of the most efficient method for removing solid particles from suspensions such as ore pulps, algae, clays, and colloid precipitates. The principal area of flotation application is still in the mining industry. However, because a large amount of paper consumption and the use of recycled waste paper have numerous environmental and operating benefits, so the basic knowledge of flotation has been transferred and developed to the paper recycling process.

In flotation deinking process, generally fatty acid such as oleic acid is used as surfactant and also combined with calcium acting as an activator. The advantage of flotation process for removing ink particles from paper fiber is that it is more effective in the removal of large particles or aggregates of particles, however the flotation mechanism is not at all well understood in most of these applications. In each case there must be a driving force, which causes the particles floating from the solution and adhering to the surface of air bubbles of air rising through the liquid column (Scamehorn and Harwell, 1988). Though, from the extensively studied ore flotation process, numerous experiments demonstrate that there is a very strong correlation between

flotation efficiency and the extent of equilibrium surfactant adsorption on the particles to be floated, but the flotation itself occurs far from equilibrium, and involves imposition of the third interface, the solid-gas interface. The understanding of the mechanisms that result in surfactant adsorption at aqueous- solid interface is then important in applying flotation process.

The aim of this thesis is to investigate the flotation mechanism by concentrating on adsorption of surfactant and co-adsorption of calcium on model ink, carbon black, instead of real ink, which may consist of a complex mixture of various pigments and binders, and also attempt to correlate the electrokinetic behavior of surface samples with their adsorption behavior.