



CHAPTER I INTRODUCTION

Admicellar polymerization is a proven method of assembling ultra thin films. Ultra thin films may be used to provide specific properties to the surfaces of substrates such as gold nanorod, gold nanoparticle, iron oxide colloid, silver colloid, and titania particle. These surface-modified materials play important roles in functionally-specific surface coatings, catalysis, micro-extraction, and semiconductors. To date, only organic films have been formed through the admicellar polymerization technique, such as polystyrene, polypyrrole, polyacrylonitrile, and polytetrafluoroethylene. The substrates which have been used for ultra thin film formation by this technique are generally hydrophilic and include glass fibers, silica, mica, silicon, and alumina.

In this study atomic force microscopy has been used to examine the admicellar polymerization of tetra-n-butoxysilane (TBOS) adsolubilization in cetyltrimethylammonium bromide ($C_{16}TAB$) admicelles to form ultra thin silica films on freshly cleaved mica surfaces in an aqueous solution. The TBOS reaction was examined both with and without the presence of surfactant and both in aqueous conditions and in air. System variables included TBOS feed concentration and reaction time.