CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Well defined and predetermined molecular mass PFMA-PMMA copolymers were synthesized by the atom transfer radical polymerization (ATRP) technique. 5% of copolymer solutions were cast onto the 1 mm thick PMMA sheet substrates. The effects of monomers ratios on tribological properties were investigated. The major conclusions are:

5.1 The total surface energy γ_{total} decreases monotonically with % FMA mole ratio and the main contribution comes from γ_{LW} the dispersive surface energy.

5.2 With increasing FMA content from 0.0-0.5% FMA, the friction coefficient decreases slightly and then abruptly decreases; this is due to the decrease in surface tension. Between 0.5-20 % FMA, the friction coefficient increases. This behavior is probably the result of a lowering in hardness, which overcomes the effect of the surface tension.

5.3 The delamination wear mechanisms proposed can be explained by the relationships between stress energy dissipation, plastic deformation, cohesion failure, and adhesion failure.

5.2 Recommendations

5.2.1 The relationships between microstructure and triboloical properties should be further investigated. Surface morphology, friction coefficient, (Feldman, 1998), dynamic viscoelastic behavior at the outermost surface (Kajiyama, 1994) can be investigated by using the atomic force microscopy. Functional groups at the surface or surface compositions can be determined by using external reflection fourier transform infrared(ER-FTIR) (Kang, 1998).

5.2.2 Blending of PFMA-co-PMMA and commercial grade PMMA commercial grade and studying scratch mechanism by using a diamond probe.

5.2.3 Other physical properties of PFMA-co-PMMA, for example; hardness and glass transition temperature of thin film (Crystal, 2000), (Xie,2002), which may affect the tribological properties, should also be measured.