CHAPTER I
INTRODUCTION

The failure of an organ is a serious and costly problem in medical industry. The organ loss can be currently treated by transferring tissue from the healthy location to the injured site in the same individual (autograft) and by transplanting the tissue from one individual to another of the same species (allograft) or different species (xenograft). Moreover, artificial devices such as polymers and metal are used as a biomaterial to restore, maintain and improve tissue function.

Many biomaterials are made from biodegradable polymers such as poly(lactic acid) (PLA), poly(glycolic acid) (PGA) and poly(caprolactone) (PCL). Development of biodegradable polymer to have appropriate cellular response is important in the field of biomedical applications. PCL attracts many interests because of its lack of toxicity, low cost, biocompatibility and biodegradability. However, PCL has a drawback of high hydrophobicity which is not suitable for cell supporting application. One way to enhance hydrophilicity and cytocompatibility of PCL is to immobilize the PCL surface with protein. It has been shown that immobilizing protein such as collagen, fibrinogen, gelatin and chitosan on surface of polymers can improve cell adhesion and proliferation better than the neat polymers.

The properties of biomaterial surface such as topography, crystallinity and hydrophobicity have the effect on cell behavior. One of the reasons behind these phenomena could be due to different amount of protein adsorbed. The aim of this work is to study the influence of surface topography and crystallinity of poly(caprolactone) on the protein adsorption.

The crystallinity of PCL film prepared from solvent casting technique can be altered by controlling the annealing time. Different surface topology of the film is done by changing the solvent system of different solubility parameters, resulted in phase separation. Surface of PCL film is modified via aminolysis in order to introduce amino group. Biomolecules are then immobilized onto the aminolyzed PCL. The amount of immobilized biomolecules on the substrate of different crystallinity and topology is determined.