CHAPTER I
INTRODUCTION

The adsorption of surfactants at the solid/liquid interfaces, especially mixed surfactants systems are widely employed in several applications such as detergency, printing, and textile. This is because the mixtures of two or more different types of surfactants often show a synergistic interaction and they also have higher performance than a single surfactant (Ogino *et al.*, 1992, and Rosen, 2004). For surfactant adsorption on low-energy solid surfaces, the presence of the nonionic surfactant in the mixtures of ionic and nonionic surfactants reduces the electrostatic repulsion between the ionic headgroups which leads to the improvement of surfactant adsorption (Desai *et al.*, 1996, Somasundaran *et al.*, 1996, and Esumi *et al.*, 1991). Moreover, the wettability of mixed surfactant solutions is also better than any individual surfactant solution (Bogdanova, 2003, and Soboleva, 2004). Hence, the adsorption of mixed ionic/nonionic surfactants on hydrophobic surfaces and its relation to wetting phenomena are of interest and were investigated in this study.

The goal of this work was to study the correlation between surfactant adsorption and the wettability of mixed surfactants solutions onto different hydrophobic surfaces. Cetylpyridinium bromide (CPB) and polyoxyethylene octyl phenyl ether ($OP(EO)_{10}$) were used as cationic and nonionic surfactants, respectively, at various molar fractions of nonionic surfactant in mixtures; 0, 0.25, 0.50, 0.75, and 1. Six plastics used for this study were polyvinylchloride (PVC), high density polyethylene (HDPE), polycarbonate (PC), polymetylmetacrylate (PMMA), polyhexamethylene adipanide (Nylon66), and acryonitrile butadiene strylene (ABS). The ability of aqueous mixed surfactant solutions to wet the plastics was investigated by measuring contact angle on the smooth plastic sheets using the sessile drop method. The critical micelle concentration was determined from the inflection in the surface tension isotherm. The effect of the polarity of hydrophobic plastics on the wettability of such solutions was also determined.