

CHAPTER I

INTRODUCTION

The adsorption of surfactant on a solid surface has potential in various applications, including separation, admicellar catalysis and admicellar polymerization. The adsorbed aggregates have been termed admicelles to indicate their similarities to bulk micelle. These bilayer structures are arranged with the headgroup of the top layer oriented toward the solution. The tail groups form a hydrophobic core, and the tail-tail interactions are believed to be similar to those found in micelles. Key factors governing the adsorption behavior of surfactants on charged surfaces are (i) interaction of the ionic head group of the surfactant with oppositely charged sites on the solid surface; (ii) interaction of hydrophobic chains with the surface; and (iii) lateral interactions within adsorbed layers. The ability to solubilize water-insoluble components in admicelles has been termed adsolubilization. It has been found that both surfactant adsorption and adsolubilization are strongly affected by structure and type of surfactants forming admicelles on the solid surface, pH, and ionic strength.

In this field of research, many works have studied a single surfactant adsorbed on solid-liquid interface. Adsorption of surfactant mixture of different types onto solid surface has gained increasing interest since the adsorption of one surfactant is often enhanced by addition of a small amount of the other surfactant. Mixed surfactant systems give various advantages over single surfactant system due to lower quantities of surfactants are needed to achieve the same effect or performance for the mixture with synergism than without synergism.

The main purpose of this work was to investigate the adsorption of surfactant and the adsolubilization of different organic solutes using surfactant mixtures of a cationic surfactant, cetyltrimethylammonium bromide (CTAB), and a nonionic surfactant, Triton X-100 on precipitated silica under fixed condition of pH and temperature. In the first part, the adsorption of single surfactant and mixed cationic-nonionic surfactants at various ratios on precipitated silica were studied. In the second part, the adsolubilization of two organic solutes with different polarities,

toluene and acetophenone, were examined in both single-solute and mixed-solute systems.