CHAPTER V

CONCLUSIONS AND SUGGESTION

Ultrathin polymer films can be prepared by an alternate adsorption between anionic PSS and cationic CHI on the amine-functionalized substrate (Si-NH_2) at pH 4. The thickness of the assembled film progressively increased as the number of deposition increased. Ionic strength had a pronounced effect on the thickness of supported films. XPS data confirmed that the assembly process was successful and the signal from the substrate was completely attenuated when the deposited film was sufficiently thick. As analyzed by ATR-IR, the multilayer film can also be assembled on treated PET substrate whose surface carried hydroxyl and carboxylic acid groups. It was demonstrated that ATR-IR was capable of qualitatively monitoring the assembly process. The stratified character of multilayer films was verified by water contact angle and zeta–potential data. This evidence also implied that each individual layer is so thick that surface properties depended upon the last layer deposited. As far as this multilayer system is concerned, an alternate blood compatibility did not proceed throughout the assembly process. Besides the surface charges, the surface topography (considering both R_a and R_z values), individual and overall thicknesses of multilayer films had to be taken into consideration. The blood compatibility appeared to be quite complicated event and not simply predicted by either the result of protein adsorption and platelet adhesion.

Sulfonated derivatives of chitosan have been recognized as reasonably blood-compatible materials due to their negatively charged nature. Our future work will involve the multilayer formation by alternate adsorption between sulfonated chitosan and chitosan. Should the resulting film have desirable characteristics, this chitosan-based material may serve as another potential material for biomedical applications. Also, deposition of multilayer thin film on polymer substrate is another interesting method of improving surface properties without affecting bulk mechanical properties of polymer substrate. As can be seen from this research, an alternate biocompatibility does not require a large number of deposition, nor a large amount of material. This

versatile method is then suitable from practical standpoint. It can be applied to a number of polymer substrates that are able to adsorb polyelectrolyte either by hydrogen bonding or electrostatic interactions.